

BEFORE THE INDUSTRIAL ACCIDENT COMMISSION oil tester
OF THE STATE OF CALIFORNIA
CLAIM NO. 51339

[REDACTED] at Avon, California, by the Associated Oil

Applicant.

2. The employer on said date was self insured under the
vs.

ASSOCIATED OIL COMPANY, TRANSCRIPT OF TESTIMONY.

3. No compensation indemnity has been paid to applicant.

Defendant.

present claim of an industrial injury.

4. Applicant was born September 19, 1899.

Testimony taken in the above-entitled case before the

Industrial Accident Commission, at San Francisco, California, on

the 2nd day of September, 1936, was ordered transcribed on

January 31, 1938.

PRESENT: A. I. TOWNSEND, Referee.

H. Drew, Reporter.

Applicant present and represented by Frank J. Comaich,

Attorney at Law.

Attorney for defendant: Wm. F. Kiessig.

pleads that the present claim is barred by section 11 of the

WITNESSES

Michael Telepnev, nature and extent of medical treatment,

Louis Middleman, defendant to applicant, Mr. Kiessig raises the

Robert Stewart Peers, M.D., the Workmen's Compensation Act,

George S. Johnson, M.D., furnished to applicant.

Robert A. Kehoe, M.D.

J. F. Peattie, M.D.

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The parties stipulate, as follows; being first duly sworn

1. [REDACTED] was employed as an oil tester on December 14, 1935, at Avon, California, by the Associated Oil Company. State your name for the record, please.

2. The employer on said date was self insured under the provisions of the Workmen's Compensation Act.

3. No compensation indemnity has been paid to applicant on account of his claim of an industrial injury.

4. Applicant was born September 19, 1889.

5. The wages at the time of injury were \$132.00 a month.

ISSUES: Associated Oil Company?

1. Whether or not said Michael P. Telepnev sustained an injury arising out of and occurring in the course of his employment with the Associated Oil Company on or about December 14, 1935.

2. If so, nature and extent of disability resulting therefrom. How long were you engaged as a laborer?

3. The defendant, Associated Oil Company, affirmatively pleads that the present claim is barred by Section 11 of the Workmen's Compensation Act. Associated Oil Company?

4. As to the nature and extent of medical treatment furnished by the defendant to applicant, Mr. Kiessig raises the question whether, pursuant to the Workmen's Compensation Act, medical treatment has been furnished to applicant.

MR. KIESSIG: I do not know what the purpose is; if you want his employment record, I will furnish it to the commission.

MR. COMAICH: I will get to it.

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on records...
I. [REDACTED] [REDACTED] was ordered as an off record
[REDACTED] [REDACTED] [REDACTED] [REDACTED]

REFEREE [REDACTED]

EXHIBIT MICHAEL P. TELEPNEV

1 [REDACTED], applicant, being first duly sworn
2 by the Referee, testified, as follows: working in the main room.
3 REFEREE: [REDACTED] I object to that answer. The answer to the
4 Q State your name for the record, please, [REDACTED].
5 ANSWER: [REDACTED] the question and try to make your
6 Q You are the applicant in this matter?
7 A. Yes.
8 REFEREE: Will you examine, please, Mr. Comaich? as laboratory?
9 MR. COMAICH: as the first man too. Mr. Kiessig? supervisor of
10 Q Now, Mr. [REDACTED] when were you first employed by the
11 Associated Oil Company? when it first came on the market.
12 MR. KIESSIG: I can give you that.
13 MR. COMAICH: I am merely asking that as an opening question.
14 A July 8th, 1924, I started work at the Associated Oil
15 Company as a laborer.
16 Q How long were you engaged as a laborer?
17 A Up to June 10th, 1926, ethyl gasoline, is there not?
18 Q Now, after that time, were you assigned to the laboratory
19 Now of the Associated Oil Company? other testers also there?
20 A Yes On July 10th I was sent to the laboratory to work as an
21 oil tester, testing ethyl gasoline?
22 Q Of what year?
23 A 1926. after you were appointed to that position?
24 MR. KIESSIG: I do not know what the purpose is; if you want his
25 employment record, I will furnish it to the Commission.
26 MR. COMAICH: I will get to it. ethyl gasoline?

1 A Well, if there has been sufficient intoxication from lead
2 that is, if lead has been present in the system in suf-
3 ficient quantities that it has produced definite degenera-
4 tive changes. Nerve tissue itself regenerates slowly,
5 if at all, and it is possible that, under those circum-
6 stances, the residual defects might persist after the dis-
7 appearance of the lead. However, it would not be pro-
8 gressive, something which we considered in Mr. Telepnev's
9 case, that is, just as we consider any disease, contribu-
10 tory causes, and we found not the evidence thereof.

11 WITNESS EXCUSED.

12 Dr. Robert A. Kehoe, being called on behalf of the defendant
13 and duly sworn by the Referee, testified, as follows:

14 REFEREE:

15 Q State your name please.

16 A Dr. Robert A. Kehoe.

17 Q Where do you live?

18 A Cincinnati, Ohio.

19 Q You are a doctor of medicine?

20 A Yes, a graduate of the University of Cincinnati, 1920.

21 Q Practicing since then?

22 A Not practice, but for the most part, engaged in experimental
23 work, particularly in relation to industrial work, in which
24 I specialize also as a practicing physician.

25 MR. KIESSIG:

26 Q Dr. Kehoe, I feel we are very fortunate to have you here

1 and available to testify as an expert in matters which
2 come within your knowledge. You have heard the testimony
3 of the preceding witnesses, and I believe that you have
4 examined this case in the file and all of the findings,
5 clinical and otherwise, and are familiar with the claim of
6 Mr. Telepnev, whom you have ^{not} personally examined, is that
7 correct?
8 A Correct.
9 Q Now, Dr. Kehoe, from an examination of this file, and from
10 your knowledge of the facts as recited by the applicant and
11 by Mr. Middleman, and from the clinical findings and the
12 diagnostical conclusions of Drs. Towne and Johnson, will
13 you give us your opinion as an expert as to the possibili-
14 ties of lead exposure by the applicant and whether or not
15 his symptomatology is consonant with a true, active case
16 of lead poisoning. In other words, having first eliminated
17 the possibilities of exposure to lead poisoning, or even with
18 that possibility existent, what are the typical symptoms
19 which are present in an active true lead poisoning case;
20 and in this connection, may I ask you if you have person-
21 ally examined and had under your care or supervision or
22 examination true lead poisoning cases and if so, how many?
23 MR. COMAICH: Just a minute, please; that question is compound.
24 REFEREE: Unquestionably, it is compound; there is no question
25 about that. Mr. Kiessig is presenting it that way to ex-
26 pedite time. If you care to object, it will be sustained.

2 of the foregoing witnesses' and I believe that you have
3 come within your knowledge. You have heard the testimony
4 and statements so far as they are relevant to the matter.

RE: KIESSIG
MR. COMAICH

DR. ROBERT A. KEMOE
DR. ROBERT A. KEMOE.

1 MR. COMAICH: I presume sufficient explanation will be given
2 on each point, and Mr. Townsend so desire.
3 A In reply to the last portion of the question first, as to
4 whether or not I have seen cases of lead poisoning. I
5 have seen in all probabilities several hundred; I couldn't say
6 the exact number, cases of varying degrees of lead poisoning
7 over a period of the past ten years, during which time I
8 have been engaged in consultation work in industrial hygiene
9 and engaged specifically in experimental work and exper-
10 mental study of the general subject of lead poisoning, and
11 have, as a matter of fact, been engaged specifically in the
12 study of the toxicology public health aspects of tetra Ethyl
13 lead in relation to that gas. However, during that period
14 of time, I have had some degree of supervision of the manu-
15 facture and mixing operations, in which the concentrated
16 ethyl fluid is handled, and have been investigating and
17 reporting to the United States Public Health Service of
18 cases of complained or alleged injury on the part of public
19 garage mechanics, filling station employees engaged in con-
20 tact with lead in gasoline. To expedite matters, I would
21 like to say that the information I am going to testify to
22 with regard to lead in gasoline is all a matter of record in
23 medical literature, and is therefore available for detailed
24 study on the data as published.
25 MR. KIESSIG: At this point I will make a proffer to submit
26 reprints thereof to Counsel and to Mr. Townsend, as Referred

1 of the Commission, so that it will be available if the
 2 Commission and Mr. Townsend desire filling section
 3 A The question of lead exposure in relation to lead in
 4 this gasoline has obviously been an important public health
 5 problem, and I and my associates, engaged in the study of
 6 this problem since 1924. To abbreviate the data that
 7 this is available, the conclusions that have been arrived at by
 8 all of the agencies of investigation, including myself
 9 and my associates, in the Kettering Laboratory, in the
 10 University of Cincinnati, representatives of the United
 11 States Public Health Service, representatives of the
 12 British Ministry of Health - all those various groups,
 13 have all been essentially the same. No evidences of
 14 lead poisoning. Also been shown is that the lead in
 15 MR. KESSIG: the vaporization of lead in gasoline is constant.
 16 Q May I interrupt? Were those independently made?
 17 A Independent investigations at different periods of ten
 18 or eleven years during which this material has been on
 19 the market in the United States. This means that the vapor
 20 MR. COMAICH: If I may interrupt just a moment, don't you think
 21 we should confine ourselves to the doctor's own exper-
 22 ience in respect to his experiments?
 23 REFEREE: I think some mention of gasoline containing tetra-
 24 A The results of our observations have been as follows:
 25 That no cases of poisoning and no cases of lead absorption
 26 as a consequence of contact with gasoline containing tetra-

1 ethyl lead have been discovered. Moreover, in carefully
 2 carried out studies in which individuals, filling station
 3 employees and garage mechanics, have been introduced into
 4 this employment and followed over a period of time with con-
 5 tinuous exposure to the product, no evidences of lead absorp-
 6 tion have been found. Animal experimentation has shown two
 7 things. First, that although tetra ethyl lead itself is
 8 absorbed through the skin; when this tetra ethyl lead is
 9 sufficiently diluted in gasoline, skin absorption no longer
 10 takes place in measurable amount, so at the dilution at which
 11 tetra ethyl lead occurs in gasoline, there is now substan-
 12 tially and generally accepted evidence to the effect that
 13 lead is not absorbed through the skin, on skin contact. The
 14 other item which has also been shown is that the boiling
 15 point or the vaporizations of tetra ethyl lead as compared
 16 to ordinary commercial gasolines is so widely separated that
 17 usually forty or fifty per cent. of the total gasoline can
 18 be evaporated over until no measurable quantities of lead
 19 is to be found in the vapors. This means that the vapors
 20 given off by gasoline containing lead, from open containers,
 21 does not contain lead. The experimental work and the clin-
 22 ical experimentation, therefore, are in essential agreement
 23 to the fact that the handling of gasoline containing tetra-
 24 ethyl lead in commercial ratio does not represent an occupa-
 25 tional exposure to lead compounds and in the period in which
 26 some hundreds of thousands of men in the United States over

1 one period since 1924 have been engaged in dispensing gaso-
 2 line from filling stations and repairing automobiles, no
 3 authentic case of lead poisoning or measurable lead absorp-
 4 tion has been found. This, I believe, puts this occupa-
 5 tion outside the group of lead trades, with demonstrable
 6 lead exposure, painless, except in its onset, and in 1902
 7 Q Dr. Kehoe, what is the typical symptomatology of lead poison-
 8 ing; just tell us that? wrist drop. I personally have
 9 A Let me say first of all, that the characteristic picture
 10 in in tetra ethyl intoxication, which has been seen in the
 11 manufacturing end of this industry, has differentiated from
 12 to the gasoline distributing end. They are two totally sep-
 13 arate problems. That tetra ethyl lead poisoning, as a
 14 clinical entity, is slightly different from the customary
 15 picture of chronic lead poisoning. It does, however, have
 16 certain things in common, in that there is an acute ill-
 17 ness, acute or chronic illness, there are certain changes
 18 in the blood eventually, with the production of anemia and
 19 the appearance in the blood cells of abnormalities of shape
 20 and basophilic stippling. In the typical lead case there
 21 are a number of characteristic manifestations, of which
 22 the commonest and the earliest are these blood changes,
 23 with the development of anemia; second the development of
 24 gastro-intestinal disturbances, in which the most common
 25 and the most significant thing is a griping colic. As far
 26 as the nervous system lesions are concerned, and they do

occur in both types of poisoning. They may be cerebral with mental disturbances of a variety at times, up to the most acute, which resemble acute alcoholism, but the more characteristic, commonly of the nervous system, is peripheral paralysis. The neuritis of lead poisoning, which results in palsy, is usually painless, prompt in its onset, and in adults, it almost never involves the lower extremities, the most characteristic lesion is a wrist drop. I personally have not seen a case of pneumological foot drop in lead poisoning in my entire experience without associated lesions of the wrist, so that wrist drop is a common phenomena. That, I think, covers the more characteristic clinical picture with which, in my opinion, this case of Mr. Telepnev's is not in harmony.

Q What is the normal lead ingestion of a person? Every person takes in some lead?

A Yes, the average American, as a result of rather mixed and varied diet a quarter of a millogram of lead a day. This results in a lead intoxication on an average of .04 to .08 millograms of lead per liter of urine and in the feces daily, which is, to all intents and purposes equivalent to that taken in, namely one quarter millogram a day. This represents the normal lead metabolism and is the inevitable consequences of having eaten food that contains very minute quantities of lead.

Q Then, in a true lead poisoning case, what is the percentage?

A Well, it is difficult to describe precisely the limits of lead

WEL. V. 12212

WEL. V. 12212

Examination

1 excretion which may be associated with lead intoxication;
2 it may be high or low, but one thing one may be sure of -
3 that is an active case of lead. The level of lead excre-
4 tion and the lead content of the tissues will be measurable
5 higher than that found in normal individuals. In serious,
6 severe cases of intoxication, the levels of lead excretion
7 may be from four to ten times that seen in the normal in-
8 dividual. I think that covers it in brief.

9 Q Just to sum it up and relate it to the particular case here.
10 From the evidence you have heard, there being no indication
11 of exposure to lead in significant quantities, there being
12 no clinical findings of lead, either by Dr. Pierce or others
13 and so admitted by Dr. Harvey, would you say that this
14 presented a picture of lead poisoning or not, giving your
15 opinion as an expert?

16 A I would say that this does not correspond to me idea of a
17 clinical picture of lead poisoning. If I may explain my
18 point of view, I should say that for this reason. In a lead
19 trade, with a known exposure and with a known existence of
20 cases, one might accept the diagnosis of lead poisoning,
21 even with bizarre symptoms and clinical evidences. In an
22 occupation, however, in which there is no recorded incidence
23 of lead poisoning; in which there is no experimental or
24 clinical evidence of absorption, as a consequence of the
25 normal operation, I should have to see a typical picture of
26 lead intoxication and lead excretion before I could accept
a diagnosis of lead poisoning as a legitimate diagnosis.

MR. WINTERBURN

MR. WINTERBURN

Cross Examination

MR. COMAICH

Q If a man is exposed to the fumes of tetra ethyl for eight hours a day, he is inclined to inhale lead from the fumes?

A That depends upon the source of the fumes entirely.

Q If there are fumes from the testing of this tetra ethyl and he is standing over this testing machine, watching the thermometer, and the fumes from this machine are hitting him, or are around him all the time, he is inclined to inhale them, isn't he?

A No, I think not.

Q Doesn't it vaporize?

A It does not vaporize under the particular conditions that prevail in his circumstances.

Q What do you mean?

A I mean this. If you put in this room an open container of gasoline containing tetra ethyl lead, put it over a flame or over a hot plate, you can distill off something more than forty to fifty per cent, depending upon the quality of the gasoline.

Q Of what?

A Of the total volume of the gasoline in the vessel, before any measurable quantity of lead comes off. That is because the boiling point of tetra ethyl lead is very high and the boiling point of gasoline is relatively low.

Q What about the other fifty or sixty per cent.?

A The other fifty or sixty per cent, or whatever it may be, re-

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HOUSE & GAS? HE IS INCORPORATED TO IMPROVE LEAD FROM THE LUNGS
IT IS USED TO EXPOSED TO THE LUNGS OF PEOPLE BECAUSE FOR OTHER

CONTRIBUTION

CLOSE EXAMINATION

- maining in the beaker will have all the lead still in it.
- 1 If you then boil off the rest of that, you will boil into
2 the room the vapors of the lead along with the gasoline.
- 3 Q That's just what I want.
- 4 A Let me say this; your question requires it; under the con-
5 ditions which prevail in the distillation when condensing
6 the gasoline by means of a condenser, you collect over into
7 the receiver practically all of the gasoline with a very
8 minute loss and all of the lead is within the limits of,
9 analytically, air.
- 10 Q Then it is possible you inhale lead and that goes into the
11 system?
- 12 A Not under the circumstances you have mentioned.
- 13 Q Speaking of this other fifty or sixty per cent, you said
14 the lead would be vaporized?
- 15 A If you boil it off into the open room. That is not what
16 you do when testing.
- 17 Q I am just asking --- (interruption)
- 18 A I am not going to allow you to cloud the issue. Let me
19 just say this. I have to go further because I personally
20 am responsible for the issuance of instructions and pre-
21 cautions in relation not only to the handling of ethyl fluid
22 but to the handling of gasoline as well. I should hold
23 myself responsible, if I permitted a suspicion of danger to
24 exist.
- 25 Q Did you write an article in the American Medical Journal in
26 1925?

2 "I am not sure I am not"
3 "the room the whole of the time with the engine"
4 "It was then that all the work of the engine was done"
5 "I am not sure I am not"

1 A Yes.
2 Q You wrote an article for that journal or publication; it is
3 a matter of public record now, isn't it?
4 A I have written a number of articles.
5 Q Can you tell me --- that was in 1925?
6 A The first I believe was in 1925.
7 Q Quite a number of other doctors joined you in that essay?
8 A My associates in the investigating work.
9 Q Can you tell me about how many deaths took place by reason of
10 exposure to tetra ethyl lead from 1924 to 1925, according to
11 your experience?
12 A I would have to refer to the figures, which by the way, I
13 have. There have been, so far as my recollection goes, some
14 78 cases of adult of mild or serious tetra ethyl lead poison-
15 ing, in connection with the manufacturing operations of tetra
16 ethyl lead. I have it right here. This is a compilation
17 of a series of my own publications at our investigating lab-
18 oratory. This is a work on this particular subject which
19 have been put together for convenience. You ask me up to
20 1926?
21 Q No, 1925, if you have the record.
22 A Incidents in lead poisoning, 1925 to 1930, in the manufactur-
23 ing operations 61 cases; 1930 to 1935, four, all mild. There
24 have been two cases of accidental ingestion. There have been
25 eleven cases in connection with a type of work that is really
26 associated with the manufacturing end, the lining of tanks,

2 I BEAR WITNESS & VERIFICATION OF EMPLOYMENT
3 IN RESPECT OF EMPLOYMENT RECORDS FROM JANUARY 1940
4 FOR EMPLOYMENT ON EMPLOYMENT FOR EMPLOYMENT OF EMPLOYMENT
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1 which have rather concentrated fluid in them, and in some
2 instances, tanks that have had gasoline stored in them
3 over a long period of time. They have issued precau-
4 tions on that; so that all told, in the total industry,
5 we have the records of some 78 cases.
6 Q One more question. Mr. Telepnev would take these test
7 tubes, after testing Ethyl gasoline, or flasks, and he
8 would be required to wash them out, that is carry the flask
9 a certain distance across the floor. He is exposed to the
10 hot flask that is just opened and the fumes coming out;
11 that, of course would contain them, and he would be inhal-
12 ing that, wouldn't he?

13 MR. KIESSIG: That is assuming something not in evidence.
14 MR. COMAICH. That is his testimony. His testimony is that
15 after testing tetra ethyl he would take these tubes and
16 he would wash them out and he would be exposed to the
17 fumes at that time; that's just what we want to show here,
18 by being exposed to those fumes.

19 A You mean distillation flasks?

20 MR. KIESSIG:(Q)After emptying all fluid, after distillation is
21 completed, he takes the exhausted flasks into which he
22 first put the fluid for testing, and takes it over and
23 washes it.

24 A I don't think there would be any significant exposure by
25 inhalation of lead under those circumstances.

26 MR. COMAICH:
Q But, as I understand you, in respect to that other fifty or

2 OAKLEY JONES, DIRECTOR OF THE...
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sixty per cent., there would be an exposure; that is, what

he has referred to?

A As I understand it, you have already distilled over into the receiver, without measurable loss, contents of the flask

and you could not leave any more than traces of tetra ethyl lead there.

Q There would be traces of tetra ethyl lead in the flask?

A Traces.

Q And then, if hot, there are fumes?

A Traces.

Q And then inhaling that, it would be in the system?

A The amount under those circumstances would be absolutely insignificant.

Q Nevertheless, he is inhaling the fumes, according to his testimony?

A That is rather a hypothetical situation, don't you think?

Q Many hypothetical questions have been asked of you.

MR. KIESSIG:

Q Assume for a minute, Dr. Kehoe, he inhales whatever comes off there, in your opinion, would the amount inhaled, if he inhaled all the residue left in the flask, be a significant amount or quantity?

A No, it could not be. It is not within the limits of the experimental analysis of the material that comes over; moreover, in this instance, we do not have to assume; it is a question of whether or not lead was excreted in abnormal quantities, and it was not.

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WITNESS EXCUSED.

DR. J. F. PEATTIE, called on behalf of the applicant, under 2050 C.C.P., being first duly sworn by the Referee, testified as follows:

REFEREE:

Q State your name, please.

A J. F. Peattie.

Q You are a doctor of medicine?

A I am.

Q Receiving your medical education when and where?

A University of Illinois, 1912.

Q Do you specialize?

A I do not.

Q General practice?

A I am not in general practice.

Q What sort of practice are you in, Dr. Peattie?

A Medical Director of the Associated Oil Company.

REFEREE: Proceed, Mr. Comaich.

MR. COMAICH:

Q Dr. Peattie, the Associated Oil Company has plant doctors, that is, stationed right there on the grounds?

A There is a visiting doctor four or five days a week, yes.

Q Who is that doctor?

A Dr. Coates.

Q You also have an infirmary there, or first aid station, with a nurse in charge?

1 BEFORE THE INDUSTRIAL ACCIDENT COMMISSION OF THE STATE OF
2 CALIFORNIA - Claim No. 51339
3

4 [REDACTED]
5 Applicant

TRANSCRIPT OF TESTIMONY

6 -vs-

7 TIDE WATER ASSOCIATED OIL COMPANY,
8 successor by merger to ASSOCIATED
9 OIL COMPANY,
10 Defendants

11 Testimony taken in the above entitled matter on February
12 26, 1938, March 1st and 2nd, 1938, was ordered transcribed on
13 March 5, 1938.

14 PRESENT: Raymond G. Lindley - Referee

15 Florence H. Jones - Reporter

16 Applicant present in person

17 Attorney for applicant: C. D. Dethlefsen

18 Attorney for defendants: Daniel W. Hone

19 WITNESS

PAGE

20 Part 1	Elizabeth Chabanoff, M. D.	5 to 72 inc.
21 " "	Vera Telepnev	73 to 76 inc.
21 " "	Louis Mittelman	76 to 106 inc.
22 " "	Dr. J. F. Seattle	107 to 116 inc.
22 " "	Dr. Robert A. Kehoe	116 to 154 inc.
23 Part 2	Dr. Robert A. Kehoe	1 to 60 inc.
23 Part 3	Dr. Robert A. Kehoe	1 to 105 inc.

24 (Dictated to dictaphone on
25 March 3rd, 4th, 7th and 8th
26 FHJ)

Transcribed by EJR, GMR and AM

N 24413.01

KE 0022061

1 MR.DETHELMSEN: I will file the letter of Dr.Chabanoff of
2 February 4, 1938, citing authorities of the American
3 Medical Journal concerning which she testified at a former
4 hearing. I believe you acknowledged receipt of the same,
5 Mr. Hone.

6 MR.HONE: No copy was sent to me, and the first knowledge I had
7 of it being filed was on February 26th, Saturday, at which
8 time I telephoned to the Commission here and someone in
9 the Commission read it to me over the telephone the letter
10 referred to.

11 REFEREE: Will that be sufficient or equivalent of service?

12 MR.HONE: I raise no point that no copy has been served, and I
13 will take a copy of it in longhand from the Commission's
14 file.

15 REFEREE: Report of Dr.Chabanoff of February 4, 1938, received
16 in evidence as Applicant's Exhibit 1, February 23, 1938.
17 All right, we will go ahead.

18 MR.DETHELMSEN: I wish to make a statement. We filed this petition
19 about six months ago, and since the last hearing when you
20 informed the attorneys for the Associated Oil Company that
21 you would have one-half hour more on cross-examination
22 and at the end of the half hour you would cut off the cross
23 examination, I received a call from Mr. Burke, the secre-
24 tary of the Commission that they felt that further cross-
25 examinations of Dr.Chabanoff would be proper at this time
26

MR. DETHELTSEN:

1 in this case, and I did not say "yes" or "no", but at his
2 request I have brought Dr. Chabanoff here today, but in
3 the past six months at the various hearings and going
4 over the notes I have made in the case, I find that out
5 of every sixty minutes we have had, fifty minutes has been
6 taken up at cross-examination of our witnesses. This
7 statement is made for the purpose of saying that there
8 must be an end to all things, and I would suggest that
9 both the referee and the attorney for the Associated Oil
10 Company curb the cross-examination. We all know from our
11 experience in a case of this character when you go into
12 the realm of "isn't it possible, doctor" you can continue
13 on for six months, and I would suggest that the counsel
14 for the Associated Oil Company get right down to what he
15 wants in the way of cross-examination, rather than say
16 "isn't it possible", because a doctor can say it is
17 possible, and it would continue on forever, and I know it.
18 is the policy of this Commission to expedite hearings and
19 we have tried to expedite this one. I say this in fair
20 criticism that we can determine the thing today, and I
21 have Dr. Chabanoff here today, and I am not going to ob-
22 ject to any questions, Mr. Referee, if you want to object,
23 that is all right. Dr. Chabanoff is here and she is well
24 thought of in the profession, but I would like to have the
25 matter determined. Six months is a long period of time,
26

MR. DETHELFSEN:

1 and in checking over my notes I think it is a fair estimate
2 that fifty minutes out of sixty minutes have been on cross-
3 examination, and it is in the interest of my client to
4 have it terminated.

5 REFEREE: We hope we can expedite it as much as the nature of
6 the case will permit. All right.

7 MR. HOME: If the witness will cooperate with us, I am sure we
8 will expedite the cross-examination. I do not mean by
9 that that I want to foreclose the witness giving all the
10 explanations she might want and attempt to answer the
11 questions and explain everything.

12 MR. DETHELFSEN: The trouble is you have thought you did not re-
13 ceive the answers you wanted.

14 REFEREE: The nature of the subject is such, the questions how-
15 ever fairly and efficiently or adroitly framed often will
16 not permit of a "yes" or "no" answer, and for that reason
17 it is difficult for all the parties at least, that has been
18 my observation in the past hearings we have had, and I
19 expect we will get along this morning along these lines.
20

21 MR. HOME: The hearing will continue this afternoon as well as
22 this morning.

23 REFEREE: Yes, I suppose so. I have no other case this after-
24 noon.

25 MR. HOME: If, for any reason it could not be concluded, can we
26 go on in the morning?

REFEREE:

Yes, so far as I am concerned.

MR. HONE: But I do not think it will be necessary.

DR. ELIZABETH SHABANOFF, witness for the applicant
recalled for cross-examination:

MR. HONE:

Now, doctor and also Mr. Referee, Dr. Kehoe who has been
quoted a number of times in this case is present and will
be available as a witness.

WITNESSES: That is fine.

MR. HONE:

Dr. Shabanoff, with regard to the letter filed by you which
has been referred to today dated February 4, 1938, that
letter contains as I understand it references to which
you referred in your testimony on previous hearings?

A Yes, sir.

Q And it is true, is it not, that a substantial part of the
literature which you have read in the medical books on
this subject consisted of articles prepared and presented
by Dr. Kehoe?

A Yes. Dr. Kehoe wrote lots of articles, a great many
articles about lead poisoning.

Q And you recognize Dr. Kehoe as an authority on lead poison-
ing?

A Yes, Dr. Kehoe has done a lot of work on lead poisoning,
and I think intoxication of lead found in other things.

REFEREN:

1 It is stipulated that copies are to be filed of the entire
2 file that have been the subject of the immediate preceding
3 testimony dealing with the number of visits Mr. [REDACTED]
4 made to physicians of the defendant, from the beginning
5 of his employment in 1924 to January, 1927, and it may
6 be filed in lieu of the original for the purpose of es-
7 tablishing the number and purpose of these visits; that
8 applicant declined to file them for the purpose of es-
9 tablishing the conditions and treatment subsequent to that
10 time.

11 DR. DETHELFSEN: That is correct.

12 -----

13
14 DR. ROBERT A. KEHOE, a witness for the defendant, having
15 been duly sworn, testified as follows.

16 REFEREN:

17 Q Your name, please?

18 A Robert A. Kehoe.

19 Q And your college?

20 A College of Medicine, University of Cincinnati.

21 Q What year?

22 A 1920.

23 Q And licensed in California?

24 A No, I am not.

25 Q Licensed in Ohio?

26 A Yes.

REFERENCE:

DR. ROBERT A. KENON:

1 Q What year?

2 A 1920, but I am not sure whether I was licensed in Cali-
3 fornia.

4 Q Are you specializing in any branch of medicine or do you
5 specialize?

6 A Yes, I have been in investigating and teaching work and
7 experimental medicine, in one field or another of experi-
8 mental medicine since 1921, and since 1924 my experimental
9 and clinic work has been in the field of industrial hy-
10 giene with particular reference to metallic poisoning.

11 REFERENCE: All right, go ahead, Mr. Hone.

12 MR. HONE:

13 Q What professional position do you hold now, doctor?

14 A I am the Assistant Professor of Physiology in the Medical
15 College of the University of Cincinnati, and Director of
16 the Lettering Laboratory of Applied Physiology in the
17 University of Cincinnati.
18

19 Q And what previous positions, if any, have you held at
20 hospitals?

21 A Well, I was the Resident Pathologist at the Cincinnati
22 General Hospital for the year 1920 and 1921, and Pathologist
23 at the Jewish Hospital in Cincinnati some time in 1921 until
24 1924, and I have been either assistant or assistant pro-
25 fessor of Physiology in the Medical School of the University
26 of Cincinnati since 1921.

MR. HONE:

DR. ROBERT A. KEHOE:

1 Q Have you any special experience or capacity with relation
2 to tetraethyl gasoline?

3 A Well, I or my associates conduct a large proportion of all
4 experimental and clinical work associated with public
5 health and industrial health studies of that problem, and
6 also I have been in an advisory capacity with relation to
7 the manufacture of tetraethyl lead, and the use and dis-
8 tribution of tetraethyl lead gasoline.

9 Q And in connection with these studies have you had very
10 much connection with the Public Health Service of the
11 United States?

12 30. A I have no professional connection with the United States
13 Public Health Service, only a friendly professional re-
14 lationship, but I have, however, a relation with the
15 Ethyl Gasoline Corporation in which I have been the
16 Chief Medical Advisor since the formation of the company
17 in 1925.

18 Q Have you specialized in industrial hygiene for the past
19 several years?

20 A Yes, actually since the founding of the Kittering Labora-
21 tory in 1931. My professional and clinical work has been
22 confined to working in industrial hygiene.

23 Q And in connection with any particular branch of it?

24 A My work has been almost entirely with metallic poisoning,
25 and especially lead poisoning.
26

MR. HOPE:

DR. ROBERT A. HEMME:

1 Q are you a member of various scientific associations re-
2 lated to this field?

3 A Yes, I am a fellow of the American Medical Association;
4 a fellow in the American Public Health Association and
5 Chairman of its committee on lead poisoning, and a number
6 of other Scientific Medical Associations.

7 Have you written a number of medical articles on the
8 subject of lead poisoning?

9 A Yes, I have published a series of articles on the subject
10 of lead poisoning, and specifically also on the subject
11 of poisoning from tetraethyl lead and lead absorption and
12 lead excretion over a period since 1925, in general
13 scientific journals.

14 Q And it was from these publications of yours that medical
15 references were given by Dr. Chabanoff in this morning's
16 testimony, is that correct?

17 A Yes, it constitutes almost all of the references given by
18 Dr. Chabanoff. I might say that I and my associates have
19 had some part in practically all experimental work that
20 was being done in that field with the exception of those
21 done by the Government of the United States and the
22 British Ministry of Health and other governmental agencies
23 with which I have no special connection.

24 You are personally familiar with the entire record in
25 this Telepnev case, are you not, or you have read the
26

DR. MOORE:

DR. ROBERT A. BROWN:

1 medical reports and laboratory reports and all of the
2 testimony, and have heard this morning's testimony, which
3 other testimony includes testimony in the case of Michael
4 Telepnev and today in this present case, you have read all
5 of that?
6

7 A Yes, I have gone carefully over the entire record.

8 Based upon your knowledge of this case and your general
9 knowledge of lead poisoning and particularly of tetraethyl
10 lead poisoning, have you reached a conclusion as to whether
11 or not Michael Telepnev suffered from lead poisoning in
12 this case and died as a result thereof?

13 A I have reached such a conclusion.

14 Q And what is your conclusion?

15 A My conclusion is that he did not have lead poisoning, and
16 it is my opinion that he did not die of lead poisoning.

17 Q Will you state the basis for that opinion?

18 A Well, that involves a rather long discussion, I am afraid.

19 Q Will you proceed, doctor?

20 A Yes. The diagnosis of lead poisoning as I would approach
21 it in this or any other case is based first on a history
22 of significant exposure to lead; second, on the presence
23 of a group of symptoms and physical signs, which when com-
24 bined together present the characteristic picture of lead
25 intoxication and upon certain laboratory evidences if
26

MR. HOWE:

DR. ROBERT A. KETION:

1 such are available as to the extent to which the exposure
2 presumed to have been present was in effect a significant
3 exposure. I would like to take each of these phases and
4 analyze, so far as I can see its relation to this particular
5 problem. The occupational lead exposure of Mr. Telepnev
6 is one which I cannot regard as in any way significant for
7 the following reasons: Experimental and clinical observation
8 in a large group of men who have been occupied with the
9 same type of work have failed to show any evidence that
10 there is any unavoidable or actual lead exposure associated
11 with the work. That is to say there is some thousands
12 of men who have been engaged over a period of years in
13 this type of work, and we have studied a relative group
14 of these men with the idea of determining whether or
15 not their occupation does involve lead exposure. These
16 observations have been based upon clinical study of men,
17 and also the study of their lead excretion at different
18 times over periods of years. This type of observation has
19 failed to show any evidence in the form of a heightened
20 lead excretion, that the occupation involves actual
21 measurable exposure to lead compounds. Moreover, so far as
22 my knowledge goes, I know of no case of lead poisoning,
23 acute or chronic, which has occurred amongst men engaged in
24 this occupation during the entire period of time since
25 1924. It is therefore an occupation which has no known
26

1 or recorded instances of lead poisoning, and it cannot be
2 regarded therefore as a hazardous occupation, in the sense
3 of a known record of having produced cases of lead poison-
4 ing.

5 The second phase of the matter is the question of
6 the signs and symptoms presented by Mr. [REDACTED] during
7 his illness. The general picture presented by his illness
8 is one, which in my mind is typical either in its onset,
9 its clinical picture, in its progress or in its final
10 termination characteristic or even more than mildly sug-
11 gestive of lead intoxication. By that I do not mean to
12 say there are any bizaare and atypical cases of lead
13 poisoning, but this case could not be regarded as typical o
14 lead poisoning in the sense that the symptoms and signs in
15 and of themselves justify a diagnosis of lead poisoning in
16 the absence of non-significant lead exposure. In the ab-
17 sence of such lead exposure of of a history of lead ex-
18 posure, and in the absence of a typical clinical picture of
19 lead intoxication, one would require laboratory evidence of
20 unqualified accuracy and significance in order to justify
21 the diagnosis. I mean, by this to say, that an occupation
22 without any recorded instance of lead poisoning cannot be
23 regarded as in itself likely to produce lead poisoning, an
24 one would therefore have to have unasailable evidence in
25 the form of further laboratory findings in order to confor
26

MR. HOWE:

DR. ROBERT A. KENON:

1 to the clinical diagnosis. In this case in my opinion the
2 laboratory evidence obtained during the patient's illness
3 does not permit a doubt, the failure to find significant
4 and abnormal quantities of lead in the excreta of the man
5 during his lifetime and during the height of his illness,
6 and can only be explained, I believe, either by the tests
7 themselves having been inaccurate and uncertain or that no
8 abnormal quantity of lead was being excreted by the man,
9 which in my belief and experience means that there were no
10 abnormal quantities of lead in his tissues. To return to
11 the clinical symptoms I should require in order to make
12 a diagnosis in the absence of a history, and in the absence
13 of adequate laboratory evidence, I should require an ab-
14 solute clinical picture, yet in a nervous case for example
15 the characteristic type of nervous system damage, which is
16 either a paralysis involving the arm, producing wrist drop,
17 with an involvement of the muscles specifically supplied by
18 the muscular spiro nerve, or I should require a character-
19 istic encephalitis, an involvement of the brain. These in
20 my opinion should be associated with blood changes, and
21 particularly evidence of stippling of the erythrocytes in
22 order to be confirmed. That is all I need to say on that.
23 Q Doctor, there is a difference is there not, between lead,
24 tetraethyl lead and gasoline containing tetraethyl lead?
25
26

DR. HONE:

DR. ROBERT A. KEEHOE:

1 A Yes, there is a wide difference between tetraethyl lead
2 itself and gasoline containing tetraethyl lead.

3 Q and will you explain that difference?

4 A Tetraethyl lead is a single chemical compound with a
5 consistent set of physical properties. It is a white
6 oily liquid of very heavy specific gravity and with a low
7 volatility. The specific gravity is about 1.65, and the
8 boiling point is about 200 centigram, which I believe is
9 about 330 Fahrenheit. This material is a poisonous sub-
10 stance which is absorbed through the skin and it gives
11 off enough vapor so that its vapor can produce acute
12 poisoning, and poisoning therefore can occur as a conse-
13 quence of skin absorbtions, inhalations or a combination
14 of both of these methods of exposure. The type of poison-
15 ing which occurs, or which has been seen and described is
16 that of an acute fulminating central nervous system in-
17 toxication which more than anything else resembles al-
18 cohohism. Such cases of poisoning have been seen in manu-
19 facturing operations which require the handling of the
20 concentrated product under conditions that did not properly
21 prevent exposure. Gasoline containing tetraethyl lead has
22 on the other hand the essential properties of any ordinary
23 gasoline. Its boiling point is not materially changed from
24 that of gasoline. Its behavior is in no wise measurably
25 different from that of gasoline, and its toxic properties
26

DR. HOPE:

DR. ROBERT . KIRK:

1 have not been found to be measurably increased above that
2 of ordinary gasoline, that is in this dilution, above that
3 of ordinary gasoline. Thus, in this dilution in gasoline in
4 which tetraethyl lead occurs commercially, it is found that
5 absorption through the skin of the product is prevented to
6 such an extent that there is no possible absorption through
7 the skin. This has been studied in the case of experimental
8 animals and has been fully confirmed in the case of human
9 beings, so that in my opinion on the available evidence
10 it must be accepted that tetraethyl lead is not absorbed
11 through the skin out of the gasoline in which such lead
12 occurs in the commercial concentration. Likewise, the
13 boiling point of gasoline and the boiling point of tetra-
14 ethyl lead are so far apart that no measurable quantity of
15 lead is given off in the vapors of gasoline as they are
16 allowed to escape from open containers. In fact, from 40 to
17 50 per cent of gasoline can be boiled off before signifi-
18 cant and measurable quantity of lead begins to come over
19 in the distillate. Thus, in handling gasoline in open
20 containers as long as they are incompletely evaporated
21 involves no measurable exposure to the gasoline. It is
22 these properties of the gasoline as differentiated from
23 tetraethyl lead that constitute the safety factors in the
24 use and distribution of leaded gasoline, and it is believed
25 that the handling of gasoline containing lead in the com-
26

DR. HONE:

DR. ROBERT A. KEMMER:

1 mercial concentration is quite without danger from the
2 point of view of the development of lead poisoning in
3 persons engaged in occupations in which such gasoline has
4 to be handled. This opinion arising from experimental ob-
5 servation has in my opinion been amply confirmed by the
6 experience of the past thirteen years, during which no cases
7 of lead poisoning have been seen, either by me or reported
8 in medical literature as arising from the use and distri-
9 bution or handling of gasoline containing tetraethyl lead.
10 So far as workers in the fields and public health officials
11 are concerned, the occupations involved in handling leaded
12 gasoline are quite without any instance of lead poisoning
13 amongst the workers, and are from the point of view, or
14 lack of proof regarded as non-hazardous occupations from the
15 point of view of lead exposure. It is this point of view
16 which justifies the United States Public Health Service
17 in permitting and continuing distribution and use of leaded
18 gasoline as a commercial product. That I have said with
19 relation to the handling of gasoline in filling stations,
20 garages, refineries and so forth is equally true in the
21 laboratory handling of the gasoline, and sharply differenti-
22 ated from the handling of tetraethyl lead as a concentrated
23 product in any way, either around laboratories, manufacture,
24 distribution and mixing operations in which tetraethyl is
25 mixed with gasoline.
26

MR. HONE:

DR. ROBERT A. ZENKOW:

1 Q Do I understand that your statement is that gasolines con-
2 taining tetraethyl lead have been established as a safe and
3 non-poisonous product, a non-hazardous product, not only
4 in the field, but also in the filling stations and garages,
5 in refineries and in laboratories which handle gasoline?

6 A In this phlegmatic sense that up to the present time after
7 thirteen years of the use and distribution of this product,
8 no scientific evidence in the experimental laboratories
9 and no occurrence of cases in the field on use and distri-
10 bution of the product has ever been known to have indi-
11 cated the dangers of lead poisoning as the result of con-
12 tact exposure. There is no case on record and from my
13 personal experience I have known of no cases in which there
14 was subjective evidence of either the absorption of lead
15 or the appearance of a case of lead poisoning.

16 Q So that doctor, based upon your own experience of thirteen
17 years and examination of all the available literature that
18 so far as the danger of lead poisoning is concerned, there
19 is no evidence that gasoline containing tetraethyl lead is
20 any different from gasoline containing no tetraethyl lead
21 whatsoever?

22 A There is no evidence from my knowledge and experience that
23 the dangers of lead poisoning are greater in relation to
24 lead and gasoline than its relation to ordinary gasoline,
25 that is my opinion expressed here and also in medical liter-
26 ature.

MR. HONE:

DR. ROBERT A. KEMMER:

1 Q Are any instructions issued at this time that you know of
2 to the effect, that persons handling gasoline containing
3 tetraethyl lead should exercise care in such handling, and
4 should wash their hands after handling the same?

5 A In laboratories, no. There is however a sign displayed
6 on every pump and every container through which this
7 product is distributed, pointing out the fact that it con-
8 tains tetraethyl lead and asking that its use be limited
9 for the purpose for which it is intended, namely, as motor
10 fuel. Those signs are present as the result of a gentle-
11 man's agreement between the Ethyl Gasoline Corporation and
12 the United States Public Health Service, without legal
13 compulsion that motorists must and should be informed if
14 and when, they are purchasing gasoline containing lead.

15 Q Originally instructions were issued back in 1926, that
16 such signs be placed in testing laboratories such as the
17 one in this case, isn't that true?

18 A Would you state that over again?

19 Q Tetraethyl gasoline was brought to the Pacific Coast the
20 first time about November, 1926?

21 A I believe so, and at that time and for some short time
22 thereafter it was the practice to recommend signs of that
23 general nature be placed in laboratories similar to the
24 testing laboratory in this case?

25 A Yes, I think it was fairly general practice in 1926 and
26

MR. HONE:

DR. ROBERT A. HEMOE:

1927, probably as late as 1928.

Q And that practice was thereafter discontinued?

A In general it has been discontinued, yes.

Q And the reason for that is because the increased information that has been developed since that time would indicate that there was no further reason for handling tetraethyl gasoline in laboratories any different than from handling ordinary gasoline not containing lead?

A I believe the real reason for it lies in the fact that on or about 1928, 1927, or 1928, I discontinued in our regulations any mention of handling leaded gasoline in laboratories on the basis of our experimental work, and our experience that such regulations were unnecessary, but for some time afterwards some of the oil distributing companies continued to use such signs, but in the main they disappeared through the laboratories at about that time.

Q Assuming, doctor, that the evidence in this case showed that during the time Mr. Telepnev was handling leaded gasoline for the Associated Oil Company, he spilled substantial quantities of such leaded gasoline on his hands, what, if any bearing, would that have on your opinion as to whether as a result of that experience over a long period of time, say six or eight years Mr. Telepnev absorbed any lead from that source?

MR. HONE:

DR. ROBERT A. HEROE:

1 A That fact would not lead me to believe that he has absorbed
2 any appreciable quantity of lead.

3 REFERER: I take it you limit that to absorption through the
4 skin?

5 A Absorption through the skin.

6 MR. HONE:

7 Q So as to cover any additional portion or thought which the
8 referee may have in mind, or he may not have any addition-
9 al thought, assuming the same test with substantial
10 spillage, would that fact lead you to from your experience
11 to believe that any significant amount of lead entered the
12 body, or the tissues, or circulation of Mr. Telepnev from
13 that source?

14 A No. I would not regard the normal and usual or even un-
15 usual spillage of gasoline as the basis for the belief
16 that lead had been absorbed, either through the skin or
17 by inhalation. That would be totally against my actual
18 experience and experimental observations.

19
20 Q Having in mind that if any gasoline were spilled on the
21 hands of Mr. [REDACTED] and assuming that even it was
22 spilled, and that it could be spilled, was a substantial
23 amount, having in mind that gasoline so spilled would be
24 the gasoline coming from the containers as the gasoline
25 was brought into the laboratories and prior to its being
26 heated, and that therefore it would have the room tempera-

MR. HONER:

MR. ROBERT A. HENSON:

1 ture approximately, would there be any lead vapors coming
2 from such spilled gasoline?

3 A The quantity of lead under those conditions would be so
4 small as to be of no theoretical importance. In order to
5 inhale any measurable significant quantities of lead as
6 the result of spillage of gasoline, one would have to in-
7 hale very high concentration of gasoline, and that ob-
8 viously is impossible, because one cannot endure exposure
9 to gasoline in concentration in excess of one and one-half
10 per cent in the atmosphere without drunkenness and un-
11 consciousness.

12 So that irrespective of the source of the gasoline and
13 irrespective of its temperature and irrespective of whether
14 they spilled gasoline, or vapors coming out of the open
15 containers, what is your opinion as to whether or not,
16

17 Mr. [REDACTED] inhaled any significant quantity of gasoline
18 during his work for the Associated Oil Company, any sig-
19 nificant quantity of lead or lead vapors during his em-
20 ployment with the Associated Oil Company?

21 A It is my very certain opinion that such spillage does not
22 involve significant exposure to lead, and it is also my
23 opinion that this type of occupation which involves the
24 handling of gasoline and some spillage by no stretch of
25 the imagination can be regarded as hazardous, and my ex-
26 perience of thirteen years is entirely opposed to any such

1 assumption. Moreover, the experimental work on men who
2 have been exposed under such conditions by skin contacts
3 with gasoline or inhalation of vapors over a period of
4 years has failed to show any evidence of lead absorption
5 in sufficient amounts to increase the lead excretion in
6 the urine and the feces, and it is my opinion that these
7 occupations are not in any sense of the word hazardous
8 lead trades. Otherwise, I should issue cautious and de-
9 tailed instructions for the avoidance of exposure.

10 Now, with respect to some of the literature and medical
11 references referred to by Dr. Chabanoff, is there anything
12 in any of that literature, which contains either statisti-
13 cally or otherwise, any reference to established cases of
14 lead poisoning resulting from the handling of leaded
15 gasoline?
16

17 A There is not.

348 Q Specifically with reference to the Standard Oil Company
19 and the evidence presented in this case of a large number
20 of persons affected with gasoline poisoning as the result
21 of handling tetraethyl lead, and the further reference to
22 the fact that large settlements in such cases have been
23 made, will you explain whether or not these circumstances o
24 that particular matter are familiar to you?

25 A Yes, they are.
26

MR. HONE:

MR. ROBERT A. HENRIE:

1 And I will ask you whether or not that involved the handling
2 of tetraethyl gasoline in testing laboratories or anything
3 similar thereto?

4 A It had nothing to do with conditions associated with the
5 handling of gasoline in laboratories or elsewhere.

6 Will you explain why the type of employment in which Mr.
7 Polepnev was engaged, as indicated by the evidence in this
8 case, was substantially different from the employment of
9 the persons involved in the Standard Oil Company cases
10 referred to?

11 Yes. Mr. [REDACTED] employment was in a wholly different
12 field. Mr. [REDACTED] was, I repeat, was in my opinion en-
13 gaged in an entirely non-hazardous trade in so far as the
14 dangers of lead poisoning are concerned. The men referred
15 to in the article quoted were engaged in manufacturing
16 operations associated with the manufacture of tetraethyl
17 lead during an early period of the manufacture, in which
18 the methods of control were not satisfactory and were not
19 put into effect, and this group of men were acutely poison-
20 ed and as I remember amongst the group there were five
21 deaths in the manufacturing plant. These cases occurred in
22 experimental work in a manufacturing plant in the Bay
23 Way, New Jersey refinery of the Standard Oil Company of
24 New Jersey, during a period in which they were attempting
25 to develop a new method for the manufacture of tetraethyl
26

MR. HOWE:

DR. ROBERT A. KEMMER:

1 lead. They had nothing whatsoever to do with gasoline, and
2 I repeat in my experience, my entire experience there has
3 never been a case of lead poisoning in the handling of lead
4 in any and all the ways in which it is and must be handled
5 commercially.

6 Q Will you give us a typical picture of an established case
7 of lead poisoning resulting from the handling of tetra-
8 ethyl lead and indicate in what way that picture differs
9 from, and if it be true, also in what particulars it is
10 the same as the picture presented by Mr. Telepnev's case?

11 A Poisoned with --

12 MR. DETMERS: (Interrupting:) I wonder if we could not dis-
13 continue now until 10 o'clock in the morning.

14 REFEREE: That will be fine, as long as the doctor is going to
15 be here.

16 A I can be here tomorrow but not longer.

17 REFEREE: Very well. Case continued to March 1, 1938, at 9:30
18 a.m.

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CONTINUATION OF HEARING

Part 2

March 1, 1938
(9:30 A.M.)

Pages 1 to 60 inclusive

WITNESS: Dr. Kehoe

1 Continued hearing - March 1, 1938 - 9:30 a.m.

2 MR. DETHLEFSEN: I would suggest in the interest of time here
3 that the doctor go on with his recitation of facts,
4 theories, and opinion from the beginning and then if we
5 want to clear up any point, questions can be asked. I pre-
6 sume that the matter has been gone into between Counsel and
7 the doctor and the doctor is well able to give this to us
8 in the proper order, probably save a great deal of time and
9 my cross-examination of the doctor will be very limited.

10 REFERENCE: That rests with the Counsel for the defendant as to
11 the method he desires to follow.

12 MR. HONE: Well, I will do the best I can. Will you read the
13 last question?

14 (Question read.)

15 MR. HONE: Will you answer the last question which has been
16 read to you?

17 A Yes, a typical case of tetraethyl lead poisoning. In a
18 typical case of tetraethyl lead poisoning, the onset of
19 illness is rather abrupt and bears an immediate relationship
20 to a significant exposure. In such a case, the first
21 symptoms seen are those of brain intoxication with insomnia,
22 extreme nervousness, anxiety, tremor, hyperactive reflexes,
23 extreme irritation in the sense that noise or ordinary
24 stimuli excite an exaggerated response, which is usually
one of fear. The mental symptoms are the striking part of
the picture. These in favorable cases diminish with the

1 cessation of exposure and such cases unless they proceed to
2 a fatal outcome, have been seen to recover fairly rapidly
3 and without residual symptoms and without residual injury.
4 In this type of poison, no case of paralysis has ever been
5 seen. In the manufacturing operation and under conditions
6 of exposure, recognized to be significant and hazardous in
7 fatal cases, the excitable nervous condition progresses with
8 the development of hallucinations followed by convulsions
9 ending in a state resembling strikingly acute alcoholic
10 delirium, with death from exhaustion in every instance thus
11 described and I believe within a period of 15 days from
12 the onset of symptoms. Under conditions of less severe ex-
13 posure, the symptoms are those of a central nervous system
14 irritation which subside leaving a state which sometimes re-
15 sembles that of ordinary chronic lead poisoning in that the
16 individual is fatigued, losses weight, and shows every evidence
17 of lack of energy and lack of strength. Within a period of
18 two or three months following cessation of exposure, such
19 cases have improved and have proceeded to recovery without
20 residual evidence of central nervous system injury. In this
21 period of delayed symptoms, with progressive recovery, one
22 finds blood changes to a somewhat less degree than those
23 seen in organic blood poisoning but of the same general type
24 with slight anemia and with stippling of the red blood cells
25 Chronic cases of lead poisoning as the result of prolonged
26 exposure to small doses have not been seen. That is, no

1 cases of anemia with persistent prostration and persistent
2 disability when paralysis have been seen were described.
3 This picture differs from that of ordinary chronic lead
4 poisoning in the above respects, in that in the ordinary
5 type of chronic lead poisoning, the most common symptoms
6 are those of gastro intestinal discomfort and in which in
7 the more severe and more typical cases, develop into a frank
8 colic with persistent abdominal pain. In a certain per-
9 centage of cases, a serious exposure over considerable
10 periods of time, muscular disorders and a peripheral nerve
11 irritation followed by paralysis are seen occasionally.
12 Paralysis, however, is not experienced as the result of ex-
13 posure to rather large quantities of lead distributed in the
14 atmosphere. In these stages, one always finds changes in
15 the blood with some degree of anemia and always during the
16 period of active symptoms, one finds microscopic blood
17 changes in the form of basophilic stippling. The above
18 symptoms are accompanied by loss of weight, loss of strength
19 loss of appetite, general muscular weakness and a variable
20 degree of prostration, the whole picture, clinical picture,
21 depending for its severity and its persistence on the
22 severity of exposure and the duration of exposure. In
23 general, the shorter the exposure, the greater is the
24 tendency to complete recovery and prompt recovery. Certain
25 types of injuries, particularly injury to the nervous
26 system, is likely to persist for an indefinite period of

1 time. That is to say, paralysis may recover or they may
2 remain without any considerable improvement throughout the
3 rest of the patient's life regardless of the discontinuance
4 of exposure. Now, the bearing on this clinical picture of
5 Mr. [REDACTED] case is in some measure dependent upon whether
6 one regards his initial injury as an acute type due to large
7 exposure or as to whether one regards it as an essentially
8 chronic injury due to prolonged mild exposure. As I pre-
9 viously stated, chronic cases have not been seen in the case
10 of low grade exposure to tetraethyl lead and this is not en-
11 tirely capable of being explained although it may be
12 partially explained by the fact that tetraethyl lead is ex-
13 creted from the body somewhat more rapidly than is lead ab-
14 sorbed in the form of inorganic lead, thus the dosage which
15 is capable to producing poison is somewhat larger than that
16 of ordinary compound of lead and it has been observed that
17 where the conditions of exposure to inhalation are not
18 greater than 2 milligrams per 10 centimeters of air, cases
19 of poisoning do not occur even under conditions of prolonged
20 exposure over a period of years and I refer here to the ex-
21 posure seen in the manufacturing enterprises. Now, the
22 clinical picture seen in Mr. Telepnev's case as I summarize
23 it, is that of progressive muscular weakness with the final
24 development of a paralysis in the lower extremities.
25 Inasmuch as cases of paralysis have not been seen in tetra-
26 ethyl lead exposure, this lesion must be regarded as an/in atypical lesio

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1 tetraethyl exposure. Furthermore, the common paralysis
2 in lead poisoning in any type in adults is that of paralysis
3 in the upper extremities, this being known classically as
4 wrist drop. In Mr. [REDACTED] case, there is no record that
5 stippling of the erythrocytes was found at any time.

6 REFEREE: Doctor, I must call your attention to the fact that
7 you are in error, in that a stippled cell --

8 A A stippled cell.

9 MR. HONE: Yes, the record shows that in some number of fields
10 examined, I have forgotten the number, the stippled cell
11 was found and I am sure I am reporting it accurately with
12 regard to stippling; that there was no evidence of stippling
13 with the exception of the finding of a stippled cell in a
14 number of fields.

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15 A I will qualify that by saying that there is no record that
16 a significant amount of stippling was found at any time
17 during the period of intoxication. By significant amounts,
18 I mean that stippling of the erythrocytes is not uncommon
19 and is in fact a substantial regular phenomena in the blood
20 in normal persons in numbers not greater usually than 10
21 per 50 fields.

22 MR. HONE: Ten what?

23 A Ten stippled cells per 50 fields. To be significant, there-
24 fore, stippling must be found in excess of this figure to
25 be beyond the normal range of values. One other very
26 significant thought with relation to the diagnosis has to

1 do with the progress of Mr. [REDACTED] illness. Despite
2 the cessation of exposure and despite various types of
3 treatment prescribed by physicians, Mr. [REDACTED] condi-
4 tion did not abate but progressed steadily with increasing
5 disability until death finally occurred. In lead poisoning
6 of fatal type, death does not occur as a delayed phenomena
7 but occurs promptly and during the height of the acute
8 clinical manifestations. Moreover, lead poisoning in all
9 but the most acute forms, tends to subside spontaneously
10 with the cessation of exposure and regularly progresses in
11 improvement and to recovery except where there have been
12 destructive lesions. These destructive lesions particularly
13 of the nervous system does not necessarily improve but in
14 and of themselves do not result in death; death resulting
15 in all fatal cases in my experience as a consequence of
16 involvement of the central nervous system from what is known
17 as encephalitis. In this instance, the steady progress of
18 the disease must be regarded as an important factor in the
19 exclusion of lead as the etiological basis of his illness.
20 I think that is sufficient for that.

21 REFEREE: All right, Mr. Hone.

22 MR. HONE: What, if any, specific significance attaches to an
23 interval as existed in this case of in excess of 18 months
24 from the cessation of exposure and death. Mr. [REDACTED]
2 did no further work in the refinery, in the testing laboratory
or with gasoline, on November 29, 1935, and died on July 28,

1 1937.

2 A It is precisely to that point that I referred in saying that
3 the progressive character of the disease following the
4 cessation of exposure is enough in and of itself to cast
5 grave doubt upon the diagnosis of lead poisoning. If Mr.
6 [REDACTED] illness resulted from lead absorption during his
7 occupation, it could confidently be expected that his
8 symptoms would subside and that he would improve either with
9 or without medical treatment following the cessation of ex-
10 posure. The failure so to improve strongly suggests that
11 lead in his occupation was not the factor in his illness.

12 REFUSE: Well, wouldn't you want to limit that, doctor, by
13 saying that whether or not he so quickly recovered after ex-
14 posure, depended upon the amount of damage that had been
15 done to the body by the lead previously ingested?

16 A That is a fair question. In replying to that I would say thi
17 If Mr. [REDACTED] developed a paralysis as a consequence of his
18 occupational exposure, it might be expected that the paralyti
19 would not improve and would not disappear for that is the
20 history of such lesion that results from the actual destructi
21 of tissue. However, it is not to be expected that his
22 paralysis would progress beyond that point, nor is it to be e
23 pected that his other symptoms of general intoxication would
24 gress and would result in his death, for with the cessation o
25 exposure, granted there was exposure, the toxic substances wo
26 not only be eliminated from the body progressively but would

1 also be so distributed in his body as to provide for the
2 diminution of circulating lead and therefore the diminution
3 of toxic substances. This in my experience is an inevitable
4 consequence of the cessation of lead exposure unless that
5 exposure has been of such magnitude that death results with-
6 in a short time following the cessation of exposure as the
7 result of overwhelming amounts of lead in the body.

8 Q Through what organ is the lead excreted?

9 A Lead is excreted steadily by way of the alimentary tract
10 through the agency of the liver and by way of genitourinary
11 tract through the medium of the kidneys, the rate of ex-
12 cretion being dependent on the magnitude of lead absorbed
13 in the tissues of the body.

14 Q Is or is not nephritis a concomitant symptom of lead poisoni

15 A Chronic nephritis, in my experience, is not a frequent con-
16 comitant of lead poisoning. In cases of active lead in-
17 toxication, one frequently finds albumin in the urine as an
18 expression of kidney irritation.

19 Q And what has caused that kidney damage?

20 A The irritation to the kidney substance is undoubtedly an
21 expression of high concentration ^{of lead} /in the circulating blood
22 and in the kidney itself.

23 REFEREE: I just wanted to get these points. I did not mean to
24 take over the examination.

25 MR. HONE: That is fine.

26 A ~~Chronic interstitial nephritis of the type seen at necropsy~~

1 in Mr. [REDACTED] case is believed by many people to be an
2 expression in some instances of residual effect of prolonged
3 lead intoxication with damage to the kidney. However, I
4 think it is fair to say that recent investigation and
5 clinical observations cast grave doubt upon that as the re-
6 sult of lead intoxication and suggests more strongly that
7 it is an accompaniment rather than a cause and effect re-
8 lationship. My own opinion is that chronic interstitial
9 nephritis is not frequently and not even demonstrably proven
10 in any case to be the result of prolonged lead absorption
11 in that I admit it is my opinion and not universally accepted
12 by medical experts.

13 REFEREE: Assuming one had some condition operating like a foci
14 of infection that may be working toward an interstitial
15 nephritis. That would be a cause that if continued at the
16 same rate or perhaps the amount of toxin by reason of the foci
17 of infection present was increased, damaged the kidney, then
18 if the individual in addition were secreting any amount of
19 lead, would it help the condition or make it worse?

20 A Well, hypothetically, at least.

21 REFEREE: Yes, hypothetical, that is hypothetical.

22 A Well, it would probably augment the damage. I'll say hypo-
23 thetically not to exclude the question with reference to this
24 case but rather because the medical evidence in the thing
25 is not such as would permit one to make a categorical reply
26 to that question. The presence of any poisonous substance

1 might be presumed to augment the damage already existent
2 from any other cause.

3 REFEREE: All right. That is all. Go ahead Mr. Hone.

4 MR. HONE: In your opinion, was the condition of chronic
5 interstitial nephritis found on necropsy entirely explainable
6 and completely independent of lead exposure?

7 A Oh, quite. One sees this type of kidney with chronic
8 interstitial nephritis with a small red contracted kidney
9 as an expression of chronic nephritis over a period of
10 years quite apart from lead poisoning and quite apart from
11 any known toxic agent. In other words, chronic interstitial
12 nephritis is a disease entity and a pathological picture
13 which has long been known to have no necessary association
14 with lead poisoning, being more frequently an expression
15 of chronic progressive blood vessel disease with spotty
16 damage of the kidney over a period of years. This is one of
17 the commonest pathological pictures in kidney disease.

18 MR. HONE: Is there anything unusual or extraordinary in the fact
19 that the patient involved, Mr. [REDACTED], had the symptoms
20 which are indicated by the record in this case and that
21 a number of doctors differed as to the etiology or origin
22 of them or were unable to definitely determine their
23 etiology?

24 A No, that isn't remarkable. Unfortunately there are still
25 quite a number of human ills, the cause of which is unknown
26 of which Bright's disease is a shining example. The actual

1 background of blood vessel disease and of Bright's disease
2 or chronic interstitial nephritis is not known and there-
3 fore one tends to ascribe hypothetical causes insofar as
4 these present themselves, as even vague plausible solutions.

5 Q What, therefore, doctor, is the significance, if any, with
6 the type of symptoms involved in this case that some of the
7 doctors handling the case suspected the lead?

8 A It would be a perfectly normal procedure in the case of a
9 man with a peripheral nephritis or muscular weakness to
10 inquire into the occupation and if lead was suspected as
11 a possible hazard to examine into its possible relationship
12 with the condition. This would be a normal procedure in
13 an effort to determine the causal background of the illness
14 and in any said case one would properly regard lead as a
15 possible factor in the illness.

16 Q The symptoms complained of by Mr. [REDACTED] were symptoms
17 falling into that group of things. Then I take it, doctor,
18 the diagnosis or cause of the original disease is a some-
19 what difficult thing?

20 A Yes, quite. There are a variety of nervous injuries which
21 fall into the category of atypical clinical pictures.

22 MR. HONE: The use of the word "atypical" is to denote the
23 opposite of the word "typical". I was somewhat confused.

24 A There are several nervous system pictures which are
25 sufficiently typical as to be in and of themselves susceptible
26 of diagnosis without unusual laboratory procedure. Mr.

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1 [REDACTED] illness was not of that type. It was not
2 characteristic of any known disease entity nor did it come
3 within the category of disease with an obvious and well
4 known causal agent. Therefore somewhat more than the usual
5 amount of speculation had to be indulged in in setting up the
6 possible disease entity for a diagnosis by a process of
7 exclusion.

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8 MR. HONE: What, then, in connection with this same line of
9 reasoning, doctor, would be your comment with respect to
10 the following conjecture, namely, having in mind that Mr.
11 Telepnev complained of the symptoms which are part of the
12 record, having in mind that these symptoms fall into a
13 group where it would be difficult to ascribe any particular
14 cause or origin to them, and having in mind that the
15 symptoms here suggest that there was nothing extraordinary
16 of such symptoms arising and of their being a difference
17 of opinion amongst the doctors examining him as to the
18 possible cause, and the further fact that none of the group
19 of doctors which included, I think, 28 or 30 who examined
20 him during his lifetime were able to definitely fix the
21 origin and having further in mind the employment of Mr.
22 Telepnev as outlined in the evidence in this case, and further
23 in mind that during that employment he tested gasoline in-
24 cluding gasoline containing tetraethyl lead in the manner
25 and to the extent developed by the testimony in this case,
26 and having in mind that some of the doctors who examined him

1 suspected lead and were of the opinion that the cause of
2 the symptoms might be lead poisoning, what is your reason
3 and explanation for your conclusion that Mr. [REDACTED] was
4 not suffering from lead poisoning in this case and did not
5 die as the result thereof?

6 A The first point in my conclusion that he did not die of lead
7 poisoning contracted in his occupation is that in my opinion
8 the lead exposure associated with his occupation even under
9 the worst possible conditions was not sufficient as to be
10 capable of resulting in the absorption of abnormal quantities
11 of lead. This opinion is based on extensive clinical ob-
12 servation and more importantly on extensive study of the rate
13 of blood excretion of men under conditions of exposure in
14 similar occupations, the results of which have been to convince
15 me that there is no measurable lead exposure associated with
16 work of the character performed by Mr. [REDACTED]

17 Q Were you through, doctor? Oh, excuse me.

18 A (Being continued) The next most important point, in my
19 opinion, resides in the fact that the clinical picture
20 definitely progressed over a period of one and one half year
21 after the complete cessation of occupational exposure. This
22 tends to exclude lead as a casual factor in his illness.
23 The third point resides in the fact that the actual clinical
24 picture of his illness was not one sufficiently characterist
25 of lead to be in any way diagnostic without more convincing
26 evidence wither of the significance of the exposure or of th

1 actual absorption of abnormal quantities of lead into the
2 body.

3 Q What would be your opinion with respect to the theory that
4 might be advanced on behalf of applicant in this case that
5 inasmuch as Mr. [REDACTED] is shown to have been working with
6 leaded gasoline and inasmuch as the symptoms of such have
7 led some of the doctors to suspect lead and inasmuch as
8 neither during his lifetime nor subsequent thereto was there
9 found any other cause, that therefore the conclusion should
10 be reached that his disability was due to the lead poisoning?

11 A I should consider such a conclusion illogical for two
12 reasons: The first, because the clinical picture in lead
13 poisoning is a fairly definite entity, capable of recogni-
14 tion, whereas there are numerous nervous system injuries that
15 do not lend themselves to accurate diagnosis. One would not
16 logically, therefore, choose a readily recognizable entity
17 in preference to a series of diseases of admittedly in-
18 definite etiological background.

19 Q To clarify what might be some confusion resulting from your
20 testimony, doctor, would those answers which you have given
21 imply criticism on your part of the other physicians who
22 examined Mr. [REDACTED] or who testified in this case,
23 particularly for their failure to immediately rule out lead
24 poisoning as a factor in Mr. Telepnev's case?

25 A Not the slightest in my mind. It has been the history in
26 this industry since its founding that there has been a great

1 confusion in the minds of many people, including medical
2 men as to the differentiation of the serious and dangerous
3 exposure associated with the handling and use of the con-
4 centrated product tetraethyl and the commercial form in
5 which leaded gasoline is put on the market. The former
6 of these exposures has been well known to produce cases of
7 serious poisoning and it has therefore been assumed that the
8 second, namely, the handling of leaded gasoline constitutes
9 a lesser degree of the same thing, whereas this has not been
10 the case.

11 MR. HONE: And will you state at this point for the record what
12 do you mean when you say "this has not been the case"?

13 A I mean that the exposure associated with the handling of
14 leaded gasoline in any and all ways in which it is commercial
15 handled can never be shown to result even in the absorption
16 of lead. In fact all experimental evidence indicates that
17 lead is never absorbed in measurable quantities as the re-
18 sult of contact to any extent with gasoline containing
19 tetraethyl lead. Moreover, there have been no cases of
20 recognizable and confirmed lead poisoning amongst some
21 hundreds of thousands of persons whose daily occupation
22 involves exposure both by skin contact and by inhalation
23 to gasoline containing tetraethyl lead. In fact, there is
24 at the moment no experimental or clinical evidence that
25 leaded gasoline is more dangerous than is ordinary gasoline
26 from the point of view of lead absorption.

1 Q And is there any danger of lead poisoning from ordinary
2 gasoline, that is, gasoline not containing tetraethyl
3 lead?

4 A No, there is not.

5 Q Your statements regarding the absence of any evidence of
6 absorption of lead from absorption of gasoline containing
7 tetraethyl lead on the skin would apply, would it doctor,
8 irrespective of the condition of the skin or would the
9 fact that the skin was broken have any further bearing on
10 that statement?

11 A The condition of the skin cannot be regarded as an important
12 factor in the absorption of leaded gasoline for the reason
13 that absorption of tetraethyl lead even under ideal con-
14 ditions occurs more rapidly in the case of a normal intake
15 and healthy skin than in the case of damaged, cracked,
16 scratched or broken skin. I refer under absorption of
17 tetraethyl lead, however, to the undiluted material as
18 applied to experimental animals, there being no evidence
19 whatever that lead in gasoline is a commercial concentration
20 capable of absorption through the skin in measurable amounts

21 Q And therefore there is no evidence of the absorption of lead
22 by contact of gasoline containing tetraethyl lead through
23 the flesh or whatever the medical term is of that which
24 underlies the skin?

25 A No, the important factor there is almost certain that the
26 lead is more easily held by the gasoline than it is by the

1 skin or the flesh and the body and that may be shown by the
2 following experiment. The pure tetraethyl applied to the
3 skin is absorbed with fair speed and as a consequence of the
4 application of two centimeters on the skin of an animal,
5 one will find by analysis from 30 to 40 milligrams of lead
6 in the carcass of the animal as the result of some two hours
7 of such exposure. If this tetraethyl lead be diluted with
8 gasoline to one part in ten, absorption still occurs but
9 with diminished speed with the result that the quantity of
10 lead found in the carcass of the animal after such a period
11 of exposure is very much less. If the lead be further
12 diluted to one part in one hundred, animals may be treated
13 over a period of weeks and months with this mixture without
14 absorbing quantities greater than $1/3$ or $1/4$ of that found
15 as the result of a single application of concentrated
16 material. If the lead be still diluted to one part per
17 1,000 which is still in excess of the commercial concentra-
18 tion of gasoline, the animals may be exposed for months
19 daily at the end of which time all animals show no measurable
20 increase in their lead content of their tissues. One con-
21 cludes from this that in concentration of less than one part
22 per one thousand, skin absorption does not occur and these
23 observations are further verified by prolonged studies on
24 human subjects.

25 REFEREE: It is 12 o'clock and we will resume at 1:30.
26

1 Hearing of March 1, 1938, 1:30 session.

2 MR. HONE: Shall I proceed?

3 REFEREE: Yes.

4 MR. HONE: The fact that Mr. [REDACTED] while working with leaded
5 gasoline had sores on his hands, that the skin was broken,
6 would not increase any probability of his absorbing lead
7 had any gasoline been spilled on his hands, would it,
8 doctor?

9 A No, not in my opinion.

10 Q In fact, with the concentrated tetraethyl lead the danger
11 of absorption would be less or greater than when the skin
12 was broken?

13 A Less danger to the skin.

14 Q What is your reason for saying that there is the possibility
15 of his having inhaled any significant quantity of lead
16 vapor particularly with respect to gasoline vapor?

17 A Two reasons, and one is my general knowledge of the manner
18 in which inhalation tests are carried out and the other
19 my knowledge of the properties of gasoline on the one hand
20 and tetraethyl lead on the other. Such knowledge convinces
21 me that there is no measurable escape of tetraethyl lead
22 into the atmosphere of workrooms and as a consequence of
23 that situation there is no exposure to lead in work in-
24 volving distillation tests.

25 Q Would any considerable quantity of gasoline fumes first have
26 to be absorbed or have to be inhaled rather, in assuming

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1 that there were vapors from leaded gasoline and if so,
2 to what extent?
3 A Yes, in order to inhale any significant quantity of lead
4 as a consequence of the distillation or evaporation of
5 gasoline, toxic quantities of gasoline itself would have
6 to be inhaled and inasmuch as the toxicity of gasoline
7 itself manifests itself very dramatically in dizziness and
8 drunkenness and unconsciousness in concentrations of 1 to
9 1-1/2 per cent in the air and above, it is quite safe in
10 concluding no significant quantity of lead could be
11 absorbed under conditions which such symptoms did not pre-
12 sent themselves.

13 Q Assuming in this case vapor from leaded gasoline escaped
14 into the atmosphere in the presence of Mr. [REDACTED], would
15 you ordinarily expect him to inhale sufficient of these
16 vapors to get an inhalation of a significant quantity of
17 lead, that he would first have to lose consciousness from
18 the gasoline vapor?

19 A Yes, I think that is a fair conclusion.

20 Q And when you base your answer upon the general manner in
21 which these tests are conducted, would you say having read
22 and heard the testimony in this case as to the manner in
23 which the tests were actually conducted that your answer
24 just given could be based upon the manner in which these
25 tests were conducted by Mr. [REDACTED] and his associates
26 and actually were conducted other than on general tests?

1 A That would be my opinion based on testimony as to the
2 actual methods of distillation carried out.

3 Q In this case, you mean?

4 A In this case, which are in conformity with standard methods
5 of gasoline testing.

6 Q Was Mr. [REDACTED] case so far as you can judge from the
7 records in this case, a chronic or an acute case irrespective
8 of what caused it?

9 A It would have to be classified as a chronic case if at all.

10 Q And I understand that neither in the literature or from your
11 own personal experience --

12 A (Interrupting) It would be the first in my experience, if
13 it were so regarded.

14 Q Would you discuss particularly with reference to the issues
15 involved in this case the subject of deleading?

16 A Deleading and deleading treatment refers to a type of treat-
17 ment in which one attempts to liberate lead which is supposed
18 to be in inert form stored in the skeleton. The purpose of de-
19 leading by any of the methods that have been advised or
20 suggested by various physicians is to bring such lead out of
21 its deposits chiefly of the skeleton, to put it into circula-
22 tion and to maintain it in circulation over sufficient period
23 of time as will permit a considerable increase in the rate
24 of excretion and in the gross elimination of lead from
25 the body. That is the purpose of such treatment. I might
26 say whether or not such treatment is actually effective

1 and of value in the treatment of lead poisoning is con-
2 troversal.

3 Q Is there any particular pattern in which lead in the body
4 is deposited?

5 A Yes. When lead is first introduced into the body it is
6 found in relatively high concentration in the blood and in
7 the soft tissues, more particularly the liver. As time
8 elapses, the lead distributes itself in the tissues in
9 accordance with a typical pattern being found in highest
10 concentration in the skeleton; in the next highest con-
11 centration in the liver and in the next highest in the
12 kidneys and in relatively low concentration in the central
13 nervous system, in the muscles and in the other glandular
14 tissues of the body, with relatively high concentration
15 in the suprarenal gland in a sufficient number of instances
16 to be note worthy and this is the pattern of the distribution
17 more or less regardless of the gross quantity present.

18 I may also say that lead is always found in some measurable
19 concentration in the circulating blood both in persons with
20 abnormal lead content and also in the case of all normal
21 persons so that lead is to be regarded as ^{an} entirely normal
22 constituent of all the tissues of the body including the
23 circulating blood and practically all states of disease and
24 health.

25 Q You are familiar with the record indicating the urinalysis
26 made by the Western Laboratories in 1935 during the lifetime

1 of Mr. [REDACTED] and of the fact that a three day output
2 of urine was collected and the lead content after analysis
3 for lead content and that the patient at the time was put
4 on a definite calcium pure diet and given large doses of
5 ammonium chloride, would you say that was a proper method
6 for making a test for lead and also what the effect of
7 ammonium chloride is?

8 A Well, I have every reason to believe that the methods em-
9 ployed in analysing that urine were sound and satisfactory
10 methods which I have described in the literature here used
11 in the urinalysis.

12 REFEREE: Let me understand. You say you have every reason to
13 believe. Do you know anything at all about the methods
14 that were used?

15 A I do.

16 Q In this particular case?

17 A I do.

18 Q What was your source of information?

19 A I conferred with Dr. Moor as to the details of her work and
20 to the size and samples employed and the method she em-
21 ployed in her analysis.

22 REFEREE: That is all right.

23 MR. HONE: Have you finished your answer, doctor?

(41) 24 A As to the effect which might be expected from the administra-
25 tion of ammonium chloride, one knows that ammonium chloride
26 increases the urine excretion in volume during the period of

1 the administration and also that ammonium chloride is the
2 commonest drug or chemical to be employed for increasing
3 the excretion of lead by bringing it out of the depots of
4 deposit and causing them to circulate in higher concentra-
5 tion and therefore to appear in higher concentration in the
6 urine. This is supposed to be one of the most effective
7 means of deleading these leaded patients.

8 MR. HONE: So that the method of conducting this test would, if
9 anything, increase rather than decrease the concentration
10 of lead in the system?

11 A Yes, it would increase the lead, if anything, in the ex-
12 cretion?

13 Q Now, with respect to the literature which has been referred
14 to and relied upon by Dr. Chabanoff, one of the articles
15 referred to is the one appearing in Volume 18 of the
16 Journal of Industrial Hygiene; that was written and published
17 by you, was it not in corroboration with two other men?

18 A Yes, that was published by me and my associates.

19 Q By the way, doctor, while I think of it, you have had the
20 knowledge during your experience in this field of lead
21 poisoning with a large number of established cases of lead
22 poisoning?

23 A Yes, I have studied quite a large number of cases of lead
24 poisoning over a period of the past thirteen years or fourteen
25 years.

26 Q Would you be able to say about how many?

- 1 A I would make a guess. It is up in the hundreds.
- 2 Q In addition to that, would you say you have examined alto-
- 3 together some few thousands of both established and suspected
- 4 cases of lead poisoning?
- 5 A I would not put it quite that way. I would say my associates
- 6 and I have studied a large number, into the thousands of
- 7 cases of persons in the lead trades under various conditions
- 8 of lead exposure, hazardous and non-hazardous lead trades
- 9 with the idea of determining the relationship of exposure
- 10 symptomatology and lead excretion.
- 11 Q There has been some differences between the various witnesses
- 12 as to whether Mr. [REDACTED] spilled any gasoline on his hands
- 13 and whether he spilled small quantities or whether he spilled
- 14 large quantities but the opinion which has been given in this
- 15 case varies dependent upon which of those facts was correct?
- 16 A My opinion would not for the reason that I could not regard
- 17 the quantity of spillage as a factor in the exposure.
- 18 Q And in a like manner, there has been some differences in
- 19 the testimony of various witnesses as to the number of
- 20 samples of leaded gasoline handled by Mr. [REDACTED] Would
- 21 your opinion be the same irrespective of whether he handled
- 22 one sample of leaded gasoline a day or three or four samples
- 23 of leaded gasoline or a substantially larger number?
- 24 A I can say very frankly that I do not regard that as a
- 25 significant point in the issue.
- 26 Q So that your opinion would be the same irrespective of the

1 number of samples handled?

2 A Quite.

3 Q In a like manner, there has been some difference in the
4 testimony as to whether or not there were any vapors of
5 tetraethyl in the laboratory in which Mr. [REDACTED] worked.
6 Irrespective of what portion or portions of this testimony
7 would be established or regarded as the most accurate,
8 would your opinion be the same?

9 A In this case, no, for the simple reason that I cannot see
10 any possibility of the quantity of vapor of tetraethyl lead
11 in those workrooms ever reaching a significant level. If
12 on the other hand you mean the question of whether I regard
13 the quantity of vapor as being important in any hypothetical
14 case as to whether poisoning might or might not develop,
15 I can tell you very frankly that I regard that as the
16 limiting factor. The question is, how much was the exposure
17 and in this instance in my opinion, the exposure was en-
18 tirely insignificant.

19 Q Insignificant, is that what you state?

20 A Yes.

21 Q Now, referring to the article in Industrial Hygiene, Volume
22 16, which is one of the references referred to and relied
23 upon by Dr. Chabanoff and particularly with reference to
24 page 101 of that article, you refer in this article first to
25 problems dealing with and arising out of the manufacture of
26 tetraethyl lead and the various blending processes and then

1 you state as follows:

2 "The serious dangers of these manufacturing processes
3 have no relation to the problem with which we are concerned
4 in the present discussion. However, the initial confusion
5 of the actual hazard of the manufacture with the
6 problematical dangers arising from the use of the finished
7 fuel has persisted. Therefore, distinction between them
8 must be made clear."

9 Q Could you explain exactly what you mean by that, particularly
10 with relation to this case?

11 A Yes, there was a great deal of general anxiety as to the
12 dangers of tetraethyl lead and gasoline containing tetraethyl
13 which arose out of publicity associated with the poisons
14 which occurred in the manufacture of tetraethyl lead
15 particularly in 1925. Newspaper articles on this line were
16 very lurid in their description of the cases and the various
17 mysterious poisonings and they made no distinction between
18 the gasoline and the concentrated material. The manufacture
19 of tetraethyl lead has always been and is now a very
20 hazardous occupation around which the most detailed precau-
21 tions must be thrown and maintained. On the other hand,
22 the dangers associated with the handling and the distribution
23 and use of gasoline containing the commercial concentration
24 has always been purely hypothetical and this problem has
25 been investigated by ourselves and by various government
26 agencies in this and other countries with the idea of de-

1 termining whether the danger to filling station employees,
2 garage mechanics and the traveling public as well as any
3 and all other persons whose work involves the work of
4 handling gasoline constituted any significant and measurable
5 exposure to lead symptoms and there has never been any other
6 opinion about them then that it might be possible that as
7 the result of very minute exposure over a long period of
8 time, cases of chronic lead poisoning might conceivably de-
9 velop and the whole pastime of public health study has
10 been to establish whether or not that is the fact or whether
11 it is not the fact. The conclusions of all the experimental
12 workers in this field are unanimous in believing that no
13 evidence of any measurable lead exposure has been obtained
14 by any of the investigative work in the field and that there
15 is no reason to believe that this constitutes a hazard either
16 to the public health or to the health of persons involved in
17 these industries and that is the current point of view and
18 there is no evidence which indicates that that is not an
19 entirely correct point of view. I may say that the attitude
20 of the health authorities has been that if any evidence were
21 found that this were a danger to the public health or to the
22 health of persons employed as I have indicated, that the
23 distribution of such gasoline should be forbidden and that
24 the product should be withdrawn from the market entirely and
25 I share in this point of view.

26 Q Referring to the same periodical, page 102 as follows:

1 "The hazards associated with the handling and use
2 of the finished gasoline differ both in quantity and quality
3 from those which occur in its preparation. Nothing could
4 demonstrate the difference in the magnitude of potential
5 lead exposure and two sets of conditions in a more
6 prognostic manner than the failure on the part of such
7 gasoline to produce the substantiated case of lead in-
8 toxication up to the present (November, 1933) after more
9 than 10 years of continuous use in certain parts of the
10 United States and for almost 8 years throughout the entire
11 United States." That is your opinion, is it doctor?

12 A Yes, I would only add that since that was written there
13 have been approximately 3 years of additional experience
14 during which leaded gasoline has been distributed into
15 practically all parts of the civilized world, during which
16 it has been investigated in a very critical manner by the
17 government health authorities in additional countries.

18 Q And your statement of their being no substantiated case of
19 lead intoxication as outline in the article up to the date
20 therein, November, 1933, would you now make the same state-
21 ment bringing the time up to the present time?

22 A I would make precisely the same statement with regard to the
23 causes of the poisoning.

24 Q Pointing to the same article at page 102, I quote:

25 "The difference between the volatility of tetraethyl
26 lead and various gasoline bases with which it is mixed is

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MR. HOWE

DR. H.

1 so great that approximately one-half of the gasoline may be
2 evaporated before lead could be found in the vapor. It
3 follows from this fact that the vapors rising from tanks
4 containing leaded gasoline do not contain an appreciable
5 amount of lead." And that is your present opinion, is it
6 doctor?

7 A Yes, it is.

8 Q I point further to the same article, pages 108 and 109, with
9 reference to conclusions you reached in connection with a
10 group of men working in a plant under conditions where
11 leaded gasoline was obtained in hoses and resulted in daily
12 drenching of these men with the leaded gasoline and I will
13 ask you to briefly summarize that case and your conclusion
14 from it.

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15 A These observations I regard as rather crucial with relation
16 to the problem of lead exposure in the handling of leaded
17 gasoline in any and all ways. The observations were made
18 in the gasoline refinery of a rather older and perhaps less
19 well equipped refinery in which gasoline was being intro-
20 duced into barrels by an open hose system with a trip valve.
21 The concentrated gasoline vapor in the room was so great
22 that enormous volumes of forced ventilation was required to
23 maintain it below the immediate toxic concentration and the
24 men were being bathed actually over a considerable area of
25 their skin by it for hours during the working day. This
26 particular refinery had planned to undertake the distribution

1 of leaded gasoline by corresponding methods and this there-
2 fore provided a very good opportunity for the study of lead
3 absorption of men before and after exposure of that type to
4 leaded gasoline. We studied this group of men by complete
5 physical examination and by analysis of their urinary and
6 fecal excretion before they engaged in this work, using
7 leaded gasoline, and then after they had worked steadily at
8 this work over a period of six months, we repeated the
9 observations in the same group of men. The significant
10 results from the point of view of lead exposure were
11 that in no instance was the lead excretion of these men
12 increased and the main lead excretion of the group before and
13 after were the same within the limit of statistical methods
14 of comparison. Quite clearly these men did not absorb lead
15 out of the gasoline as a consequence of this massive ex-
16 posure which I regarded as the highest exposure to gasoline
17 that I have ever encountered in my experience in refinery
18 practice.

19 Q Your discussion of this case, then is with the following
20 statement, page 112: "No case of lead intoxication was found
21 amongst the subjects." And that is correct, is it not?

22 A That is correct.

23 MR. DETMERS: Doctor, is there anything you have written in
24 these articles relied upon by Dr. Chabanoff that you would
25 change in any degree at the present time?

26 MR. HONE: (Interrupting) Reserve that for your cross-examination

1 will you, to keep the record clear.

2 MR. DETHLEFSEN: I thought I would save time by it.

3 REFEREE: While Counsel is looking there in the book, I will
4 ask you a question or two about the men working in such a
5 quantity of gasoline. Was there any history taken or an
6 accurate record made or ascertained as to what the condition
7 was, say, one year after these investigations?

8 A Yes. We made no further analysis actually of the men be-
9 cause I regarded six months as sufficient evidence to pro-
10 duce a change in the lead excretion if such change could
11 occur. On the other hand, we did make periodic inquiry as
12 to the outcome of the situation and I may say also just to
13 be frank, that I advised the discontinuance of that type of
14 exposure not because of any fear of lead poisoning, but be-
15 cause I regarded that method of handling gasoline as dis-
16 tinctly obsolete and highly undesirable from the point of
17 view of the frequency of occurrence of skin dermatitis. That
18 type of exposure would be forbidden outright in most re-
19 fineries.

20 Q Was any sufficient record made or trace kept of any of the
21 men involved in that case that would enable you to say what
22 the condition of any of these men were three years after this
23 time?

24 A Yes. I am not willing to say too much about that in detail.
25 I think the record will show but I think it is quite safe to
26 say that a number of the men were maintained in the employme

1 of the refinery and I suspect we could find some statement
2 at the present time if we should look for it. However, they
3 were not specifically followed from time to time to see
4 whether there were any further developments and I personally
5 regard our observation showing complete failure of lead ex-
6 cretion over that period of time as absolutely certain
7 evidence that no measurable quantity of lead was being ab-
8 sorbed for the reason that we have followed over a period
9 of now more than 10 years a group, several groups of men
10 in the manufacturing occupations, in which one can say
11 definitely, the effect of lead exposure on the average of
12 lead excretion, and they now know definitely what quantity
13 of lead exposure is required over a period of time, 6 months,
14 or 2 months or 3 months, to permit a measurable average in
15 the lead excretion of exposed men.

16 Q Isn't it a fact, doctor, that if one be storing small
17 quantities of lead that you don't get an increase until the
18 storage capacity is exhausted?

19 A No, that isn't true. Lead excretion bears a direct and
20 easily measured relation to the magnitude of the lead ex-
21 posure.

22 Q At all times?

23 A In any group of men in industry that you study, you can
24 measure the magnitude of the lead exposure in terms of the
25 magnitude of lead excretion to such an extent that the study
26 of lead excretion in the feces and urine is the best and by

1 far the most accurate way of measuring the lead exposure
2 itself.

3 Q Then how do you account for the fact, doctor, that so
4 frequently careful medical men fail to find any lead in the
5 excretion during the time the man is exhibiting symptoms and
6 remove him from the environment and treat him, and yet they
7 are unable to find lead in the urine and subsequent examina-
8 tions prove he was suffering from lead poisoning?

9 A I can understand your attitude in asking that question be-
10 cause that is a very significant point. The answer to that
11 is this. That only in the past ten years have the methods
12 of analysis used in these cases been adequate for the detection
13 of small quantities of lead in the urine, and only in the
14 past 5 years have these methods been sufficiently sensitive
15 and accurate to enable one to show with accuracy the lead ex-
16 cretion of normal persons and lead excretion of persons whose
17 excretion differs only slightly from the normal. The reasons
18 for that and for the discrepancy in laboratory matter lie in
19 the extreme difficulty for the accurate determination of small
20 quantities of lead in the excretion. Prior to 1926 it was
21 unfortunately believed that lead never occurred in tissue and
22 in the excreta of entirely normal persons. It is now known
23 and fully accepted by all of the experienced authorities in
24 this and other countries that lead is a normal constituent
25 of the human body and it is found always and without exception
26 in the blood, urine, in the feces and in the tissues in-

1 cluding those of new-born children and unborn fetuses, and
2 that is without exception and without any reservation the
3 failure to previously observe and take into account these
4 facts, is the result of the previous inadequacy and in-
5 sensitivity of the analytical methods. Within the past
6 five years it has become possible to work with 100 cubic
7 centimeters of urine, 10 cubic centimeters of spinal fluid
8 and with a few grams of tissue with an accuracy that pre-
9 viously was not obtainable even with entire organs and with
10 actual quantities of excretion. Now, this is a technical
11 development of the past few years and that is the reason for
12 the discrepancy found in medical literature and it is the
13 reason also for the uncertainties that existed in the minds
14 of medical men without actual experience as to the significance
15 of this or that other statement in the literature.

16 Q What method is used in this delicate matter? I do not mean
17 the details. Do they use a spectroscope?

18 A There are at the present time three accepted methods. One
19 of them is a chemical method using orthodox chemical
20 technique which is quite satisfactory but which requires
21 large samples of urine or feces or tissue. There are two
22 relatively recent methods one of which was developed in our
23 laboratory and the other of which has been developed by a
24 series of individuals with slight variations. The first
25 of these is known as a spectrographic method by means of
26 which one can deal with quantities of lead in the magnitude

1 of the third or fourth decimal place of milligrams. The
2 other is known as dithizon which has recently come into
3 fairly general use by the people in the world which is al-
4 most as sensitive as the spectrograph method and which with-
5 in a very low range is quite accurate. I may say further,
6 however, that the great difficulty in the use of all of these
7 methods lies in the fact that lead is found so widely
8 distributed in nature and is found in so many things and in
9 relatively large quantities, method and agents and even
10 laboratory equipment must be handled with the most scrupu-
11 lous care otherwise gross contamination results. In our
12 own laboratory, for example, we have to work in air con-
13 ditioned space which excludes contaminated air for the
14 City of Cincinnati is just full of soot.

15 Q Do you know what method Dr. Moore used in her examination?

16 A Yes.

17 Q What was it?

18 A Dr. Moore used a chemical method which we described in the
19 Journal of Industrial Hygiene, volume 15, September, 1933.
20 A good chemical separatory method which, however, we have
21 since largely abandoned because it requires fairly large
22 samples for its accurate use.

23 Q Would you say that Dr. Moore did the samples both before
24 death and after death?

25 A She did, yes. She did samples of urine on more than one
26 occasion and she also analyzed certain samples of the tissue.

1 Q Then would you say that the relatively large quantity that
2 she had furnished her by the autopsy surgeon, the result
3 would be expectedly more accurate than with the relatively
4 small quantities she had to operate with during the life of
5 the man?

6 A I would not actually because there are several factors in
7 this that had not been mentioned that had to be discussed
8 a little in order to arrive at a conclusion.

9 Q Go on.

10 A If the samples she had had been large, the conclusion would
11 be correct but the samples she used actually were quite
12 small.

13 Q You are speaking of samples from the coroner?

14 A Yes, on autopsy. I will be glad to discuss that in some
15 detail.

16 Q All right.

17 A Well, I will do it now if you wish.

18 Q Well, yes. What quantity was she furnished after death?

19 A She had fourteen grams.

20 Q That would be about one-half ounce?

21 A A little less than one-half ounce, yes, and a rib.

22 Q Approximately 30 grams to the ounce?

23 A Yes, 32. Two hundred thirty-eight grams of mixed tissue
24 consisting of liver, spleen, kidney, heart and bone of
25 which she used 117 grams of mixed material for her analysis,
26 one-half of it was used for her analysis.

1 Q A little over five ounces?

2 A Mind you, there is no reference in this to the precise
3 weight of the individual organs in question.

4 Q That would be approximately five ounces?

5 A Yes.

6 Q How many was it?

7 A One hundred and seventeen. That is about five. A little
8 less than 5 ounces.

9 Q A little less than 4 ounces?

10 A Yes, a little less than 4 ounces.

11 REFEREE: All right.

12 A Now, one does not know and Dr. Moore does not know the
13 proportions represented in this mixture of the different
14 organs and it isn't fair to make any assumption because there
15 isn't any idea of that at all. Now, the quantity of lead
16 found in that mixture of soft tissue if it had been all liver
17 or mostly liver, would not be significant. If, however, it
18 was all brain or mostly brain, then one would have to admit
19 it was of some significance. In the absence of any informa-
20 tion as to the relative proportions it becomes purely guess-
21 work. Moreover, these tissues were supplied in this form
22 in a Mason jar with a metal top on it and the jar was
23 supplied without having been previously chemically cleaned,
24 and it is the rule rather than the exception that tissues
25 supplied in that fashion for a chemical study should be
26 contaminated to some degree with lead from extraneous sources.

1 Therefore, one is left entirely without any conclusion as
2 to the actual quantity of lead found in these tissues. That
3 is sad but it is definitely true. With respect to the piece
4 of bone, the same criticism must be made with the additional
5 statement that this is not an adequate quantity of bone to
6 be representative of the skeleton of the body and in
7 arriving at the figure arrived at, any error of analysis or
8 any error occasioned by the contamination of the tissue from
9 extraneous sources has been multiplied at least by seven in
10 the process of calculating milligrams per one hundred grams
11 of tissue. Therefore, I cannot personally regard these findings
12 as making one iota of contribution toward a conclusion in the
13 case.

14 Q And your reason for that is because you don't know the pro-
15 portion of mixture of the organs and the fact you don't know
16 how much lead might have contaminated it from the top of this
17 jar?

18 A Yes, and from other sources, I may say that in our laboratory
19 we do not and are utterly unwilling to make an analysis of
20 tissue supplied in that fashion because we believe the re-
21 sults are much more likely to be misleading than to be useful.

22 Q Well, of course, Dr. Moore did not have any quantity whatso-
23 ever of any bone or brain or liver or spleen from this man to
24 examine before he died?

25 That is quite right. She had excreta only.

26 Q And excreta was the urine?

1 A Yes. She did however have the urine during the period in
2 which the clinical picture was at its height so that at that
3 time whatever quantity of lead was in the excreta should
4 have been at its maximum in its time relation to the lead
5 exposure if there had been lead exposure.

6 Q Would the fact that no lead was found in the urine, would
7 that be conclusive that no lead was lodged in the vital
8 organs examined after death or in the bone?

9 A No. The fact that lead was not found in significant quantity
10 in the excreta during the period in close relation to the ex-
11 posure strongly indicates that at that further time there was
12 no abnormal quantity of lead in the tissue of Mr. Telepnev.

13 Q Would it be conclusive in your opinion?

14 A In my opinion if I could be certain that the analysis were
15 carried out with every proper precaution, that would be
16 utterly conclusive. I have never seen a case of lead
17 poisoning with active symptoms without a sufficiently
18 elevated lead excretion in the urine. There is here an ad-
19 ditional factor with relation to the findings in the skeleton
20 and that is the period of something like eighteen months
21 elapsing between the cessation of exposure and the man's death.
22 Granting there had been a significant exposure in the course
23 of this man's work, the time interval between the cessation
24 of exposure and those examinations is of such an order of
25 magnitude, that no abnormal quantity of lead should have been
26 found in those tissues and I am therefore fully convinced as

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REFEREE

DR. R(RE

1 Dr. Moore is that these results were the effect of con-
2 tamination and not a true representation of the facts so
3 far as the lead contents of this man's tissues.

4 Q Is Dr. Moore taking that position?

5 A Dr. Moore has so expressed herself to me personally and
6 has authorized me to say that that is her opinion. I
7 recognize that that has no standing but that is her opinion
8 expressed to me in conversation.

9 Q Well, I take it then that the chemist's findings as to the
10 existence or nonexistence of lead up until very recently,
11 three to five years ago, and even now, is dependent very
12 much on the technique employed and extraneous circumstances
13 of possible contamination, and in other words it isn't very
14 much to be relied upon, is it, doctor?

15 A To be relied upon only in those instances in which the
16 technique employed has been checked and double checked and
17 followed carefully over a period of years and in which the
18 tissues or excreta are obtained under conditions which
(47) 19 certainly exclude the possibility of contamination. May I
20 point out this that in obtaining samples for examination from
21 a hospital by the routine method of collection it is im-
22 possible to obtain significant and useful results. One must
23 use special methods for the collection of samples. One must
24 use known chemically clean containers and in obtaining blood
25 samples, it is necessary even to use a special type of hypo-
26 dermic needle for the reason that the ordinary needle has

1 lead or brass hook which of itself would contaminate the
2 sample. In general this is all true that there are a number
3 of industrial commissions in the country that flatly refuse
4 to regard analytical evidence as in any way significant
5 unless they know precisely the laboratory from which the
6 information came.

7 Q Well, how do you account for the fact that no lead was ever
8 found at all and many clinical examinations and clinical re-
9 search that was done during the time Mr. Telepnev was alive
10 notwithstanding the great possibility of concentration,
11 how do you account for the fact that there was no trace of
12 lead ever found?

13 A I believe traces of lead were found in one examination and I
14 believe that the results will show that in one examination of
15 the feces containing 2 milligrams of lead was found. More-
16 over, Dr. Moore has informed me that in her observations
17 she found traces of lead in every instance but that she re-
18 ported them as insignificant because they were within the
19 zone of normal results and she therefore reported them as
20 negative following the clinical pathologist's practice of
21 reporting the results to the clinician for the reason that
22 in general in these matters the clinicians are not able to
23 determine them themselves.

24 (RECESS)

25 A Mr. Referee, I think I should say out of courtesy to Dr.
26 Moore that the samples of urine which Dr. Moore obtained for

1 analysis were obtained in accordance with her precise in-
2 structions, that the samples of tissue, on the contrary,
3 were merely given to her without any knowledge on her part
4 in the manner in which they were collected or of the treat-
5 ment which they had received up to the time they reached her
6 laboratory and it was her feeling because of her negative
7 results during the period of the man's exposure that the re-
8 sults obtained on necropsy tissues could hardly be explained
9 in any other logical way than as the result of some con-
10 tamination in their collection and delivery to her.

11 Q She then found no trace of lead in any of the urine?

12 A Yes, she found small quantities of lead well within the limits
13 of normal lead excretion.

14 Q Would the fact that the man had a nephritis effect the amount
15 of lead that was being excreted even although he had it in
16 his body and blood that even if the kidneys were normal, you
17 would expect larger amounts in the urine?

18 A The evidence is that so long as water is adequately excreted,
19 lead in the blood is also adequately excreted. One might
20 presume that there would be some interference with the lead
21 excretion as a consequence of the nephritic state but the
22 facts that have thus far been observed are not in harmony
23 with that opinion.

24 Q And it is your opinion that a nephritic kidney would be as
25 fully a good kidney as a healthy kidney?

26 A Yes, substantially.

(47)

REFeree

DR. KEE

1 Q Would it be as an effective instrument in excreting urea?

2 A Not the nitrogenous bodies in the circulating blood.

3 Q Would it be as an effective instrument in excreting all other
4 poisons with the exception of lead?

5 A In general the excretion of certain mineral material, more
6 particularly chloride, tends to be interfered with in the
(48) 7 case of a nephritic kidney, but dissolved substances in
8 general, with the exception of nitrogenous bodies, are not
9 very seriously interfered with by the type of kidney that
10 is seen in chronic interstitial nephritis where the water
11 excretion is satisfactory except in the terminal stages.

12 REFeree: All right, Mr. Hone.

13 MR. HONE: Are you satisfied, doctor, that as the result amongst
14 other things of the examination and laboratory analysis made
15 by Dr. Moore of the urine of Mr. [REDACTED] during his life-
16 time and of finding therein only such quantities of lead as
17 is well within normal limits, that there was at that time
18 no abnormal quantity of lead in Mr. Telepnev's body?

19 A Yes, I would arrive at that conclusion.

20 Q And while you have testified that the positive findings of
21 abnormal quantities of lead in an uncontrolled examination
22 of tissue such as followed Mr. [REDACTED] death, are you
23 satisfied, however, that the negative finding of only a
24 nominal quantity of lead or the failure to find an abnormal
25 quantity of lead during his lifetime is a reliable finding?

26 A Yes, I am. I am fairly well satisfied that the actual

1 analytical method of the material examined as employed by
2 Dr. Moore were substantially accurate.

3 Q With reference to the urinalysis?

4 A Both the urinalysis and the tissue analysis, the tissue
5 with which she was supplied.

6 Q The reason you do not place any significance on the positive
7 findings of abnormal lead in the tissue examined on necropsy
8 is because of the contamination, including errors resulting
9 from the small amount of tissue examined, but with regard to
10 the analysis made during his lifetime, where there was not
11 found very abnormal quantity of lead, the same criticism would
12 not apply?

13 A So far as the contamination is concerned, you mean?

14 Q Or anything else that would effect your opinion that the
15 analysis showed it was not an abnormal quantity?

16 A No, I regard the analysis of urine as carried out by Dr. Moore
17 substantial evidence of the fact so far as the lead excretion
18 of Mr. [REDACTED] was concerned during his lifetime. I have
19 no good reason to think otherwise.

20 Q Now, with respect to Dr. Reeves' report which is the result
21 of the autopsy surgeon, made in connection with Mr. Telepnev
22 death and which report shows as a cause of death uremia
23 secondary to interstitial nephritis which is probably
24 secondary to lead poisoning, does that report affect your
25 opinion that his death was primarily or secondarily caused
26 by lead poisoning?

1 A Well, I would like to answer that question somewhat
2 differently than the question implies.

3 Q That is all right.

4 A By saying that the reference to lead poisoning in the
5 coroner's diagnosis leaves me entirely unconvinced and leaves
6 me to believe that the statement that it was probably
7 secondary to lead poisoning is entirely without adequate
8 evidence in support of it. I do not take seriously in any
9 way these statements "Probably secondary to lead poisoning"
10 for a variety of reasons.

11 Q Will you give the reasons?

12 A First of all the necropsy report even as it is shown here
13 briefly demonstrates an adequate cause of death, in that this
14 man had uremia and had interstitial nephritis, a condition
15 which in and of itself is frequently responsible for death
16 and which requires no further explanation inasmuch as we are
17 not fully aware of all of the conditions which produce chronic
18 interstitial nephritis. Moreover, the report itself does not
19 say frankly that this was secondary to ^{lead poisoning} chronic interstitial
20 nephritis but says "probably secondary to lead poisoning",
21 which involves a definite suspended judgment on the part of
22 the pathologist and it was the pathologist's opinion as
23 transmitted to me personally that the only ground for this
24 explanatory statement of the probability lies in his knowledge
25 of the analytical finding and that he had no other reason
26 whatever for inquiring into the cause of death.

(48)

MR. HONE

DR. KEOE

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1 Q And he so stated, doctor?

2 A And he so stated to me.

3 Q And did he authorize you to make this statement?

4 A He authorized me to say that that represented his opinion.

5 He said in fact that had the question of lead poisoning
6 not been introduced into the case prior to the necropsy,
7 that he would have been entirely content to give as the cause
8 of death uremia secondary to chronic interstitial nephritis.

9 REFEREE: And he gave you the opinion that he sufficiently re-
10 lied on the chemist's finding to make it the basis of that
11 speculation or that statement of probability?

12 A Yes, he further said that in his official opinion when the
13 question of death has been introduced into his mind by any
14 previous information, that it was his duty to make further
15 inquiry beyond the mere necropsy finding and that he merely
16 carried out what he regarded as the normal routine in sub-
17 mitting the tissue for analysis. I should say that as to
18 the type of material which should have been submitted and
19 as to the manner in which it should have been protected
20 against contamination, it is scarcely to be expected that
21 Dr. Reeves would be in possession of all the information
22 necessary to enable him to do that with the preciseness that
23 is required to make a post mortem diagnosis of lead poisoning
24 since his duties cover every type of thing, every type of
25 possible accidental or toxological cause of death and he can
26 not be presumed to be an expert in every one of these phases

1 of his daily work.

2 MR. KONE: In discussion with Dr. Reeves, did you give the
3 statement of Dr. Moore to which you have testified regarding
4 contamination?

5 A I did.

6 Q And Dr. Reeves was in agreement with your views likewise?

7 A Yes, Dr. Reeves was in agreement that there might have been
8 ample opportunity for the contamination of the equipment that
9 he was compelled to use for the purpose of collecting

10 samples - such equipment as had actually been supplied to

11 him for that purpose and that included an ordinary Mason

12 jar purchased on the market and without facilities for proper
13 cleansing or proper selection, so as to avoid the metal top.

14 Q And he expressed his views to you that his preference was
15 for a different type of procedure for handling such tissues,
16 did he not?

17 A He expressed himself as believing in all probability some
18 better technique should be used in collecting samples for
19 this type of purpose particularly in the case of lead
20 analysis where it is notorious that the possibility for
21 contamination is substantially ubiquitous.

22 Q And he advised you, did he not, that his report including
23 reference to the possibility of lead poisoning was written
24 after examination by him of Dr. Moore's laboratory report?

25 A That is correct. May I say further for the benefit of the
26 Referee that in order to make the diagnosis of lead poisoning

1 at post mortem, it is necessary to obtain representative
2 samples of practically all of the tissues of the body, to
3 collect them with great care against contamination, and to
4 analyze them separately and individually so that on the
5 basis of their precise weight, one may calculate the lead
6 content of the body with reasonable precision and only in
7 this way is one justified in arriving at the conclusion
8 as to the gross lead content of the body and gross lead
9 content of the body is the only factor which permits one to
10 express a sound opinion as to the significance and presence
11 of lead in the body.

12 REFERENCE. Did you ever hear in your own experience since your
13 graduation from medical college ^a ~~in every~~ single case in
14 which that method had been followed at autopsy?

15 A Yes, I have.

16 Q How many?

17 A I have my complete record of some 25 or 30 cases in which
18 the analysis was made in that precise fashion and I have in
19 my own writing described the technique which is necessary
20 for medical ^{and} legal purposes to enable one to arrive at a con-
(50) 21 clusion on lead analysis alone. May I say in addition that
22 even in the presence of large quantities of lead in the
23 tissue, it does not necessarily follow that the patient
24 either had or died of lead poisoning and it is well known
25 that persons engaged in the lead trades die of other causes
26 and that they have had or may have had in their tissues for

1 a period of years quantities substantially over the normal
2 quantity without at any time having had a single symptom
3 or sign of lead intoxication.

4 Q Do you believe that in the meantime while carrying that
5 excess of lead around, it was militating against the
6 progress of any disease that might have or perhaps assisted
7 the disease?

8 A Actually there is very little evidence either way. Some
9 years ago Bell and his coworkers came to the conclusion that
10 lead compounds were valuable in treating and preventing
11 cancer, because they thought they found a significant de-
12 crease in the instances of cancer amongst lead workers.
13 ~~But~~ I do not believe any one seriously believes it is true
14 but I mention that because it was the background for the
15 extensive use of lead compounds in the treatment of cancer
16 on the part of Bell and his coworkers in England.

17 Q Coming back to these 25 cases in which you mention this metho
18 or taking samples of every part of the body to ascertain
19 the entire lead content of the entire body, were any of
20 those found ingested dying of lead?

21 A Yes, I have reported two or three fatal cases of lead
22 poisoning and since the report of these cases I have ob-
23 tained the analytical data on a series of additional cases
24 in which there was no question about the diagnosis prior to
25 death and in which the necropsy findings, that is to say the
26 analytical findings, fully verified the clinical diagnosis.

1 Q What amount of lead in the entire body would be the approxi-
2 mate amount found in the case of vital lead poisoning?

3 A That depends in some degree upon the nature of the case as
4 to whether it was the central nervous system intoxication or
5 generalized intoxication, but the largest quantities within my
6 experinece that have actually been found are approximately
7 one thousand milligrams in the adult and approximately 400,
8 I believe, in the severest cases of fatal poisoning in
9 childhood that I have seen. This corresponds in the skeleton
10 to concentration running from 10 milligrams to 30 milligrams
11 per 100 grams of weight in the skeleton as compared to
12 figures of 1 to 4 milligrams in various parts of the skeleton
13 of normal persons.

14 REFEREE: All right.

15 MR. HONE: Have you had extensive experience at post mortems of
16 suspected lead cases?

17 A Yes, I have done a series of post mortems myself and have
18 analyzed the tissue from a series of post mortems as carried
19 out by other pathologists.

20 Q As concerns the others in the United States, what would you
21 say you experience was in that regard?

22 A Well, I think there is no question we have done more analytical
23 work in this field than any one else in the United States.

24 Q Ruling out for the moment the possibility or probability of
25 contamination, you made some mention of the probability of
26 an error inasmuch as seven times - I did not quite understand

1 your reference to that in connection with this necropsy?

2 A Well, that was based on this fact. Fourteen grams of tissue
3 were used for the analysis of bone. Any quantity of lead
4 which was found in these 14 grams, may have had some error
5 as the result of contamination or as the result of analytical
6 error. Whatever error there was from these combined sources
7 was multiplied approximately by 7 in arriving at the figure
8 per 100 grams of tissue.

9 Q And the same would apply with regard to the analysis of
10 self tissue?

11 A No, because there were 117 grams used.

12 Q Oh, yes.

13 A And the figure was set on the basis of 100 grams.

14 Q And will you explain why the finding by Dr. Moore of a
15 specified amount of lead in the mixed tissue would not in-
16 dicate even in the absence of contamination that that was
17 an abnormal quantity. I mean basing this particular dis-
18 cussion upon the fact that mixed tissue was used.

(51) 19 A Well, my reply to that is based in some degree upon assumption
20 but if this tissue had been all or predominately liver, the
21 result obtained is not far enough from the normal figure to
22 be in and of itself significant in relation to the diagnosis.

23 Q In other words, the quantity you have testified, the quantity
24 of one to four milligrams of lead per 100 grams?

25 A In the bone.

26 Q As being found in the bone of the normal person?

1 A Yes.

2 Q And similarly, there are figures for the amount to be found
3 in the normal person for the various types of tissue, the
4 brain, the liver and etc. and the quantity in a normal
5 person is greater per 100 grams or other unit of measure and
6 would differ from the quantity to be found in the brain or
7 spleen or other tissue, isn't that right?

8 A Quite right.

9 Q So that to get a true picture as to whether the quantity
10 of lead in the tissue is abnormal or normal, you would
11 have to have the results for each of these tissues separately?

12 A Yes, that is right. Incidentally, what I said with regard
13 to the necessity for calculation of the total quantity
14 present is standard practice in the case of arsenic.

15 REFEREE: Well, that method isn't usually followed by autopsy
16 surgeons throughout the country, is it?

17 A No but when it is not, the evidence will not stand in Court
18 in the face of competent expert advice.

19 Q In other words it is pretty hard to convict Mr. Lead?

20 A I would not say so. It is hard, however, to ascertain the
21 facts with certainty unless one exhausts the proper methods
22 of procedure.

23 Q This is precisely the reason that this whole question in
24 present medical legal problems is controversial.

25 MR. HONE: Doctor, the Referee asked you a question as to
26 whether you attach significance to the fact that one of the

1 doctors that examined Mr. [REDACTED] recommended that he be
2 removed to some employment where he was not working with
3 leaded gasoline. Now, having in mind the fact that this
4 physician was a general practitioner and not specializing in
5 lead poisoning cases, or any other facts which may suggest
6 themselves to you, do you attach any particular significance
7 to that recommendation?

8 A I do not attach any significance to that largely for the
9 reason that under the same circumstances I would not want
10 to give any such advice.

11 Q Now, Dr. Chabanoff in her testimony, at which time you were
12 present, referred to report of the Mt. Zion Hospital showing
13 a finding of 2 milligrams of lead in a 24 hour specimen of
14 feces and stating substantially that that proved to her that
15 Mr. [REDACTED] had absorbed an abnormal quantity of lead. Do
16 you reach the same conclusion upon that report?

17 A No.

18 Q Why not?

19 A The diagnosis of abnormal lead excretion cannot be arrived
20 at from the study of the lead content of the sample of feces
21 alone, chiefly for the reason that it is so easily possible
22 for one to ingest any quantity of lead up to 3 or 4 milligram
23 in the course of a day because of the varying lead content
24 of food and drink. Lead found in the feces is largely lead
25 which was put into the alimentary tract by swallowing in the
26 period of 24 or 48 hours immediately preceding the collection

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MR. HONE

DR. HONE

1 of the sample. Such lead may have come in part from the
2 body by excretion into the alimentary tract but it can be
3 readily demonstrated and has been demonstrated that the
4 greater portion of the chemical lead excretion is the re-
5 sult of lead content of food. That such lead was not ab-
6 sorbed into the body but transversed the alimentary tract
7 without absorption and appeared unabsorbed in the fecal
8 specimen. The daily content of our food under ordinary
9 normal conditions varies from one-tenth of a milligram up
10 to as high as four milligrams with the average quantity of
11 approximately one-fourth of a milligram.

12 Q Does the appearance of lead in the feces necessarily in-
13 dicate that lead had been in the tissues?

14 A No, and for that reason one does not study the fecal lead
15 in order to determine the rate of lead excretion. One knows
16 that that is not the case and that therefore it is not the
17 material which should be chosen in this type of study. One
18 should either study either the blood or urine or both.

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19 Q I understand then that the appearance of lead in the feces
20 has very little if anything to do with lead which was ab-
21 sorbed through the skin or inhaled by inhalation of lead
22 vapors?

23 A It has no relationship and in most instances is purely
24 residual.

25 Q Would you say that the quantity of 2 milligrams in a 24 hour
26 specimen of feces was beyond the range of what might be found

1 in normal individuals on a normal diet?

2 A Such values are not found frequently in a normal individual
3 but does occur from time to time in all normal individuals.

4 Q In view of this particular test being one test as against
5 several others, would you say it was particularly significant
6 or significant at all?

7 A It is not a finding which I would consider as a factor in
8 the diagnosis in this case in any way.

9 Q Magnesium sulphate is one of the things mentioned, I think,
10 by Dr. Chabanoff as being given to the patient suspected
11 to be suffering from lead poisoning and I am not sure whether
12 she said it had been given to Mr. [REDACTED]. Assuming he had
13 been given magnesium sulphate would that have any effect
14 upon this particular analysis of the fecal matter?

15 A That would merely tend to confirm belief that lead was
16 swallowed rather than excreted from the tissues because
17 magnesium sulphate in the ordinary does contain usually
18 several milligrams of lead. However, in all fairness it is
19 to be said that Dr. Chabanoff definitely stated she did not
20 administer magnesium sulphate during this period. Therefore
21 that is not a factor in my judgment.

22 Q In connection with the examination of bone made for lead
23 determination, was the examination of a rib in your judgment
24 sufficient?

25 A No, it is not. One should examine both flat bone and long
26 bone for it has been shown that the lead concentration in

1 the various parts of the skeleton is quite varied and the
2 extent of the variation is not fully known.

3 Q Now, with respect to Dr. Chabanoff's testimony, Dr.
4 Chabanoff testified that the necropsy result, the post
5 mortem result, proved that her opinion that Mr. [REDACTED]
6 was suffering from lead poisoning was correct. In view of
7 what was said, particularly this afternoon, I assume you are
8 in disagreement with the effect of the necropsy result?

9 A Absolutely so.

10 Q Next, Dr. Chabanoff stated that the medical literature showed
11 cases of lead poisoning after exposure had ceased for months
12 and even years. Are you in agreement with that?

13 A No, I am not. I have not been able to find any substantiated
14 cases of latent lead intoxication in which symptoms came on
15 within a period of six months to one and one-half years after
16 the cessation of exposure. In my experience the symptoms
17 do not recur except within a period of a few months under
18 the longest condition following the cessation of exposure
19 and even their recurrence following the cessation of exposure
20 is extremely rare.

21 Q Dr. Chabanoff quoted you as saying, and purporting to have
22 said, that basophilic or lead cells occur only occasionally
23 in lead poisoning cases and the medical literature shows
24 that such basophilic stippling of red cells occurs in only
25 12 per cent of the cases. Is that correct?

26 A No, it is not correct. My reference to the failure of

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MR. HONE

DR. HONE

1 stippling to occur in certain acute cases of lead poisoning
2 had to do with the acute fulminating type of tetraethyl
3 lead intoxication in which the onset of symptoms of an acute
4 type is so rapid, the blood changes do not take place
5 during the most acute symptoms. I pointed out, however, that
6 blood changes occurred subsequently in those instances. In
7 my experience stippling is a consistent finding during the
8 period of manifestation of acute symptoms in every instance
9 except those of acute fulminating tetraethyl intoxication

10 MR. DETHLEFSEN: Dr. Chabanoff, I might say, was quoting Dr.
11 Alice Hamilton.

12 MR. HONE: (Interrupting) She was quoting Dr. Kehoe.

13 A I think I can explain that discrepancy. The question of
14 whether stippling is found is largely a question of when
(53) 15 you look. During the period of exposure and during the
16 period of active symptomatology, stippling is almost always
17 present and I pointed the absence of it out in those acute
18 cases of tetraethyl lead intoxication as an important
19 variation from the normal and usual picture. However,
20 following the cessation of exposure and following the
21 diminution of symptoms, stippling does disappear rapidly
22 from the blood and it disappears long before the rate of lead
23 excretion has reached the normal level. In my experience
24 it is always present during the active period of intoxication
25 ting symptoms except as I have indicated in those acute very
26 rapidly developing cases of tetraethyl exposure where the

1 exposure is massive and accidental and occurs in a few
2 hours or maybe in a few minutes.

3 Q Dr. Chabanoff testified that in only 46 per cent of lead
4 cases may lead be demonstrated in the urine, is that
5 correct?

6 A That is distinctly not correct. It is the result of the
7 sort of contradictions in the literature of which the
8 Referee spoke a short time ago. Whether or not one finds lead
9 in the urine in abnormal amounts depends on the sensitivity
10 and the accuracy of analogical methods employed in the search
11 for lead and because methods have been quite variable in
12 their sensitivity and in accuracy and because of the quantity
13 of the samples used has been quite variable. One finds all
14 sorts of results in the literature all the way from entirely
15 negative to large quantities.

16 Q Now, you will recall Dr. Chabanoff's testimony that she
17 treated Mr. [REDACTED] in accordance with Dr. Flynn's in-
18 structions and particularly Dr. Chabanoff's testimony that
19 Mr. [REDACTED] failed to improve as a result. Is there any
20 significance in that?

21 A Probably not. It is somewhat suggestive, however, that when
22 one uses a treatment that is supposed to produce benefit
23 and it does not result in improvement one might perhaps
24 conclude that the treatment was ineffective because the
25 hypothesis upon which it was given was incorrect and that
26 possibly the diagnosis was incorrect. As a matter of fact,

1 one expects lead poisoning to improve even without treat-
2 ment after exposure is discontinued and when it fails to
3 do so, one is justified in being extremely skeptical of
4 his diagnosis.

5 Q Dr. Chabanoff referred to a case she treated of a woman
6 coming to her with complaints in a cleaning and dyeing
7 establishment using gasoline for that purpose. Is there
8 any significance in that case as related to this case?

9 A No, I see no significance except that this was a group of
10 symptoms derived rather obviously from a situation in which
11 there was no lead exposure and presumably the symptoms were
12 due to either gasoline intoxication or quite probably to
13 carbon tetrachloride intoxication since it is used in a
14 cleaning and dyeing establishment.

15 Q Leaded gasoline is not used in a cleaning and dyeing ex-
16 tablishment?

17 A It is not because it is colored and not a suitable cleaning
18 medium.

19 REFIREE: Is that the only reason?

20 A It has been used for almost everything else under the sun,
21 for cleaning tools and equipment in garages and other
22 places despite the warnings that it probably should not be
23 used for that purpose but it is actually and regularly used
24 for that purpose.

25 MR. HONE: The higher cost of leaded gasoline might have been
26 another reason?

(53)

MR. HONE (

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1 A It would have been once but probably not now.

2 Q Dr. Chabanoff referred to a second case which refers to
3 lead in printer's ink. This patient was a printer. Is
4 there any lead in printer's ink?

5 A No, printer's ink is a carbon. The lead, if any comes
6 from the type along with bismuth.

7 MR. DETHLEFSEN: (Interrupting) It is 5 minutes to four.

8 REFEREE: All right. Case continued 10 o'clock tomorrow
9 morning, March 2, 1958.

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CONTINUATION OF HEARING

Part 3

March 2, 1938

Pages 1 to 105 inclusive

WITNESS: Dr. Kehoe

1 Bright's Disease portion of it could scarcely be contributed
2 to Vitamin B deficiency, but the symptom complex seen in
3 life is not strikingly different from the picture often
4 described in Vitamin B deficiency, and particularly the
5 peripheral neuritis, which is an accompaniment of such food
6 deficiency quite frequently.

7 And would approximately the same answer be given to, we will
8 say, malnutrition?

9 To the extent that Vitamin B deficiency is a malnutrition;
10 it is a specific type of malnutrition.

11 Is it not true that the picture in this case is one which
12 renders it not at all improbable that assuming upon death
13 Telepnev had an abnormal quantity of lead in his system
14 that the presence of lead would be in itself ingestion
15 or absorption through food, liquids, medicines or other
16 sources subsequent to the termination of Mr. Telepnev's
17 employment in the laboratory in November 1935?

18 Well, I do not consider it probable that Mr. Telepnev did
19 absorb any large quantity of lead following the cessation
20 of exposure, but if you ask me if it is possible that is a
21 somewhat different matter, and I can only reply to that by
22 saying if at the time of his death Mr. Telepnev did have
23 an abnormal quantity of lead in his tissue, which I doubt,
24 it came from some source which was active during the period
25 following the cessation of his employment, and for the reason
26 that in my experience, which is fairly extensive, I have nev

MR. HONE: (54)

DR. KENOE:

1 seen yet a case in which excessive quantities of lead were
2 found in the tissues as long as eighteen months had elapsed
3 between the cessation of exposure and the death of the
4 patient and analysis of his tissue. The evidence quite
5 clearly, the evidence both of the rate of lead excretion and
6 the quantity of lead found in the tissue at necropsy indicate
7 that abnormal quantities of lead do not remain in the
8 tissues for indefinite periods of time following the cessa-
9 tion of exposure, and in no instance have I known them to
10 remain abnormal over a period longer than eighteen months.
11 Having in mind that Mr. [REDACTED] ceased his contact with
12 leaded gasoline at the Associated Refinery in November 1935
13 and having in mind Dr. Chabanoff's testimony that each time
14 she saw him he was worse and that he was worse in 1936
15 than he was in 1935, and that he was worse in June 1936
16 than he was in January 1935, and that he was worse at the
17 end of 1936 than he was prior, and that he was worse in 1937
18 than he had been in 1936, would those facts add to your
19 opinion that his condition was not attributable to any
20 possibility of lead contact during his employment terminating
21 in November 1935?
22 A Yes, I have already stated that in my opinion the progress
23 of his illness with increasing disability is enough in and
24 of itself to strongly argue against lead poisoning as the
25 cause of his disability during his period of employment. In
26 my experience this progressive progress following the

MR. HONE: (57)

DR. KEHOE:

1 cessation of employment is not to be expected; rather the
2 reverse is to be expected, that is progressive improvement, b
3 that I do not mean that I would necessarily have expected
4 the paralyses either to disappear or improve, but that the
5 general constitutional symptoms and evidence of intoxica-
6 tion should have disappeared progressively following the
7 discontinuance of the exposure.

8 Q Dr. Chabanoff testified in this case that in the literature
9 she remembered you mentioning that the testing of gasoline
10 was the most dangerous procedure of the whole business, is
11 that correct?

12 A No, that isn't correct, I have made no such statement.

13 Q What are the facts in that regard?

14 A I think it is almost certain that Dr. Chabanoff misinter-
15 preted the type of cases I was discussing when I referred
16 in one of my articles to blindness of laboratory workers.
17 This reference had to do with the activity of workmen in
18 the manufacturing plants in which tetraethyl lead is manu-
19 factured and prepared for use in gasoline. Nothing that
20 I have ever said with regard to the instances of lead
21 poisoning or the dangers, actual dangers, has ever had any
22 reference to persons working with gasoline.

23 Q In your opinion, is there any danger whatever in handling
24 and testing gasoline containing tetraethyl lead?

25 A I have never seen any evidence of any such danger and it is
26 my firm conclusion that there are no such dangers in

MR. HONE: (()

DR. KEHOE:

1 connection with the normal testing operations and activities

2 Q And the operations of Mr. Telepnev in this case would be
3 normal testing activities of leaded gasoline?

4 A They were, from all the information I have been able to
5 obtain.

6 Q And that information is based upon your knowledge of all
7 the evidence in this case?

8 A Yes, it is, and from further questioning carried on on my
9 own.

10 MR. HONE: That is all.

11 MR. DETHLEFSEN:

12 Q Doctor, what is your full name?

13 A Robert A. Kehoe.

14 Q And where were you born?

15 A The State of Ohio, very near to Cincinnati.

16 Q And I presume you went through ^{the} elementary schools in that
17 vicinity?

18 A Yes, Georgetown.

19 Q And the high school at Georgetown? A. Yes.

20 Q And after you graduated from high school, then what college
21 did you attend?

22 A The Ohio State University for one year, and then because of
23 my desire to study medical I went to the University of
24 Cincinnati.

25 Q And what year was it you left the Ohio State?

26 A 1914.

1 Q Then you took a pre-medical course?

2 A A pre-medical course at the University of Cincinnati and
3 continued on in medicine at the University of Cincinnati.

4 Q How many years pre-medical course did you take at the
5 University of Cincinnati?

6 A One year at the Ohio State and the second year at Cincinnati
7 and then went on with the combined medical course so as to
8 include a bachelor of science and a bachelor of medicine
9 degree.

10 Q And how many terms did that take?

11 A Six years.

12 Q And that made then seven years?

13 A It made six, because of one year at Ohio, three included
14 in the pre-medical years at that time. It is now three.

15 Q And what year did you graduate?

16 A 1920.

17 Q And after your graduation, did you interne?

18 A No, I did not; my interest had been definitely in the
19 direction of investigative work, and I had been working in
20 the pathological department of the University for a period
21 of two years, and I continued as the resident pathologist
22 in the General Hospital, which was regarded officially as
23 the equivalent of an internship.

24 Q And when you refer to the General Hospital, do you mean the
25 General Hospital of the City of Cincinnati?

26 A The Cincinnati General Hospital, which is part of the

1 Medical School.

2 Q How many years did you spend in that hospital?

3 A Well, I actually lived in the hospital and worked in the
4 pathological department as a student and resident pathologist
5 for a period of two and a half years.

6 Q And what year did you leave there?

7 A I left that work in the latter part of 1921.

8 Q Up to that time had you established yourself in an office
9 for the general practice of medicine and surgery?

10 A I have never been established in an office; my work has
11 always been at the University.

12 Q And you have no office at the present time for the general
13 practice of medicine and surgery?

14 A I have not.

15 Q When you left the Cincinnati General Hospital, then did you
16 go as an employee of this oil company that you are now the
17 medical director of?

18 A No, I went into the Department of Physiology as Assistant
19 Professor of Physiology and carried on outside work as the
20 director of the clinical pathological laboratory of the
21 Jewish Hospital, which is one of the largest hospitals in
22 Cincinnati.

23 Q How long did you continue in that work?

24 A Until 1924, but my major work was in the University, where
25 I was in the capacity of a full-time member of the faculty
26 and have been since that time.

1 Q And still are at the present time?

2 A Yes.

3 Q Now in 1924 then, what did you do?

4 A In 1924 my specific work with this problem began in that I
5 was, I spent the summer of 1924 studying and advising as
6 to some difficulties that had arisen in the manufacturing
7 activities of tetraethyl lead in Dayton, Ohio.

8 Q You went to Dayton, Ohio?

9 A I worked at Dayton, Ohio, through the summer.

10 Q And were you working there for some oil corporation at that
11 time?

12 A No, I was working at the request of the ^{the people in the} General Motors
13 Research Corporation, who developed this product experiment-
14 ally and who ran into difficulties in one phase of their work
15 when they got along to the semi-production scale.

16 Q And you say you were up there studying the problems of the
17 manufacture of tetraethyl lead?

18 A Yes.

19 Q What were those problems?

20 A This was a small manufacturing plant which was the outgrowth
21 of an experimental discovery, and when relatively unskilled
22 workmen were introduced into this shop, which had previously
23 been a chemistry shop, the conditions of exposure which had
24 previously not been recognized to exist resulted in the
25 poisoning of a number of men, and it was simply a question
26 as to whether the plant should be carried on and what could

1 be done to protect the workmen and what could be done to
2 make the manufacturing process safe, and my job was to take
3 care of the men that were ill at that time and to study
4 the plant and to try and devise safeguards which would per-
5 mit this work to go on, if possible, under safe conditions.

6 Q Were you associated in other details with the care of these
7 men?

8 A I was asked to do it because of my experimental work for
9 several years, which had been concerned with the heavy
10 metal poisonings, and that fact being known I was asked to
11 come in and investigate the problem and do what I could.

12 Q And in investigating this problem, how many men did you
13 treat suffering from tetraethyl lead poisoning?

14 A At that time I went ^{to} through the plant, and what, ^{it} occasioned
15 my coming was the serious illness of a group of 25 or 30
16 men, and there had been two deaths which were pretty certain
17 attributable to their occupational exposure, and that threw
18 enough fright into the whole project, and there was a ques-
19 tion as to whether it should be abandoned or whether they
20 should go ahead and do something further with it.

21 Q Was that the Ethyl Corporation?

22 A No, it was prior to the formation of the Ethyl Corporation,
23 it was ^a ~~this~~ little chemical company organized as a conse-
24 quence of this discovery, which came out of the research
25 laboratory as the consequence of about ten years of techni-
26 cal experimental work.

1 Q And how long did you stay in that position?

2 A Only through the summer, because I was due to teach at the
3 University of Cincinnati and I could not spend any longer
4 time there.

5 Q And at the end of that summer, then, where were you employed?

6 A I did continue in an advisory capacity, however, going back
7 and forth between Dayton and Cincinnati from time to time
8 and supervising certain changes in the plant, and certain
9 experimental studies that were being carried on under my
10 general direction.

11 Well, then, after that summer and your position of
12 Assistant Professor at the University of Cincinnati, did you
13 engage in any other practice or advisory work?

14 A Yes. The general salaries of the University of Cincinnati
15 are not very large and it is not uncommon amongst the
16 University -- the University of Cincinnati is not a wealthy
17 university, as a consequence of which it was the general
18 practice there to permit their full-time members of the
19 faculty to engage in consultation work and general medicine
20 or in any other field in which their interests or professional
21 training allowed them to go. My consultation in that field
22 has been that of advisor to the industries that have been
23 concerned in the manufacture and handling and distribution
24 of leaded gasoline, largely as a matter of chance. I
25 was for a time the only person who had had any experience
26 and had any direct knowledge of this subject, and when

1 the Ethyl Gasoline Corporation was formed, fortunately for
2 me, they more or less naturally came to me for advice and
3 assistance, and I have continued in that capacity up to the
4 present time.

5 Q Even at the time of this hearing?

6 A Yes, at the present time.

7 Q Are you in their employment at the present time?

8 A To the extent that a physician is in the employ of anybody,
9 that is a rather theoretical question.

10 Q Now, the corporation that you are the medical director of
11 at the present time is called what?

12 A The Ethyl Gasoline Corporation.

13 Q The Ethyl Gasoline Corporation? A. Yes.

14 Q And you have your laboratory in the City of Cincinnati?

15 A Well, I think you must understand my laboratory -- our
16 laboratory -- is a laboratory for the study of occupational
17 diseases in the University of Cincinnati, and I am the
18 director of that laboratory and in a full-time capacity,
19 with my primary responsibility to the University of Cincinnati
20 under the Dean of the Medical School and under the Board
21 of Trustees of the University, with the necessity of having
22 their full knowledge and consent in all of the experimental
23 activities I carry on in that laboratory.

24 Q But your salary comes from the Ethyl Corporation?

25 A No, my salary comes in part from the University of
26 Cincinnati and I rather obviously draw a retainer fee from

1 the Ethyl Gasoline Corporation for such advice and assistance
2 as I give them.

3 Q And as such you testify in the various cases that arise out
4 of the use of the ethyl gasoline and in various parts of the
5 country, do you?

6 A Not necessarily. I do if I choose and if the circumstances
7 are that I can testify out of my own knowledge and experience

8 Q Now I presume you are here being paid by the defendants,
9 Associated Tide Water Oil Company?

10 A I have no understanding whatever with the Associated Oil
11 Company. My expenses are being paid by the Ethyl Gasoline
12 Corporation, if you want to know.

13 Q By that you refer to the Ethyl Corporation? A. Yes.

14 Q Isn't your laboratory a sort of central distributing point,
15 you might say, where occupational diseases arising out of
16 gasoline or tetraethyl lead or leaded gasoline are all con-
17 centrated in your laboratory?

18 A That amongst other things. My laboratory has been concerned
19 with the study of lead poisoning more than any other problem,
20 and that has involved studies in relation to public health
21 problems that arise from lead, such as the front spray
22 problem, and such as lead exposure in quite large plants, and
23 the storage battery plants. Because of the nature of my work
24 I was permitted by the University of Cincinnati to undertake
25 the study of this problem as a public problem in public
26 health and industry along with the problems on which we were

working.

Q When was the problem of this [REDACTED] case first called to your attention?

A My first knowledge, I believe, (I will have to state from my memory because I haven't my correspondence with me) was in ~~I believe~~ in the spring or early summer before the hearing in this city, the summer before last.

Q It was in Mr. [REDACTED] lifetime?

A Yes, it was in his lifetime, but I cannot just recall.

Q Who first called this case to you, it was the Ethyl Corporation?

A No, my first attention was called to it by one of my own associates who was asked about the case by Mr. Hugo, I believe, who was the refinery superintendent in the refinery in which Mr. [REDACTED] worked.

Q That is the one here in California of the Associated?

A Yes.

Q And did that come in the form of a letter or just reporting the case to you?

A He mentioned the case at the time and gave some brief description of it.

Q Well do you recall the description of the case he gave you at that time?

A No, I do not in detail, because actually it was reported in more or less layman's language to one of my associates, who in return reported it to me verbally, and I had no correspondence on it until some time later, I having written Mr.

1 Hugo on receiving this information and having asked for
2 further information about the case.

3 Q In your position, receiving a retainer from the Ethyl
4 Corporation, isn't it one of your duties to advise all the
5 various oil companies using lead gasoline?

6 A Yes, I have been responsible for laying down the regulations
7 or setting up the detailed precautionary measures in relation
8 to the proposition of leaded gasoline in these various
9 refineries where the fluid is mixed with gasoline and in
10 prescribing precautionary measures from all of the situations
11 which in my knowledge are in any way hazardous with relation
12 to this entire industry, from the top to the bottom.

13 Q Well, now you say you have not made any arrangements regard-
14 ing your fee schedule here; isn't your regular fee \$350 per
15 day and expenses from the time you leave Cincinnati and
16 return?

17 A I have never collected such a fee.

18 Q You never have?

19 A No; actually my standard fee where the people involved can
20 afford it, and I make no charge if they cannot afford it,
21 is \$100 a day and my traveling expenses, and any fees which
22 I collect in expert testimony go into our laboratory research
23 fund and do not accrue to me personally, because when I
24 testify as an expert witness I testify on information de-
25 rived from laboratory studies and my general philosophy of
26 that is that I testify on the best information which has

1 come out of the laboratory and any benefit which comes from
2 such testimony is only properly due to the source of infor-
3 mation. That is the general arrangement at the laboratory.

4 Q I wasn't going to ask you this, but as to turning your fees
5 over to the University, you are under a general retainer
6 from the Ethyl Corporation?

7 A Yes.

8 Q What is that retainer a year?

9 MR. HONE: I object to that; it has absolutely no bearing on
10 this case and I think it is an impertinent question.

11 REFEREE: The very general rule is that the very widest latitude
12 is allowed in examining an expert for the purpose of test-
13 ing his credibility by showing interest in the matter, and
14 under that general rule I am not going to be very strict,
15 so I will overrule the objection.

16 MR. HONE: I will advise the doctor it is a matter of his own
17 personal desire.

18 REFEREE: Well, I shall hold him for contempt if he does not
19 answer.

20 A I do not mind answering. My salary from the Ethyl Gasoline
21 Corporation has been an annual fee which has gone up from
22 year to year more or less, naturally, and it is now \$14,000
23 a year.

24 MR. DETHLEFSEN: Q. \$14,000 a year?

25 A Yes, which, of course, is a great deal more than I could ever
26 hope to receive from the University of Cincinnati as a salary

1 Q And are you not subject to call and direction of those that
2 retain you with this annual fee for the purpose of testify-
3 ing, in addition to other duties?

4 A I am distinctly not. I am a doctor of medicine and I testify
5 when I choose and at no one's call.

6 Q Now, how many cases would you say you have testified to re-
7 garding lead poisoning in the last three years?

8 A Lead poisoning or tetraethyl poisoning?

9 Q Both.

10 A Oh, probably fifteen before the Ohio Industrial Commission
11 as their consultant.

12 Q And any other states other than California and Ohio?

13 MR. HONE: (Interrupting) Have you finished your answer, Doctor?

14 A I was. Probably some ten or twelve others, a few of which
15 have been concerned with the problem of tetraethyl lead, but
16 more of which have been concerned with the occupational
17 lead poisoning in other industries.

18 MR. DETHLEFSEN: Q. Have you ever testified in behalf of any
19 patient suffering from lead poisoning?

20 A Yes.

21 Q When was that?

22 A The case ⁱⁿ before which I appeared before the Ohio Industrial
23 Commission and in one or two occasions on behalf of the
24 claimants and not of the defendants.

25 Q Was that with reference to tetraethyl lead poisoning?

26 A No, I believe only one instance on behalf of the patient,

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1 whose reputed poisoning was tetraethyl lead. The ~~rest~~ ~~of~~ ~~the~~
2 was an employee of the General Motors Chemical Company
3 prior to the founding of the Ethyl Gasoline Corporation, in
4 which I appeared at the request of the Commission to give
5 advice with relation to this case.

6 Q Well, in your opinion, then, Doctor, testing, making tetra-
7 ethyl lead tests, constitutes no hazard to the person making
8 them, irrespective of the amount of vapor coming from them
9 or the amount of absorption to the hands or any other
10 source?

11 A I must ask you to say whether you mean tetraethyl lead or
12 tetraethyl lead gasoline.

13 Q Yes, the tetraethyl gasoline, such as being made by Mr.
14 [REDACTED] in this case?

15 A It is my opinion that that involves no danger to lead poison-
16 ing.

17 Q And one could not take lead poisoning from engaging in an
18 occupation of that kind?

19 A In fact it is my opinion that it is impossible to acquire
20 lead poisoning in that occupation.

21 Q At the second point regarding Mr. [REDACTED] in which you
22 stated you did not feel he obtained this in the course of
23 employment with the Associated Oil Company, was that the
24 clinical picture progressing one and one-half years until
25 the termination of exposure?

26 A That is one point in my opinion, yes.

1 Q And you feel from your experience, do you, that the lead
2 would be excreted or thrown out of the body in a period of
3 six or eight months following the period of termination of
4 exposure?

5 A In a period within some eighteen months, yes.

6 Q Do you know of any case where there has been lead poisoning
7 that has developed after the termination of exposure to
8 lead poisoning?

9 MR. HONE: Are you speaking of lead generally?

10 MR. DETHLEFSEN: Lead generally.

11 A Within what limitation of time?

12 MR. DETHLEFSEN: Q. Within any limitation of time?

13 A I know of no case in which lead poisoning has developed
14 following the cessation of exposure within a period longer
15 than a few weeks.

16 Q Well, is it a known fact, Doctor, that lead may be deposited
17 in the dust in the garage that uses ethyl gasoline?

18 A It is a known fact that there is some dust in garages that
19 use ethyl gasoline, and it is also a known fact that there
20 is dust in all garages, regardless of whether they use
21 tetraethyl gasoline or any other gasoline; lead compounds
22 are used in garages in the form of solder and in the form
23 of storage batteries, naturally, and it is well known that
24 lead is found within the dust on the floor of such garages.
25 There has ^{few} not, however, been cases of lead poisoning with
26 any measureable degree of frequency amongst garage mechanics.

1 It is not regarded as a hazardous occupation in the sense
2 that it produces numerous or even few cases of lead
3 poisoning.

4 Q Well, now the third point, that you thought Mr. [REDACTED] did
5 not receive this as a result of his occupation was that
6 the clinical picture was not one of sufficient characteris-
7 ties of lead, without a history of abnormal exposure, is
8 that correct?

9 A Yes, it is not a typical picture of lead poisoning.

10 Q Would you feel that one cannot absorb lead during the long
11 period of time in small quantities and have it stored in
12 the body?

13 A No, I did not say that.

14 Q Do you feel that one handling lead products in small degrees
15 over long periods of time that there may be storage of lead
16 in the system there that would cause lead poisoning?

17 A There may be, and there is lead absorption under conditions
18 of exposure to lead compounds. That I may say is the
19 universal experience. We are all exposed to lead compounds
20 and we all absorb lead and we all have lead in our tissues
21 and excreta, and the quantities of lead required to produce
22 lead poisoning even over any period of time, six months,
23 two years, twenty years, is a definite thing. The small
24 quantities we normally are exposed to do not produce lead
25 poisoning in the general population.

26 Q Now, Doctor, other than the summer in which you had charge

MR. DETHELTSEN: (59)

DR. KIMBLE:

1 of these men that were suspected or had lead poisoning, have
2 you actually treated any case?

3 A Yes, quite a number. There had been a series of cases
4 of tetraethyl lead poisoning in the manufacturing end of the
5 trade up to and including the year 1925, and since that time
6 there have been a few cases of tetraethyl lead poisoning,
7 several from accidental ingestion, one with suicidal motive,
8 something like twelve, I believe, associated with the
9 cleaning of tanks that had contained lead compounds, and
10 in all since 1925 there have been, I believe, about --
11 well I will say in round numbers about twenty cases, I may
12 be wrong in my figures -- excuse me a second-----.

13 (Mr. Hone giving the doctor a book).

14 A (Continuing) ----- about twenty-one cases (referring to table
15 in book) since 1925.

16 MR. DETHELTSEN: Q That have been called to your attention?

17 A That I have either myself seen and treated and diagnosed,
18 or that one of my immediate associates have seen and treated,
19 and with which I have been in actual contact.

20 Q Would they report to you findings on examination?

21 A Yes.

22 Q And how many out of that 25 cases, did you see?

23 A About 21, I believe, since 1925.

24 Q How many have you personally examined of that 21?

25 A I believe about six.

about six?

A. Yes.

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1 Q And that has been since what year?

2 A Since 1925.

3 Q 1925?

4 A The difficulties occurred in this industry prior to the period
5 of 1925.

6 Q When did the difficulties start in?

7 A The first difficulties occurred late in 1923, and extended
8 through into 1925 during the period in which there were not
9 really adequate precautionary measures taken in the manu-
10 facturing industries.

11 Q Well, Doctor, isn't it true in one of your articles you
12 stated that the lead content of dust in garages is increased
13 by the use of leaded gasoline?

14 A No, I don't think so. I don't think so. I think what I said
15 was that one would expect such an increase, but I don't
16 think our figures permitted us to say definitely that there
17 was any striking increase or any definitely recognizable
18 increase as a consequence of the use of leaded gasoline.

19 Q You have your book there with your article; can you turn
20 to that particular portion regarding the lead content of dust
21 in garages that use leaded gasoline?

22 A No, because it isn't published, nor have our figures on the
23 lead content of dust in garages been published in detail,
24 since a rather large series of such observations were re-
25 ported by the United States Public Health Service and by
the British Ministry of Health, their figures being more

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MR. DETHLEFSEN: (60)

DR. KYNHOE:

1 comprehensive than ours; I never published ours at all. If
2 Dr. Chabanoff knows any reference to such a statement I
3 would be glad to have it.

4 MR. HONE: I think it is only fair.

5 A It will save me time.

6 MR. HONE: I think it is only fair as a matter of fact. I
7 understand we are not subject to strict rules of evidence,
8 but if reference is made to written articles that they should
9 be produced and shown to the witness; otherwise, the reference
10 should not be made because it carries implications / which
11 be difficult for the witness to disprove.

12 MR. DETHLEFSEN: Well, he is an authority and he should remem-
13 ber what he has written.

14 MR. HONE: I think he has done remarkably.

15 MR. DETHLEFSEN: I will not try to confuse you. Journal of
16 Medical Hygiene, Volume 16, Page 101. It is in that
17 journal or it is in the Journal of Medicine.

18 MR. HONE: You don't mean that.

19 A Journal of Industrial Hygiene, 1934.

20 Q Volume 16, Page 101.

21 MR. DETHLEFSEN: Oh, it is in the Journal of Industrial Hygiene,
22 Volume 15 at Page 306, one or the other.

23 REFEREE: Well, let us see.

24 MR. HONE: Both of the publications just referred to are present
25 in the courtroom, are they not?

26 I believe so.

KE 0022167

MR. HONE:

DR. KEEHOE:

1 Q All right, I will ask you to refer to each of those.

2 A All right. With reference to the articles last mentioned,
3 the article which appears in the Journal of Industrial Hygiene
4 Volume 15, Page 306, there is no reference in this article
5 from beginning to end to dust in garages. This article is
6 concerned with the study of a series of non-hazardous lead
7 trades in manufacturing of white lead and the manufacture
8 of lead storage batteries and the manufacture of tetraethyl
9 lead in the manufacturing plants, which are now in existence
10 and which have been under study for a period of years.

11 MR. DETMERS: Q. Now the other article; is there anything
12 in that?

13 A The other article has to do with the Journal of Industrial
14 Hygiene, Volume 16, 1934, which is a report of a comprehen-
15 sive study of the hazards associated with distribution and
16 use of gasoline containing tetraethyl lead, as carried ^{out} by me
17 and my associates in the laboratory. This problem begins
18 with the discussion of all of the hypothetical hazards which
19 are either known or imagined in connection with the distri-
20 bution and use of leaded gasoline, and it is probable at that
21 point that some reference has been made to the fact that lead
22 in the exhaust gas of automobiles may be expected to be found
23 in the atmosphere at those points and they also may be ex-
24 pected to be deposited in some degree on the floor of garages
25 along with the lead. It is a rather long article with a
26 good deal of tabular data in it, and I may say for the benefit

KE 0022168

MR. DETHLEFSEN: (60)

DR. KIMHOE:

1 of the referee that that article reviews and cites the
2 available literature on the subject up to the time it was
3 written, in case one is interested in the references.

4 Q Well, you say in here that the sale of gasoline to the con-
5 sumer takes it into the province of the general public
6 where to some degree ^{sk} in contact and vapors may occur.

7 MR. KIMHOE: What page?

8 MR. DETHLEFSEN: Page 102, the second paragraph at the top.

9 Q What do you mean by that, Doctor, that the sale to the
10 general public and handling of it?

11 A Involves exposure to gasoline and to the exhaust gases
12 from the consumption of gasoline in automobiles on the
13 part of ourselves, you and me and everybody else that uses
14 an automobile and that walks in the streets, etc.

15 Q Wouldn't the exposure be greatly increased in the case of Mr
16 [REDACTED] making these experiments which he made of tetra-
17 ethyl lead gasoline?

18 A As compared with the filling station attendant and garage
19 mechanic?

20 Q Yes.

21 A The answer is distinctly "no."

22 Q And do you know Dr. Logan Glendenning; do you read about him
23 in the newspapers?

24 A I do not know him personally; I know his writings.

25 Q From where was he graduated?

26 A I am sorry, I cannot answer that.

KE 0022169

REFEREE: (61)

DR. KENOE:

University of Iowa.

MR. DETHLEFSEN: Is that it? He is more or less an authority on the general practice of medicine, isn't he?

A Well, he writes syndicated articles in the newspapers, if that makes him an authority.

Q It would indicate him as being an expert on the articles he writes?

A It would indicate he had time to write syndicated articles and would indicate he hasn't very much time to do research work.

Q Do you know that it is only within the last three days he recommended wearing a certain type of glove for the employees of oil stations wearing gloves or handling tetra-ethyl?

A Well if he did, it is very bad advice.

Q You don't know of this article appearing three days ago, do you?

A No, I have never seen it.

MR. HONE: (Interrupting) Do you, Counsel?

MR. DETHLEFSEN: Yes, I saw it.

MR. HONE: Well, I think it ought to be produced.

A May I say this.

REFEREE: It would be better to produce it.

A In explanation of my statement that if he is advising the use of a certain type of gloves as a protection against lead absorption, it is bad advice. If he has some other knowledge of the necessity of protecting men against skin

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REFEREE: (61)

DR. KIHCE:

1 contacts with something or other, perhaps I am being a bit
2 hard to say it is bad advice.

3 MR. DETHLEFSEN: Q. Well, wasn't this laboratory, that Kittering
4 Laboratory, really established for the purpose of attempting
5 to prove to all users of tetraethyl gasoline and those en-
6 gaged in the manufacture and testing and use of it that it
7 was not harmful to the system?

8 A. Now, do you think that is a fair question to ask me, a
9 university man, if a laboratory was established in his
10 university to prove that this particular product was not
11 dangerous?

12 A. Yes.

13 A. Wouldn't it be fairer to say that this laboratory was to
14 find out whether it was dangerous.

15 Q. You are testifying in these cases to prove that it isn't ,
16 that this is a non-hazardous occupation. I did not mean
17 anything than the most courteous question to you. I am
18 not saying such is the fact.

19 REFEREE: The answer is worthy of the question, that equalizes
20 it.

21 MR. DETHLEFSEN: Q. Quoting from your work of March 1934 in your/
22 on Page 103, "Garages in general are poorly ventilated, few
23 of them indeed are equipped to maintain adequate dilution
24 of exhaust gases under the most favorable conditions, and
25 when doors and windows are closed in cold weather ventilation
26 is often negligibile, and for this reason through the winter

KE 0022171

1 months many mechanics develop late afternoon headaches from
2 the absorption of carbon monoxide. The exposure to lead
3 in the exhaust gas of automobiles burning leaded gasoline
4 is greater therefore than that of any group of persons
5 in the community." And continuing down about fifteen lines,
6 "The spillage and evaporation of gasoline leave behind a
7 large volatile tetraethyl lead, to be slowly volatilized at
8 a later time and to be decomposed, and by so doing then after
9 the lead dust in the garage in the dismantling of motors
10 and carbon products of tetraethyl lead may be encountered
11 by the mechanic, and although these cannot be absorbed
12 through the skin they may be a means of contaminating his
13 hands, his clothing and his surroundings. We must regard
14 these factors, as well as the deposits of lead of exhaust
15 gases as contributing to the accumulation of lead dust
16 within the garage, although the amounts of lead involved are
17 probably not so great as that originally from the electric
18 storage batteries and use of paint and solder in the repair
19 of automobiles." That is the particular portion you refer
20 to?

21 A Yes, and at that point I was reciting the whole list of
22 hypothetical dangers regardless of whatever they might be,
23 and regardless of whether or not they were actually measur-
24 able. I tried to recite every factor that could complete
25 the lead exposure of garage mechanics in association with
26 those performing such work.

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YE

MR. DETHLEFSEN: (62)

DR. MEDHOE:

1 Q Well, there is a danger then of inhaling, you might say,
2 this dust in garages such as I have just read?

3 A It is a hypothetical danger and our purpose has been to
4 study that danger carefully, and the results of which study
5 have been to conclude that the dangers are not of any actual
6 or consequential value.

7 Q Now you are basing your opinion upon the entire file. What
8 file do you refer to?

9 A The records in this case, which are available here in the
10 room, I believe.

11 Q And have you read the record of the Industrial Accident
12 Commission?

13 A Well I have gone over rather carefully, I believe, all of
14 the testimony that has been offered in any of the hearings
15 before the Commission insofar as they have been made avail-
16 able to me, and I believe that is practically the entire
17 record, and incidentally it is a duty on my part to investi-
18 gate these cases on my own behalf and to make adequate report
19 on them to the United States Public Health Service for their
20 information.

21 REFEREE: Q. By virtue of what connection?

22 A By virtue of a gentlemen's agreement with the Service. I
23 have no legal or professional responsibility to do so.

24 MR. DETHLEFSEN: Q. Well, lead dust from gasoline has been
25 actually measured, hasn't it?

26 A Yes, in the exhaust gas.

KE 0022173

MR. DETHELFSEN: (62

DR. KIMBLE:

1 Q But what percentage does it contain of lead?

2 A What percentage does the exhaust gas contain of lead?

3 Q Yes.

4 A I can't tell you the range of values offhand, because I do
5 not remember them. They are quite variable, depending on the
6 actual time in which the observations are made both in
7 relation to the operation of the car and with relation to
8 the age of the car; that is these deposits are found along
9 the whole exhaust system of the automobile, and they tend to
10 deposit fairly rapidly on a new car so that the whole thing
11 becomes covered with the deposit, and the proportion that is
12 actually thrown into the atmosphere increases to some degree
13 and the result is widely variable and I don't remember.

14 Q Do you recall the report of investigation made by Dr. Sayre?

15 A Yes, I have know of Dr. Sayre's work since the beginning,
16 and I was partially responsible for the turning over of this
17 end of the problem for careful study to the United States
18 Bureau of Mines for the reason ^{that they} I had facilities for studying
19 ~~and which he~~ did not have in the laboratory, and for the
20 further reason that they occupied a position of trust in
21 relation to the United States Government, which I myself
22 did not occupy, and in this period of 1923 and 1924 I was
23 a substantially unknown person and anything I might have
24 said on the subject would have been taken with a "grain of
25 salt," whereas their observations would be and have been
26 taken as totally disinterested.

KE 0022174

1 Q Are you able to recall now the percentage of lead dust as
2 the result of this investigation?

3 A They did not work on dust in garage floors or the particular
4 amount of lead in the exhaust gas of motors, putting exhaust
5 gas into a chamber on which they studied with animals, and
6 I don't remember their figures because there are actually
7 reams of data one would have to go over and remember.

8 (63)
9 Q It was greater than ten per cent, wasn't it?

10 A You mean ten per cent lead in the exhaust pipe gas?

11 Q Yes.

12 A Oh, no, that is an absurd figure. There actually is only
13 five per cent of carbon monoxide and that is the largest
14 single constituent of dangerous material in the exhaust
15 gas. Incidentally, my conclusion and those of the Bureau
16 of Mines are in precise harmony in these matters.

17 Q You said something about printer's ink, what was that, on
18 your direct examination?

19 A I believe Mr. Hone asked me if printer's ink had lead in it,
20 and I said it does not; I do not remember the connection
21 otherwise.

22 REFEREE: Yes, that was the question and answer.

23 MR. HONE: Yes, that is it.

24 REFEREE: Q. You said it was composed of carbon.

25 MR. DETHLEFSEN: Q. Do you know who Alice Hamilton is?

26 A Yes, I know Alice Hamilton quite well personally and pro-
fessionally.

1 Q And is she an authority along any lines?

2 A She is a recognized authority, she having been for many
3 years Professor of Industrial Toxicology in Harvard
4 University.

5 Q And she has written articles on lead poisoning?

6 A Yes, indeed, a great deal on the subject of lead poisoning.

7 Q Well, lead is really an accumulative poisoning, isn't it?

8 A Within certain limits. Lead accumulates if the dosage
9 taken in regularly is sufficient; however, it does not
10 accumulate in limited dosages within the limits of normal
11 intake and output; the output keeps up the intake.

12 REFERENCE: Q. And is that true regardless of the amount taken?

13 A Entirely so, as can be clearly demonstrated by the fact that
14 the concentration of lead in the skeleton of young children
15 varies only slightly from the concentration found in the
16 skeletons of old men. There is no satisfactory evidence
17 of a progressive accumulation of lead increasing concentra-
18 tion with the years of advancing life.

19 Q I suppose it is not known and could not be ascertained just
20 the maximum amount of it, more correctly, the minimum amount,
21 no the maximum amount, the maximum amount that an individual
22 might take, an average individual might ingest through a
23 period of ten years and yet not be the victim of any ingestion
24 of lead intoxication?

25 A It is not known in precise terms, but within certain limits
26 and within practical limits. It is rather well known, for

REFERENCE: (3)

(. REMOVED)

1 example, since the time of Sir Thomas Legge and Kenneth
2 Goodby's studies in England, it has been believed by indus-
3 trial hygienists who have had the widest experience with this
4 problem that if the lead dust in the atmosphere is not in
5 excess of five milligrams per ten ^{liter volume} centimeters of air through
6 the working day that cases of lead poisoning will not occur
7 at all or may be of such mild clinical character as not to
8 give serious injury. Since that time both direct and indirect
9 observation has stated the figure at a slightly lower level,
10 so that it is now believed by a number of persons whom I
11 regard as the most competent authorities that if the lead
12 concentration in the atmosphere is less than two milligrams
13 per ten ^{liter} centimeters of air cases of lead poisoning will
14 not develop, even after years of daily exposure. The reason
15 for believing that this a fair expression of facts has come
16 first of all from years of clinical observation in which
17 under those conditions cases of poisoning have not been seen
18 and has been in the latter days explained rather adequately
19 by the fact that at that level of exposure the lead excretion
20 in the feces and in the urine has been elevated in the
21 population group to such an extent as to lead one to believe
22 that intake and output are equivalent so that storage does
23 not occur beyond a certain point in which the quantity of
24 lead within the tissues of the body is in equilibrium with
25 whole in and outflow of lead, so that it is now believed,
26 and I think very well substantiated, that there is a

dynamic equilibrium within certain limits of lead intake with a slight elevation in the lead output, which is maintained at the equivalent with lead intake, and I personally believe that lead poisoning occurs at levels of lead exposure in which that equilibrium cannot be maintained because of the inadequacy above the certain level of exploratory mechanism, and we have shown fairly good evidence of the range of lead exposure within which those conditions come to pass.

Q Would those calculations in any wise be affected by any pathological process or disease process that might be activated within the body of one who had taken in small quantities of lead over a long period of time?

A They might be, and in fact one would suspect that they would be, but as a matter of fact no evidence has actually been obtained that that is the case.

Q And isn't it the case that none could be obtained?

A No, I don't think so, because in the study of plant population under conditions of exposure, which is where types of work have to be done, one doesn't find men so definitely under par physically, with blood vessel disease, and with chronic kidney disease and with chronic infections of a variety of sorts, and our general attitude in relation to these men is that if the conditions of work are safe within the limits which I have described, there is no necessity nor is there any advisability in removing these other men from their occupations. That policy has not been followed by any

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REFEREE: (65)

DR. KIMHOE:

1 disastrous results amongst these men or by any results that
2 would lead one to believe that they do not handle lead
3 within those limits any less well in a practical sense than
4 perfectly normal individuals. As a matter of fact, some
5 recent studies have been made of men with general blood
6 vessel disease in which strangely enough it has actually been
7 found that the rate of lead excretions seem to be somewhat
8 higher than that of persons without blood vessel disease.
9 I question these results, but they are available in the
10 literature.

11 REFEREE: Go on, Mr. Dethlefsen.

12 MR. DETHLEFSEN:

13 Q. Doctor, is it not true that acid base equilibrium influences
14 the deposit of lead as regards conditions which tend to depos-
15 it calcium in bones could also tend to deposit lead from
16 circulation into bones, and that under such conditions the
17 actual quantity of lead circulating could not be measured
18 quantitatively?

19 A You ask me if that is a fact?

20 Q Yes.

21 A That is a hypotheses, it is not a fact.

22 Q Not a fact?

23 A No. As a matter of fact, one never finds in any normal per-
24 son or any sick person a time when there is not lead in the
25 circulative blood, if you will look by sufficiently sensitive
26 methods. That is true even of a primitive population living

KE 0022179

1 under conditions in which there is no lead exposure except
2 the natural exposure with the intake of food absorption.

3 Q Isn't it true that intake by the lungs and digestive tract is
4 in the same manner?

5 A They are distributed in the tissue in essentially the same
6 manner.

7 Q And you are familiar with the work, I presume, of Dr.
8 W. Heinbner and J. Schuller concerning the action of certain
9 cells toward heavy metal?

10 A I am not familiar with that particular article, but I am
11 familiar with Heinbner and most of his work; I know him
12 personally.

13 Q Is lead a metal in your opinion?

14 A Of course it is a metal.

15 Q And do you agree that the concentration with the concentration
16 of metal in the cells may be 1000 times greater than the
17 surrounding media?

18 A I should say that is a very, very fine technical point that
19 ought not to be discussed in this very crude manner. The
20 whole method of arriving at the conclusion as to the lead
21 content of a cell as differentiated from the lead content
22 of the mass of tissue is a very exotic ^{all} zone of scientific
23 work. It takes in methods that I do not think could be
24 possibly discussed amongst lay people.

25 REF:

26 Q Well, how do you account that the eminent authorities attempt

REFEREE: (8)

BY HONE:

1 to discuss it in the scientific works that were put out
2 for the uneducated public yearning for knowledge on the
3 subject?

4 A I do not believe Dr. Heinbner has discussed such a subject
5 with relation to the practical problems and diagnosis, lead
6 poisoning or actually the interpretation of lead poisoning.
7 I am not familiar with the article and I am not speaking
8 for Dr. Heinbner, but I know him and I doubt if he has
9 connected this with the diagnosis of lead poisoning.

10 MR. DETHELFSEN: Q. I would say from your answer, then, that
11 you do not agree with the works of Dr. Heinbner and Shuller
12 concerning the action of cells toward heavy metals. Would
13 you say you do not agree that the concentration of metal
14 inside the cells may be a thousand times greater than the
15 surrounding media?

16 MR. HONE: Objected to as incompetent, irrelevant and immaterial
17 and lends nothing of value, and if we are going to go into
18 the question as to whether the doctor agrees with some other
19 doctor then if it is material I shall certainly want to go
20 into the subject thoroughly.

21 REFEREE: Well, I don't think it is very greatly material, except
22 it cannot be said it is so immaterial or irrelevant that
23 nothing should be heard about it, but I do not think it is
24 of very much important to pursue very much further about that,
25 although this whole case is composed of very difficult
26 scientific questions and issues and theories, and

KE 0022181

REFEREE: (66)

DR. KCHOE:

1 investigations.

2 MR. HONE: Well, I submit the specific question can't be answered
3 If the whole context is read we can answer it and we will
4 get the reference and go into it from top to bottom.

5 MR. DETHLEFSEN: I cannot stay here later than August 1st.

6 MR. HONE: Well, it is your fault if you are starting into a
7 thing which is so technical and so far from the issues in
8 this case. It is your fault and not mine.

9 REFEREE: The question seems to have some relevancy to this
10 matter as to the amount of concentration in the cells with
11 relation to the amount existing.

12 A (Interrupting) May I answer the question. I think I can
13 briefly dispose of it.

14 REFEREE: Yes, that might be the best way.

15 A On this question of where the lead actually is in a tissue,
16 whether it is within the cells of an organ, or whether it
17 is within the cellular fluid that is within the organ but
18 on the outside of the cells, certainly very precise methods
19 of experimental procedure would have to be engaged in.

20 REFEREE: I would think so.

21 A We know for example that chloride is found within certain
22 cells and that in certain other instances it is outside of
23 the cell. Now the question of whether lead is in liver,
24 whether it is actually within the cell or outside the cell
25 and gets within the organ is of interest in connection with
26 the mechanism of the action of lead within that organ. It

YE 0022182

REFERENCE:

(6)

R. KENOE:

1 is of no importance with relation to the problem as to
2 whether lead is there in abnormal or normal amounts.

3 Q Might not it be important in this respect, Doctor, if it wer
4 locked in the cell it would affect the individual vastly
5 differently than if it were in the surrounding tissue or
6 fluid?

7 A That would seem to be entirely possible, but whether it is
8 the case depends fundamentally upon what is the mechanism
9 of the poisoning, and that is, I assume, what Heinbner and
10 his associates are trying to get.

11 Q And might it not also be vastly material and important in
12 determining the question of the amount of lead to be ascer-
13 tained from tests of the excreta and the blood, whether it
14 were locked in the cells in higher proportions than whether
15 it was circulating in the surrounding tissues and blood;
16 that
might/not be of importance in that respect?

17 A It might well be. However, one knows that with a few excep-
18 tions these metals are not actually locked in a cell. The
19 proportions might be very different on one side or the
20 other but this proportion fundamentally would depend upon
21 the total quantity available for distribution within the
22 organ, not in cellular material, and also not in fluid mater-
23 ial, whereas for a practical purpose in relation to the
24 problem of poisoning we must further pursue, be more inter-
25 ested in the question of what is the lead content of the
26 organ itself and not what is the lead content of the inside

KE 0022183

REFEREE: (67)

DR. KEECE:

1 of the cell as compared with the outside, for in the latter
2 situation we are dealing with a hypothetical controversial
3 and even in some ^{speculation} of toxicological mechanisms?

4 Q Might it not also very materially affect the circumstances
5 of whether one who had ceased his exposure to lead would have
6 symptoms long thereafter depending on whether the lead were
7 locked in the cell in a higher concentration or whether it
8 was circulating in the organisms, not locked within the cell?

9 A Well, I don't want to argue the point, but I believe in all
10 good conscience that we are dealing here with a purely
11 speculative matter.

12 Q Yes, but that is the way I make my living, and therefore it
13 seems that this question counsel has asked might be of some
14 importance as to whether or not you agree with that authority
15 that lead is one of those substances that may be locked up
16 in a cell in a concentration vastly higher than it could be
17 found in the surrounding tissue?

18 A Well, I may say that I am not familiar with the details of
19 these articles, and I cannot say therefore whether I am in
20 agreement with him or disagreement.

21 Q As a pathologist and physiologist, is it one of the attributes
22 of lead that it is susceptible of being locked up in some
23 chemical combination or mixture, or as it is within the cells
24 of the living body or any of its organs, so that it does
25 not circulate in the surrounding mediums and would not be
26 discoverable in the urine?

KE 0022184

1 A The answer to that distinctly is "no," that lead is not
2 deposited in inert form in the tissues of the body. It is
3 deposited in the tissues of the body and there is an
4 equilibrium relationship whereby lead is being continually
5 moved in and moved out of the organs in accordance with
6 the characteristics of the particular organ; that is, the
7 pattern of lead distribution is substantially the same
8 whether the lead content is 1000 milligrams or 100 milligrams
9 which means that as lead is lost from the body it is stead-
10 ily lost from all the tissues in which it is found, includ-
11 ing the skeleton. Moreover, it also means that as lead is
12 being distributed through the body it is distributed into
13 all the tissues of the body in proportion to their ability
14 to take it up and combine with it, so that the picture of
15 the distribution of lead in the body as a very definite
16 pattern. Now if one gives lead to an experimental animal
17 or human being it distributes itself into the tissue.

18 Q At this point, as metallic lead?

19 A Perhaps some organic compound. When the administration of
20 lead, whether accidental or deliberate, is discontinued
21 lead is excreted from the tissues of the body at a rate
22 which becomes progressively smaller with the lapse of time.
23 That is, during the period in which the lead content of the
24 body is higher, the excretion rate is relatively higher.
25 As the lead is lost its excretory rate progressively
26 diminishes until it reaches a level corresponding to the

KE 0022185

REFEREE:

(67)

DR. KEMMER:

1 normal picture, and at that time the lead content of the
2 body is substantially within normal limits. In our exper-
3 ience in conditions of severe exposure from one year to one
4 and a half years is required before this lead is excreted
5 from the tissue down to the normal level, and it is for this
6 reason that I said that the lapse of a period of not less
7 than eighteen months is adequate, in my opinion, to get the
8 lead content of the tissue down to a wholly normal level,
9 without exception, in my experience.

10 Q Do you know of any case in your experience or in the litera-
11 ture in which one had been exposed to lead for a sufficient
12 length of time to exhibit symptoms of its poisonous effects
13 who had then been absented from lead environment for a
14 sufficient length of time for him to have recovered his
15 former state of health with the absence of symptoms of lead
16 intoxication, subsequent to which for some reason or other
17 he had died; and there had been an autopsy and investigation
18 to determine whether he was free from lead?

19 A Yes, there are a series of such cases reported here in my
20 articles; there are only a few to be sure and there have
21 been several ^{who have} had the opportunity to make this type of ob-
22 servation, and one takes the opportunity when he gets it.

23 Q Yes.

24 A It has taken me something like ten years to get half a
25 dozen such cases (at this point witness going through books).
26 I cite you the Journal of Industrial Hygiene, Volume 15,

KE 0022186

REFEREE (68)

W. KEHOE:

1 Page 332, for a series of cases which at the time of this
2 publication represented all the data I had on this question.

3 REFEREE: Well, that is illuminative.

4 A Now I may say here, and I would like to say for Dr.

5 Chabanoff's benefit, that I recognize what I am saying at
6 this point is unorthodox in terms of literature of more than
7 five years ago. The contradictions in the literature prior
8 to that time are in most part due to the fact that there
9 have not been analytical methods on such process available
10 and in general use to enable one to clinically study cases
11 of this type and to determine the facts in the case, and
12 in my opinion is still, and I am quite sure, the general
13 accepted opinion in this field, for during the years of our
14 work in this field we have had the privilege and pleasure
15 of distinctly upsetting some current hypotheses in relation
16 to the behavior of lead in the animal organism. These
17 points of view are now becoming generally accepted because
18 of the unavailability of the data and proof of the statement
19 I have made.

20 DR. DETHLEFSEN: Q. Is it not true, Doctor, that most authori-
21 ties agree that lead injected is immediately in most cases
22 excreted by the liver, but that lead inhaled enters into
23 the general circulation?

24 A You did not read it correctly, it is ingested.

25 Q Yes, it is.

26 REFEREE: Lead ingested.

KE 0022187

MR. DETHLEFSEN: (68)

DR. KEMOE:

1 Q Is it not true, Doctor, that most authorities agree that
2 lead ingested is immediately for the most part excreted
3 by the liver, and that lead inhaled enters into the general
4 circulation?

5 A That is not true.

6 Q That is not true?

7 A No, lead which is ingested is in a large part unabsorbed
8 and passes through the alimentary tract and is excreted
9 in the feces and a small portion is absorbed and most of
10 what is absorbed goes fairly directly to the liver where
11 it is for a time stored and subsequently distributed through
12 tissue of the body in accordance with the general pattern
13 which lead assumes because of its characteristics. Lead
14 which is absorbed by way of the lungs enters the general
15 circulation and, because it enters the general circulation,
16 only a portion of it is found in the liver, and under
17 those conditions the tissues of the body in general have
18 an opportunity to come in contact with this lead, and under
19 those conditions lead is more readily absorbed by the brain
20 and by the muscles and by other organisms than it is in
21 those cases in which it is ingested, and because of the
22 mechanism of lead absorption it must go through the liver
23 until it is distributed in the general circulation.

24 (At this point the case was continued to 1:30 of the
25 same date).

26 (Afternoon session of March 2, 1938, beginning at 1:30 P.M.)

KE 0022188

MR. DETHLEFSEN: (69)

DR. KEHOE:

1 REFEREE: All right.

2 MR. DETHLEFSEN: Doctor, do you know the article, Volume 4,
3 of 1928, United States Veterans Bureau of Medical Bulletin
4 at Pages 147-148 entitled "Neuropsychiatric Disease", with
5 history of onset following exposure to tetraethyl lead,
6 written by Dr. Paul E. Reynolds, United States Veterans'
7 Hospital, Perry Point, Maryland. Are you familiar with
8 that?

9 A No, I am not.

10 And I note at the end the references are "Tetraethyl Lead
11 Poisoning" by Robert A. Kehoe, Journal A. M. A., July 11,
12 1925, and Public Health Bulletin, No. 153, United States
13 Public Health Service. Have you ever read this article?

14 A No, I have never seen or heard of this article until you
15 called my attention to it a few moments ago.

16 In view of the fact that I want to read it into the record,
17 I believe there would be no objection; will you read a
18 portion of it and I will then take it up.

19 REFEREE: I will undertake to read it. Counsel wants it all
20 in, however. Maybe we had better take turns reading it.

21 MR. DETHLEFSEN: I can read the whole thing.

22 R. HONE: Let the doctor read it and leave it here so the reporter
23 can copy it.

24 REFEREE: Off the record.

25 MR. DETHLEFSEN: Let me read it, Doctor.

26

KE 0022189

MR. BETHLEFSEN:

DOCTOR KEMMER:

1 "NEUROPSYCHIATRIC DISEASE - (With History of onset
2 following exposure to Tetraethyl Lead).

3 "Paul E. Reynolds, M. D., United States Veterans' Hospital
4 Perry Point, Maryland.

5 "Lead has been for many years one of the most important
6 occupational poisons. Less than three years ago the
7 attention of the profession was directed toward tetra-
8 ethyl lead. Tetraethyl lead about this time was being
9 added to gasoline and widely sold as a motor fuel under
10 various trade names.

11 "Tetraethyl lead is a heavy liquid (specific gravity 1.62)
12 clear, with a sweetish odor. It is volatile at ordinary
13 temperatures and it decomposes in the sunlight with the
14 formation of triethyl oxid.

15 "The increased toxicity of tetraethyl lead over the other
16 forms of lead is probably due to its physical properties,
17 which permit rapid absorption through the skin and the
18 respiratory mucosa. Acute and even fatal results may
19 occur from exposure to a high concentration of the vapor
20 for several working days, or from covering a large skin
21 surface with the liquid. Products of the oxidation of
22 tetraethyl lead, which frequently are found in tetraethyl
23 lead containers, may be absorbed as dust and are equally
24 toxic."

25 MR. BETHLEFSEN:

26 The parts I have read is from Dr. Kehoe's writings in the
A.M.A. Journal of July 11, 1925, that is right?

A It is almost a verbatim quotation, and that is the reason
I have recognized it.

MR. BETHLEFSEN: (Continuing with his reading).

"The following case is of special interest because of its
resemblance to post-influenzal encephalitis, another such
case having been reported.

"C., a young white male, was admitted to United States
Veterans' Hospital at Perry Point, Md., on July 11, 1926.
Family history is negative. Pre-war history unimportant
save that he secured a degree of bachelor of science
at Johns Hopkins in 1918, at the age of 21 years.
Enlisted May 5, 1918; served overseas. He had a mild
attack of influenza, and while serving with the Field
Artillery injured his knee. Discharged August 5, 1919.

KF 0022190

DR. DETHLEFSON:

OTHER:

1 "Onset: In November, 1924, he was working as a super-
2 visor in the experimental laboratory of a company en-
3 gaged in the manufacture of tetraethyl lead. He had
4 been working with tetraethyl lead for about three weeks
5 and during this time had been exposed to the vapor of
6 the liquid and to the dust from the products of decom-
7 position resulting from spilling of tetraethyl lead on
8 the floor.

9 "Onset was with persistent frontal headache, vertigo,
10 and diplopia. Almost complete insomnia was present,
11 with sleep replaced by dreamlike states in which horrible
12 situations arose. He was sent to a hospital in the city
13 where he was employed and remained there for two weeks.
14 When he left the hospital he was quite weak and had shown
15 no improvement except that the headache no longer troubled
16 him. The diplopia and insomnia continued in the same
17 degree for two months and the insomnia did not entirely
18 disappear for five months. Several months later he
19 noticed that his movements had become much slower and in
20 one year a definite slowing and change in his facial
21 expression, but this came on so gradually he does not know
22 when it began. After the acute symptoms had abated he
23 had no desire to attempt anything, lost all initiative
24 and desire for association with others. He felt "too
25 tired to want to fool with anyone," gave up his former
26 position, and spent his time at home by reading and fishing
until coming to this hospital.

"Physical examination is negative except for a deformity
of left hand (an industrial injury) and a postoperative
scar on right knee. Blood Wassermann and cytology negative.
Urinalysis negative.

"Neurological: There are no pupillary changes. Triceps,
biceps, tendoachilles, abdominal, and cremasteric reflexes
are present and respond within usual limits. Knee jerks
show a marked bilateral exaggerated response. Romberg,
Babinski, and ankle clonus not elicited. Facial expression
is masklike and efforts to wrinkle forehead or frown
give rise to muscular twitching of face. Smiling and
whistling movements present, but not well controlled. All
movements are performed slowly. Speech is slow, decreased
in quantity, and lips are not employed to the usual extent.
Speech is rather flat and lacks emphasis. Carriage is
erect, but gait is slowed and body does not sway nor do
the arms swing to the usual extent in walking. When he
looks from side to side he does so whenever possible
without turning his head. No atrophies or marked muscular
weakness are present and no areas of anesthesia.

KE 0022191

1 "Mental examination: This man has lost his initiative
2 and even his former desire to accomplish things. He
3 has a feeling of his responsibility to provide for his
4 family, and worries because he feels he can do nothing.
He keeps 'putting things off' and they are never done,
and he has made no plans for the future."

5 MR. DETHELFSEN:

6 Q That is the first time you have heard of this particular
7 article?

8 A Yes, probably.

9 Q Do you know of your own knowledge now whether or not this
10 particular case from Perry Point, Maryland, was ever brought
11 to your attention?

12 A I cannot be sure that it was, but it probably was. I cannot
13 be sure because the name is not cited.

14 Q Doctor, is it not true that the dilution of tetraethyl lead
15 gasoline also largely diminishes the danger of lead inhalation
16 the difference between the volatility of tetraethyl lead
17 and various gasoline bases with which it is mixed are so
18 great that approximately one-half the gasoline may be
19 evaporated before lead can be found in the vapor?

20 A That is quite correct.

21 Q What is the maximum part of a milligram of lead which may be
22 present per 100 grams of canned food as contamination allowed
23 for sale in the United States by the Federal Government?

24 A I am afraid I do not understand the question.

25 Q What is the maximum part of a milligram that may be present
26 per 100 grams of canned food as contamination allowed for

KE 0022192

1 sale in the United States by the Federal Government?

2 A That is .256 milligrams per 100 grams.

3 Q Well, Doctor, isn't it true that the Federal Government
4 permits foods to be sold and packed in Mason jars in the
5 United States?

6 A Right.

7 Q Of the type you say the specimens were given to Dr. Gertrude
8 Moore?

9 A Right.

10 Q Is it true that a man may be poisoned as a result of inhala-
11 tion of the vapor of tetraethyl lead and also as a result
12 of skin absorption?

13 A Of tetraethyl lead?

14 Q Yes.

15 A Quite. I have described a series of cases in which poison-
16 ing resulted from that exposure to concentrated tetraethyl
17 lead----

18 Q Your answer is -----

19 A Yes.

20 Q Is it true that if a small portion of a rabbit skin was ex-
21 posed for 30 minutes to tetraethyl, 100 milligrams was
22 found 30 days later in the carcass of the rabbit?

23 A That seems quite plausible.

24 Q In some of your experiments?

25 A Did I cite such an experiment?

26 Q Yes, we have the citation.

KE 0022193

MR. BETHLESEM: (70)

DR. KENHOE:

- 1 A Well, if I did, that is true.
- 2 Q That was cited in the American Journal of Hygiene, Volume 13,
- 3 issue of 1931, in the vicinity of Page 478.
- 4 A Under my name?
- 5 Q Yes.
- 6 A Well, yes, undoubtedly it is true.
- 7 Q Is it true that in your experience when the rabbit was ex-
- 8 posed for four hours to tetraethyl lead you found 30 days
- 9 later 9.27 milligrams of lead in the animal's carcass?
- 10 A That sounds quite plausible.
- 11 Q Is it true, Doctor, in one of your experiments you exposed
- 12 a rabbit skin to tetraethyl lead for four hours and found
- 13 lead in the excreta and the carcass for over a period of
- 14 thirty days?
- 15 A That is true.
- 16 Q Is it also true that the initial distribution of lead in
- 17 tissue in rapid tetraethyl lead absorption occurs and indi-
- 18 cates some portion of tetraethyl is absorbed and circulates
- 19 as such?
- 20 A Yes, when it is applied to the skin that happens.
- 21 Q The nerves and brain are largely composed of fatty substances?
- 22 A Yes, and as a consequence of that lead goes into the central
- 23 nervous system, which is the initial distribution of tetra-
- 24 ethyl lead poisoning where there is contact with either the
- 25 liquid or the vapor or concentrated metal.
- 26 MR. BETHLESEM: Now, when tetraethyl lead is diluted with

KE 0022194

MR. BETHLEFSEN: (70)

DR. KEEHOE:

1 gasoline, there is absorption through the skin?

2 A It is delayed or merely prevented, depending on the concen-
3 tration.

4 Q Is there a hazard of tetraethyl lead intoxication if proper
5 precautions are not used in blending gasoline with tetra-
6 ethyl lead solution?

7 A Quite, because that involves the handling of the concentrated
8 material and the precautions in connection with that occu-
9 pation are quite vigorous and quite elaborate in their
10 application and in their performance.

11 Q For instance, still operators are exposed to the possibilities
12 of tetraethyl intoxication?

13 A Where?

14 Q In the operation of the still, I presume.

15 A In a refinery?

16 Q Yes.

17 A We never handle any tetraethyl in a refinery in the still
18 and never have. You are speaking of the article in which I
19 refer -----.

20 Q (Interrupting) Volume 15, Page 306.

21 A I know what it is.

22 Q Will you point that out and read it.

23 A Referring to my discussion on the hazards of the manufacture
24 of lead amongst men who are handling the still from which
25 tetraethyl is distilled -- that is in the manufacture of
26 lead which is never done in ~~the~~^A refinery.

KE 0022195

1 Q Then those still operators are subjected to the intoxication
2 of tetraethyl?

3 A All persons who are engaged in the handling of tetraethyl
4 lead in its concentrated form are exposed to hazards which
5 are very carefully kept under surveillance. The purpose
6 of my study of tetraethyl lead -- of the concentrated mater-
7 ial, -- was to determine the extent of the hazards and to
8 determine the precautions necessary to provide safety. I
9 will find the reference for you (Witness looks through book).
10 It is in the Journal of Industrial Hygiene in Volume 15,
11 beginning on Page 310. It is headed "The Lead Excretion of
12 Workers in a Tetraethyl Lead Manufacturing Plant" -- Do you
13 want to see it?

14 Q No.

15 A No.

16 Q Will a human being excrete lead in the urine if he or she
17 were never exposed to lead?

18 A I presume he would not, but I have never known a situation
19 in which that was possible. We have been attempting under
20 laboratory conditions to obtain a situation in which persons
21 had no exposure whatever to lead, in order to see whether we
22 could ever see a situation in which lead would not be excreted
23 and I have never found such a situation.

24 Q In one of your articles you have reported for a five-year
25 observation you found that 22% of still operators, 29.49 %
26 of blenders and 3% of laboratory workers were excreting be-
tween 0.12 and 0.15 milligrams of lead per litre of urine.

MR. BETHLENFEN: (71)

DR. KILHOE:

1 that is Volume 15, in the vicinity of Page 311 or 312, is
2 it not, Doctor, Page 309 I think it is.

3 A I think your quotation or your statement is incorrect, do
4 you mind reading it again -- you said something about 3%,
5 there was never any such thing as that.

6 Q Twenty two per cent of still operators in the table at 309;
7 do you mind if she points it out, Doctor? (Referring to
8 Dr. Chabanoff)

9 A This table to which you refer has to do with the distribution
10 of the findings on the urine of all the persons studied over
11 a period of five years in the manufacturing plant and they
12 are classified in percentages on the basis of their rate of
13 excretion, the number and per cent which excreted lead within
14 certain limits, is set down here and the total for the whole
15 list of values adds up to 100%. That is the frequency of
16 distribution of various types of findings within the group
17 and I may add that the observations made on the laboratory
18 workers demonstrated that their lead excretion was within
19 the limits of normal persons not working in lead trades,
20 whereas for every other group there was a definite elevation
21 in the lead excretion above the normal levels.

22 Q What is the percentage you have there of laboratory workers,
23 I said 3%, but I understand it is 8%?

24 A Eight per cent of what?

25 Q Of the laboratory workers were excreting between 0.12 and
26 0.15 of lead for a litre of urine?

KE 0022197

1 A Yes, that 8% was one person, however.

2 Q Just one person?

3 A Yes.

4 Q Were there 5% with 29%?

5 A There were twelve 8% and approximately one of 12.

6 Q Does tetraethyl lead decompose so that only a small portion
7 found later is in the form of tetraethyl lead?

8 A Yes, most all lead is decomposed fairly promptly into some
9 non-volatile compound, so that within a short time after the
10 absorption tetraethyl as such cannot be found in the circu-
11 lating blood or tissue.

12 Q It is true that tetraethyl lead poisoning is not different
13 from lead poisoning occasioned by other lead compounds?

14 A It is different in its initial manifestation in that it is
15 without exception an acute central nervous system intoxi-
16 cation with the decomposition of the lead compounds in the
17 body, and with its subsequent redistribution into the tissues
18 in a manner resembling that of ordinary lead poisoning, and
19 the clinical picture becomes that of chronic lead poisoning,
20 but the initial picture is so different from that of ordinary
21 lead poisoning that it probably would not be identified as
22 lead poisoning in the hands of any other than a person
23 experienced in the handling of such cases.

24 Q Is that what you set forth in your article, Volume 13,
25 Page 478? A. Yes.

26 And would you say there was no difference between

KE 0022198

MR. DETHLEFSEN (71)

DR. KEHOE:

1 tetraethyl poisoning and ordinary poisoning?

2 A No, I would not say any such thing.

3 Q Could you pick out Volume 13, Page 478?

4 A This is just a collection of reprints and that is the reason
5 it has no apparent order to it (witness going through book).

6 Yes, what do you want?

7 MR. HONE: (Interrupting) Doctor, doesn't it upset you or make
8 you nervous seated next to Attorney Dethlefsen is Dr.

9 Chabanoff, who during your cross-examination is making
10 motions and passing him a large and substantial number of
11 notes and that a large majority of questions are in written
12 form during your cross-examination and are being made by
13 Dr. Chabanoff and handed to Mr. Dethlefsen?

14 MR. DETHLEFSEN: (Interrupting) They were written before com-
15 ing here.

16 MR. HONE: I have seen Dr. Chabanoff making a great many notes
17 and I would like to know if it makes Dr. Kehoe nervous?

18 A It does not disturb me and I am very pleased to have Dr.
19 Chabanoff here.

20 MR. DETHLEFSEN: Q. Well, Doctor, while I am waiting here on
21 (72) that one question, I will proceed to some other. You were
22 here, I believe, you testified in San Francisco during the
23 lifetime of Mr. [REDACTED]

24 A Yes, I believe in the summer of 1936.

25 Q And you testified at the previous hearing, did you?

26 A Yes, I testified.

KE 0022193

MR. HOME: (73)

DR. KEMOE:

1 Q At a previous hearing?

2 A Yes, in the summer of 1936, during his lifetime.

3 MR. OETHELSEN: Q. I am referring to that time.

4 A Yes.

5 Q And prior to giving your testimony, did you make a physical
6 examination of Mr. [REDACTED]

7 A No, I did not; I never made a physical examination of him
8 at any time.

9 Q Then, of course, no physical findings of your own examina-
10 tion were made by him at that time; you did not examine him?

11 A No, I only had my observations of him here in the room.

12 Q You testified at that time that Mr. [REDACTED] did not suffer
13 from toxic neuritis without examining him, and even though
14 you had the opportunity to examine him, didn't you?

15 A I think if you will look at the record, I think that you
16 will see that I testified it was an opinion based upon the
17 clinical findings as reported in the medical testimony, and
18 I expressed an opinion on those.

19 Q From the testimony as given by other doctors?

20 A Yes.

21 Q Rather than on personal examination and observation of the
22 patient?

23 A Yes, rather on personal observation.

24 Q How many cases have you treated suffering from chronic
25 tetraethyl intoxication?

26 A I have never treated or seen a patient with chronic tetra-
ethyl lead poisoning. There have been no such cases to treat

KE 0022200

1 Q So far as you know?

2 A Yes, so far as I know.

3 Q And this case, if it were such, would be the first case in
4 history?

5 A Yes, a medical curiosity.

6 Q And then it should be reported in the medical literature?

7 A With reservations. One does not report medical cases ordi-
8 narily unless we can report unassailable clinical and scien-
9 tific evidence in proof of the diagnosis. Otherwise there
10 is no point in it. I may say this, however, that if I
11 found a case of poisoning as the consequence of handling or
12 distribution of anyone using tetraethyl gasoline, I would
13 be the first to publish it in medical literature as a scien-
14 tific curiosity, because that is precisely what I have been
15 looking for in the past fifteen years unsuccessfully.

16 Q Well, in this article I referred to, Volume 13, Page 493,
17 you summarized the conclusions, first, that these experiments
18 show that tetraethyl lead is absorbed through the skin;
19 second, the initial distribution of lead in the tissues in
20 rapid tetraethyl lead absorption corresponds to an oily
21 soluble material and indicates thereafter that some portion
22 of tetraethyl is absorbed and circulates as such; three,
23 however, tetraethyl is rapidly decomposed by the tissues,
24 including the skin, so that only a small portion is found
25 later in the blood, which is in the form of tetraethyl lead;
26 four, as a net result after a period of three to fourteen

four, as a net result after a period of three to fourteen

KE 0022201

1 days of lead on animal tissue is distributed in a manner
2 characteristic of water soluble lead compounds; five,
3 in small dosages, the factors of rapid decomposition and
4 lower concentration in the blood so interfere with the dis-
5 tribution of tetraethyl lead as such as to prevent its
6 preliminary absorption by the nervous system; six, even
7 when absorbed as tetraethyl compounds, the excretion shows
8 a quantity of water soluble lead compound ; seven, tetraethyl
9 lead poisoning is therefore not different from lead poisoning
10 occasioned by other lead compounds -- that is number 7 which
11 I have referred to?

12 A Yes, I call your attention to the fact, however, that that
13 does not say that the clinical picture of tetraethyl lead
14 poisoning is not different from the clinical picture in
15 ordinary lead poisoning. What I have said there is that
16 tetraethyl lead poisoning in principle is not different from
17 ordinary lead poisoning in that the active intoxication in
18 this instance as well as in the case of the inorganic portions
19 of the lead and not the lead compounds as a whole, and what
20 I have said there is just as true now as it was when it was
21 written. May I call your attention to one further conclusion
22 which wasn't stressed in reading. It happens to be rather
23 an important matter with relation to gasoline exposure, if
24 there was such a thing.

25 DR. DETHELET: I quit with Paragraph 7 because I reached my
26 point in Paragraph 6. If there is something there that

YE 0022202

MR. DETHLEFSEN: (72)

DR. KENGE:

1 should be in the record I wish you would please read it.
2 A No, that was not my point. I simply asked to call the
3 referee's attention specifically to Paragraph 5, which
4 happens to be an important point scientifically; "In
5 small dosages the factors of rapid decomposition and low
6 concentration in the blood so interferes with the distri-
7 bution of tetraethyl as such as to prevent its preliminary
8 absorption by the nervous system. That is different from
9 the absorption of large doses.

10 MR. DETHLEFSEN:

11 Q. Doctor, is it true that in early stages in the use of gasoline
12 containing tetraethyl lead it became apparent that the manu-
13 facture of tetraethyl lead and the blending of the concen-
14 trated fluid for use in gasoline was a hazardous occupation
15 and a unique opportunity for the rapid development of lead
16 intoxication?

17 A You are again quoting me and that is correct.

18 Q Would you find the article for me, American Medical Association
19 Journal, Volume 85, Page 108?

20 A That is the Journal of Industrial Hygiene and not the A.M.A.
21 However, I remember that statement. It occurred somewhere
22 in something I have written; that must have been the
23 American Journal of Hygiene.

24 MR. DETHLEFSEN: Well, that is all right.

25 A Well, let me see it. It is somewhere (referring to book).

26 What was the sentence again?

MR. HONE: (53)

DR. KIRKHOE:

1 I have tried not to interrupt the cross-examination, but is
2 far afield and I would like to point out that the ques-
3 tions asked are dealing with the type of employment in
4 which Mr. Telepnev was not engaged and dealing with a sub-
5 stance known as tetraethyl lead which Mr. Telepnev at no
6 time handled, and I have not wanted to object because it
7 has a certain indirect bearing on the matter, but I think
8 Counsel is going far afield to inquire into tetraethyl lead,
9 which was not handled in any way by Mr. Telepnev.

10 REFERENCE: I have that in mind, but due to the fact that he did
11 handle gasoline containing this substance it would be a
12 little difficult for me to say it was sufficiently irrele-
13 vant to refuse to hear it.

14 MR. HONE: I am simply saying that I think there should be some
15 limit going into the manufacture of this.

16 A I did not seem to be able to find it (still referring to
17 book); my answer is that it has never been denied by anyone,
18 and least of all by me, that the handling of concentrated
19 tetraethyl lead in any and all places in which it is found
20 is a serious danger, and I have been equally emphatic in
21 saying in my experience and in all the experiments that
22 have been done by me, by the United States Public Health
23 Service and the British Minister of Health, there is not the
24 slightest evidence that the handling of leaded gasoline has
25 the slightest hazard. It has been investigated for fifteen
26 years with negative results. That is the whole story. I

YE 0022204

MR. HONE: (73)

MR. KAHOE:

1 may say that not only is the evidence negative completely
2 with regard to cases of lead poisoning but the evidence
3 is entirely negative with regard to the absorption of lead
4 under conditions of exposure to gasoline in any and all
5 ways in which it is handled.

6 Q I will quote you again to see whether you agree with this
7 point: Is it true that when the product of tetraethyl lead
8 emerged from the laboratory scale into a recipient stage, all
9 cases of lead poisoning occurred?

10 A Yes, I have recited that many times.

11 Q Well, I let you go on the direct examination.

12 A Well, I don't want to be irritable.

13 Q But you are here as an expert for the Ethyl Corporation of
14 America?

15 MR. HONE: We object to that on the ground that the testimony
16 implies he is not here in such capacity.

17 REFEREM: He is here as an expert.

18 MR. HONE: I will agree to that.

19 A I do not want to be irritable; I am just getting tired of
20 the repetition.

21 MR. DETHELFSEN: Yes, I know, and so is Dr. Chabanoff, and
22 nothing could be more lengthy than the cross-examination of
23 opposing counsel, but I want everything in the record. We
24 believe one way and you believe another.

25 A What I have written in this matter is precisely the same
26 now as it was when I wrote it and there is no point at which

KE 0022205

1 I have contradicted myself.

2 Q Can printers' ink be contaminated by lead from the lead
3 used in the printing process?

4 A Yes, measurably. The lead type disintegrates due to the
5 continual passage of ink over it and some of the particles,
6 particularly the oxide, gets into the ink. It is quite
7 definite that printing is a hazardous occupation because
8 it involves the handling of molten lead in rooms in which
9 a large number of linotype machines are in operation. This
10 is a hazard of such magnitude that special ventilation is
11 required.

12 REFEREE: Q. In those linotype rooms where the lead is molten
13 to a certain extent, does the lead evaporate or volatilize
14 so that it may be inhaled by an individual?

15 A Yes, the boiling point of lead is in the neighborhood of
16 900 degrees centigrade and the vapor present is appreciable
17 at any temperature in excess of 500. As a consequence of
18 which when lead is inhaled in a melting pot^{and} there is vapor
19 arising from it in a variable amount, depending on the tempera-
20 ture at which it is kept, and for workers over such molten
21 pots in lead industries in this day a special ventilation
22 equipment is required to carry the fumes over the surface.
23 The amount of vapor depends on the temperature which is
24 maintained.

25 MR. KENOE: I take it that question was not asked as to this case
26 but as a matter of information that you as referee in handling

MR. HONE: (P4)

DE KENOE:

cases, different types of lead cases.

REFEREE: I was merely "sponging" a little scientific explanation.

MR. DETHLEFSSEN: Q. Do you agree with the statement contained in the works of a man named McNeilly, who states if a person is once leaded he is always leaded?

A I know Mr. McNeilly quite well and I do very definitely disagree with him.

Q Who is Mr. McNeilly, by the way?

A A toxicologist at the University of Chicago.

Q And a man with ability?

A A man with considerable ability and for whom I have considerable respect, but he has not had the experience in lead intoxication.

Q Then you do not agree with the statement that I have just stated that once leaded is always leaded?

A I do not.

Q You know he has made that statement?

A Yes, I do; I have read his book.

Q Do you know the name of the book?

A Yes.

Q What is it?

A Industrial Toxicology; it is a new book.

Q When was it published?

A The book I have in mind came out in November of this year.

MR. HONE: November, 1937, you mean, last year?

KR 0022207

MR. HONE: (24)

DR. KENOE:

1 A Yes, I can place the date because it came in the course
2 of a trial in Cincinnati, a murder trial in which I
3 happened to be on one side and McNeilly on the other.

4 MR. DETHELFSEN: Q. Do you have disagreed with him before?

5 A Yes, publicly and privately.

6 Q And you are familiar with Alice Hamilton's works?

7 A Quite.

8 Q Do you recall she reports cases of lead poisoning that
9 have occurred seventeen years after exposure?

10 A She cites literature to that effect.

11 Q Yes?

12 A Yes.

13 Q And do you recall offhand what the name of the book is which
14 that is cited?

15 A No, I can't, I am sorry to say.

16 Q It is a fact she has made that statement?

17 A Yes. Dr. Hamilton, for whom I have the greatest respect,
18 has not been for a long time engaged in experimental work,
19 but she has made very excellent reviews of the literature
20 on this subject and of the literature in the whole field
21 of industrial toxicology, and she recites the literature in
22 some instances, drawing conclusions from it, and in some
23 instances merely citing and pointing out what has been said.
24 I have no way of knowing what Dr. Hamilton's opinion is on
25 the subject.

26 Q Are you familiar with any of the reports from Australia

YE 0022208

1 where a number of children were affected by lead?

2 A Yes, I know that very well.

3 Q And that they all died from the results of nephritis?

4 A No, I would not say that. I would say that Gibson has worked
5 in that field and reported a series of cases of chronic
6 nephritis in children in which they demonstrated to their
7 own satisfaction that the occurrence of chronic nephritis
8 in children with a previous history of lead exposure, lead
9 absorption and lead poisoning was unusually high, and they
10 arrived at that conclusion, therefore, that chronic nephritis
11 was in part at least due to the previous history and previous
12 poisoning of these children, a conclusion which is contro-
13 versial in the sense that though they have cited much evidence
14 in favor of it there has been corresponding evidence cited
15 by men who disagree with the point of view, who believe that
16 the conclusions have been unjustified. In this controversy
17 I must say I occupied a neutral position without being able
18 to arrive at a definite conclusion. I suspected, however,
19 that the point is well taken, and that is the reason that
20 lead poisoning in children is a particularly pernicious
21 disease of much too frequent occurrence.

22 Q Well, Doctor, isn't it true that patients died from Vitamin B
23 deficiency due to cardiac muscle degeneration and that this
24 organ is greatly enlarged?

25 A It is not necessarily enlarged; its function is interfered
26 with but it is not necessarily enlarged; there may be a small

atrophic artery.

Q Well, there are some doctors that are not, who disagree with your writings, your statement that a tester in a laboratory testing tetraethyl gasoline, that he is in a non-hazardous occupation?

A If there is anyone who disagrees with me on this, I do not know who it is. I think it is universally accepted at the present time that this is not a hazardous occupation from the point of view of lead.

Q Three of them disagree with you in this case.

A I am ^{not} speaking of doctors engaged in the regular practice of medicine. I am speaking of doctors and investigators who have had the opportunity to study this problem and that involves no criticism.

Q To err is human, I understand that, Doctor?

A Or having any contempt of my medical colleagues who spend their time practicing medicine.

Q Do you know the four typical groups of paralyzes from lead poisoning, due to lead poisoning?

A Beg pardon.

Q Alice Hamilton ^{has} / classified as stating there are four typical groups of paralyzes from lead poisoning, do you recall that in her works?

A I am sorry I do not and that does not make sense to me.

Q Well, I will consult Dr. Chabanoff here and see if I can get it in more medical terms (Mr. Dethlefsen speaking to Dr.

MR. DETHLEFSEN: (75)

DR. ASHOE:

Chabanoff out of the record).

MR. HONE: Q. Well, isn't it rather unusual to ask a witness on the other side to help you find your medical references, Mr. Dethlefsen, and if you want to ask a doctor to compare his views with someone else, I think the ordinary procedure would be to present the reference to the doctor, to give his comments. I do this in the interests of saving time? May I say in response to that that one could classify the paralyzes in nervous lesions in lead poisoning in a variety of ways. I have no doubt whatever classification Dr. Hamilton made is a reasonable and plausible one, and I have no essential disagreement with Dr. Alice Hamilton.

MR. DETHLEFSEN: Q. Now, getting down to Mr. [REDACTED] Arriving at your conclusion, did you take into consideration that he in 1933 had a pain in the right leg and right foot and back pain and pain in the tip of his big toe?

MR. HONE: (Interrupting) Is there any such testimony?

MR. DETHLEFSEN: Yes, it is in the record.

MR. HONE: I do not think it is an exact statement.

REFEREE: I am sure I don't remember exactly what it was and if comparison shows it is an error I will militate against it to that extent.

MR. DETHLEFSEN: Well, I have it right here. Did you take into consideration when you were reviewing the entire file in this case that when Mr. [REDACTED] started to work for the company, according to their own records, he was in perfect health?

RE 0022211

MR. DETELEPNEV: (75)

DR. KISHOE:

1 I took into account the record showing he was accepted for
2 employment, and I assumed he was in a fairly good state of
3 health.

4 The record shows he was in a perfect state of health, doesn't
5 it?

6 I would not be interested in what the record said in that
7 connection, because I do not believe it is usual to find a
8 man in a state of perfect health. I accept the fact that
9 he passed the examination.

10 Acceptable to the company?

11 And that makes him a reasonably healthy man.

12 That while he was working with lead, doing from four to
13 eight distillations of tetraethyl gasoline for a period of
14 two years, he noticed he had pain in his right leg, his right
15 foot and back pain, and a pain in the tip of the big toe,
16 and he went to the company doctor -- you remember that, do
17 you?

18 Yes, I remember the record fairly well.

19 At that time wouldn't that give consideration to you that
20 there should be some consideration given to the fact that he
21 might be subject to lead poisoning?

22 No, for the following reasons: That the conditions of
23 exposure under which Mr. Telepnev was working have never in
24 my experience produced a case of poisoning. Moreover, my
25 observations have demonstrated to me beyond any doubt that
26 men working under these conditions with customary methods

KE 0022212

MR. DETHLEFSEN: (75)

DR. KENOE:

1 and care do not absorb lead as a consequence of their expos-
2 ure. I would not, therefore, go against my years of exper-
3 ience and assume that this man had developed lead poisoning
4 as a consequence of an exposure, which I know did not exist.
5 Moreover, in an adult the development of neuritis in the
6 lower extremities is totally unknown in relation to tetra-
7 ethyl lead absorption and is as real in adults as strictly
8 differentiated from children in whom paralyzes of the lower
9 extremities is not infrequent.

10 DR. DETHLEFSEN: Q. And that he then continued working in the
11 laboratory doing the same type of tetraethyl testing up to
12 June 1935, when he had a foot drop; wouldn't you take, to-
13 gether with the history of pain in the right leg and right
14 foot and the back pain, together with the objective finding
15 of foot drop, plus the statement to you by Mr. Telepnev that
16 he had constipation, insomnia and headaches, wouldn't that
17 cause you to believe there might be some indication he was
18 suffering from lead poisoning, or do you adhere to the prin-
19 ciple that in your opinion upon making such tests it is
20 impossible to get lead poisoning and that you would rule out
21 everything, including the lead findings and symptoms as
22 given to you?

23 No.

24 DR. HONE: (Interrupting) I want to object to the question, but
25 I think the doctor can answer it.
26 I know what he means.

MR. HONE: (26)

DR. KIMCE:

1 In other words, I would like for the record to show you
2 are not going to answer the question but answer what Mr.
3 Dethlefsen believes he has in mind in putting the question.

4 REFEREE: Maybe you had better reframe the question.

5 A I can answer it quite satisfactorily, I think.

6 REFEREE: All right, answer.

7 A I would feel quite certain that the lesion which you have
8 described under those conditions was not due to lead absorp-
9 tion. I would suspect, for reasons which I have mentioned,
10 that it was some other condition, and in this instance I
11 would think particularly of arsenic poisoning since arsenic
12 is the commonest metallic agent which produces paralysis of
13 the lower extremities without evidence of arsenic exposure,
14 however, and without permitting myself to a doctrinary
15 point of view, I would investigate such a case to determine
16 whether or not lead was being excreted in abnormal quantities
17 and I would study every factor I could find to help in a
18 diagnosis, which diagnoses in these cases are often difficult
19 I would exclude every possibility I could think of that
20 would produce such a lesion; perhaps successfully.

21 This has been an interesting case, would you have come in at
22 outset?

23 A I have been very glad to have studied this man and tried to
24 see what I could do for him.

25 Is it not true that in arsenic neuritis, both sensory and
26 motor nerves are affected?

KE 0022214

1 Quite commonly, and that is the situation in this case. This
2 man had both sensory and motor disturbances.

3 Q And paralysis also comes from lead poisoning, from one
4 exposed to lead poisoning?

5 A Paralysis, particularly of the upper extremities, in adults,
6 and particularly of the arms.

7 MR. DETHLEFSEN: Q. Do you agree with the four classifications
8 as set forth in Industrial Poisons in the United States, by
9 Alice Hamilton, at Page 62, Chapter 5?

10 "Five varieties are generally recognized, following the
11 classification introduced by Mme. Dejerine-Klumpke (2).

12 "First is the antibrachial type which involves the exten-
13 sors of the wrist and fingers, with the supinator escaping.
14 Second is the brachial type which involves the deltoid,
15 biceps, brachialis anticus, and the long supinator; and
16 this is sometimes called the scapulo-humeral form and
17 may be primary or may follow the antibrachial. Third is
18 the aran-Duchenne type of amyotrophy, i. e., a more or
19 less rapid atrophy of the small muscles of the hand which
20 begins in the thenar eminence, then involves the interos-
21 seous and hypothenar muscles with flattening of the hand,
22 the 'main de singe,' and then, as atrophy progresses and
23 the middle and nail fingers flex, the 'main en griffe' re-
24 sults. The fourth type is the peroneal, which, accor-
25 ding to Tanquerel, is the type seen in 13 cases to 100
26 cases of type one. This type of palsy attacks the exten-
sors of the toes, the peroneal muscles, and sometimes the
tibialis anticus; moreover it is also bilateral, symmet-
rical, and is attended with loss of tendinous reflexes.
The fifth is the very rare laryngeal type described by
Seiffert in 1884 and later by Morell Mackenzie, Stieglitz,
deSchweinitz, and others."

27 Q Do you agree with that?

28 A I think it is a fair statement of the types of paralysis
29 that are seen. In my own experience paralysis of the
30 lower extremities is not as frequent as Dr. Hamilton has
31 indicated, but I call your attention to the fact that she

MR. DETMERS:

DR. KNOX:

1 states such paralyses are bilateral involving both legs,
2 that is, and are often associated with paralysis of the
3 upper extremities. A very large and overwhelming propor-
4 tion of all cases of paralyses in adults, that is in lead
5 poisoning, involves the upper extremities, as Dr. Hamilton
6 indicates, and in children the reverse is true, in that
7 palsies of the lower extremities are quite frequent.

8 MR. DETMERS: Do you know a textbook written by Dr. Solomon?

9 A I know there is such a book, but I am not very familiar with
10 it.

11 Q Who is he?

12 A Pharmacologist, I believe, in St. Louis or Cleveland. I
13 am not sure that I know of him.

14 Q Do you agree with him when he states in his book, 73%
15 cases of lead poisoning report constipation?

16 A It seems plausible.

17 Q and 56% backache?

18 A It seems plausible.

19 Q And 56% joint pains?

20 A That seems a bit high, but it is plausible.

21 Q What would be your expression on that?

22 A Well, arthralgia occurs sometimes in a fairly large number
23 of cases; it is possible.

24 Q Colic 51%?

25 A Yes, perhaps more frequently than that.

26 Q Headaches in the frontal region 46%?

1 A I doubt it.

2 Q What would be your expression?

3 A Well, I have not considered that symptom very important.

4 Actually I have not referred to the frequency of its
5 occurrence. Let me see what I have said on the subject.

6 (Witness at this point referring to book). I have headache
7 in tetraethyl poisoning in 3% of the cases.

8 Q And how about lead in the urine?

9 A It is universally and uniformly present in all cases of lead
10 poisoning during the active stages of intoxication and in
11 all normal persons.

12 Q And high-blood pressure 39%, do you agree with that?

13 A No, that is not an important symptom in lead poisoning; that
14 is the evidence of blood vessel disease and occurs with the
15 frequency with which blood vessel disease is found amongst
16 persons with lead poisoning.

17 Q What is your expression?

18 A In tetraethyl lead intoxication, low blood-pressure is
19 always a constant finding during the active period of intoxi-
20 cation, almost constant, and is one of the more frequent
21 findings.

22 Q Pain in the chest 35%, do you agree with Dr. Solomon?

23 A I do not think it is important.

24 Q Metallic taste 18%?

25 A That is notoriously misleading; the patient rarely describes
26 the taste as metallic, but they call it a sweet taste and a

YE 0022217

MR. DETHLEFSEN: (77)

DR. KEMOE:

1 bitter taste and a nasty taste, but only by leading questions
2 can we get them to admit it is a metallic taste.

3 Q And the blue line in the gums in 14% of cases?

4 A That would depend entirely on the stage of the case. Lead
5 line is found with a high degree of frequency in cases of
6 ordinary lead poisoning and during the period of exposure
7 and during the period of active symptomatology, but it tends
8 to disappear with some rapidity; that is to say usually over
9 a period of a few weeks to two or three months until the
10 cessation of exposure.

11 Q And stippling in the blood cells 12%?

12 A In my experience stippling during the active phase of the
13 symptomatology is a substantial consistent finding except
14 in cases of acute fulminating tetraethyl lead poisoning
15 where the symptoms come on so rapidly as a result of nervous
16 system absorption that the distribution of lead in the tissue
17 or blood generally has not had time to occur.

18 I offer in evidence at this time a textbook of medicine by
19 Russell L. Cecil, Assistant Professor of Clinical Medicine
20 in Cornell University and Assistant Visiting Physician to
21 Bellevue Hospital, New York City, 2nd Edition, and the
22 article entitled "Lead Poisoning," starting at Page 536 and
23 ending at the bottom of Page 541, together with the references
24 therein appended.

25 REFEREE: Do you want to put me in physical possession of that
26 book?

1 I thought it could be copied in the record.

2 REFEREE: Yes. Will you be satisfied with having that copied
3 in the record?

4 MR. DETHLEFSEN: Yes. Is there any other thing that I can do for you?

5 REFEREE: All right, it is so understood and ordered that the
6 reporter will copy the cited pages from the cited book into
7 the record.

8 "A TEXTBOOK OF MEDICINE BY AMERICAN AUTHORS. Edited by
9 Russell L. Cecil, A. B., M. D., Sc. D. Assistant Professor
10 of Clinical Medicine in Cornell University; Assistant
11 Visiting Physician to Bellevue Hospital, New York City,

12 "LEAD POISONING: Ever since lead has been used in industry
13 and the arts lead poisoning has been a well-known occu-
14 pational disease. Physicians of the Middle Ages associated
15 colic and anemia with the poison, but to Tanquerel des
16 Planches (1831) belongs the credit of first correlating all
17 the manifestations of the intoxication. It is now known
18 that the blood, striated and smooth muscle, and the nervous
19 system are most strikingly affected, and that the disease
20 is usually associated with inhalation of the dust of lead
21 or of its compounds, and with the ingestion of contaminated
22 foods and liquids.

23 "Incidence: Although lead poisoning is still the most im-
24 portant of all industrial diseases, the relative frequency
25 of occurrence is far lower than it was fifteen years ago.
26 The recent work of Oliver and Legge in England and of
27 Alice Hamilton in America has proved that prevention is
28 possible; and as a result of the legislation and factory
29 improvement incited by their investigations the number of
30 cases in industry is rapidly declining. About one hundred
31 and fifty industries involve some exposure to lead. The
32 dusty trades are the most hazardous and include the manu-
33 facture of white and red lead, of storage batteries, and
34 of pottery, as well as painting, printing, and the mixing
35 of rubber.

36 "Etiology: Outside of industry lead poisoning is infrequent.
37 Recently the preparation by amateurs of wines and liquors in
38 which contain lead alloys has caused some plumbism in the
39 United States. Many years ago this was such a common cause
40 of poisoning in the cider district of Devonshire that
41 'Devonshire colic' became a well-known disease.

In the sixteenth century 'Colica Pictorum' was epidemic in France near Poitiers, and later this was found to be caused by the lead added to wine to prevent souring. On standing, wine thus treated could not turn to vinegar because the lead reacted to form lead acetate.

"Other less frequent causes of plumbism are the drinking of rather acid water in which lead pipe has been immersed; the use of hair dyes or cosmetics; the sucking of painted toys; and the ingestion of lead salts with suicidal intent or to cause abortion. The amount of lead which enters the organism need not be large to produce symptoms, as in a case of poisoning recently reported after the ingestion of 1.33 gm. of lead acetate (less than 750 mgm. of metallic lead).

"It is now known that lead may be absorbed from the gastro-intestinal tract, from the respiratory tract, and even from the mucous membranes of the nose and mouth. The respiratory tract is the more dangerous path of entry, because, while a majority of the lead absorbed from the gastro-intestinal tract is caught by the liver and excreted that absorbed by the respiratory tract enters at once into the circulation and is distributed throughout the organism. Subcutaneous or intramuscular deposits of lead enter the blood-stream so very slowly that intoxication from bullets, if it occurs at all, is very rare. Absorption of inorganic lead salts from the skin is probably negligible.

"Lead is a cumulative poison because it is stored in relatively large amounts in the solid portion of the bones. Until it is liberated from the skeleton this deposit does no harm. During absorption, the blood-stream carries lead to all the organs, especially to the bones, liver, kidneys, and intestines. After active absorption has ceased almost all the lead in the body (more than 95 per cent) is to be found in the bones, from which it is excreted extremely slowly. Symptoms of lead poisoning appear when lead is circulating throughout the organism as a result either of absorption from outside sources or of liberation from the deposit in the bones.

"There are three possible paths for the excretion of lead from the body - the gastro-intestinal tract, the kidneys, and perhaps the skin. The larger part of lead eliminated is in the feces, but the fact must be kept in mind that during active absorption of lead the feces also contain some which has been ingested but has never been absorbed. The amounts of lead excreted in urine are usually very small, but even after exposure to lead has ceased this slow elimination (usually a fraction of a milligram per day) may

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continue for months, and even for years. Excretion from the skin is probably small and is not yet proved.

"Morbidity Anatomy: Some claim that an abnormally high incidence of arteriosclerosis, chronic interstitial nephritis, gastric ulcer, and cirrhosis of the liver are found in lead workers. The male gonads are said to degenerate. Palsy usually follows a peripheral degenerative neuritis; and in permanent palsy many of the anterior horn-cells in the cord disappear. The affected muscles are atrophic and fatty, and the muscle tissue itself is gradually replaced by fibrous material. There are no other definite pathologic changes.

"Symptoms: -Acute Poisoning. - True acute poisoning is to be seen only after the sudden ingestion of large doses of lead. In animals the symptoms are vomiting and collapse, and there may be a peripheral destruction of large quantities of red blood-cells accompanied by acute anemia and sometimes by hemoglobinuria. The marked general weakness, loss of appetite, diarrhea, and dehydration may result in death or in a more chronic type of poisoning. In very susceptible individuals the onset may be rapid and intense after only a slight exposure. This is frequently called acute lead poisoning, although the symptoms are those of the more chronic type. Lead colic may develop after exposure of only a few days, and may be associated with constipation or sometimes with diarrhea. Severe acute anemia may occur, and very rarely, mild nervous disturbances.

"Chronic Poisoning: - In chronic plumbism the patient usually suffers from great weakness and lassitude, obstinate constipation, and often from intense colic. A peculiar pasty appearance of the skin is quite characteristic of the condition. The several features peculiar to lead intoxication will here be considered individually.

"(a) Changes in the Blood. - One of the earliest evidences of lead poisoning is a change in the nature and number of red cells in the circulating blood. A marked destruction of erythrocytes in the peripheral circulation is accompanied by increased production of red cells. The counterbalancing of the loss of red cells by stimulation of bone marrow activity maintains the cell count above 3.5 or 4 million cells per cubic millimeter so that anemia is usually not as severe as the pallor of the patient would indicate. Recent investigations of the mechanism of destruction of blood have shown that lead reacts with the inorganic phosphate to form insoluble lead phosphate and acid on the surface of the cells. This renders the cells inelastic and brittle, so that they are probably broken more easily than normal cells by the trauma suffered in circulation.

"The most characteristic change in the blood is the appearance of 'stippling', a punctate basophilic granulation in the cells which is best demonstrated by dilute Unna's alkaline methylene-blue stain. This appears during absorption and may continue for many months after absorption of lead has ceased. Stippled cells are probably degenerating young reticulated cells. Their presence in the blood is not absolutely pathognomonic of lead poisoning, as a few may be found in cases of pernicious anemia, leukemia, and sometimes even in normal blood, but such large numbers as 100 per million red cells do not appear in adults in any disease except lead intoxication. Stippling is, therefore, one of the reliable criteria for establishing the diagnosis of lead absorption.

"(b) The 'Lead Line.' - The 'lead line' on the gums is a second important sign of plumbism, and is very valuable in making a diagnosis. It is due to a deposit of lead sulphide about the blood-vessels in the tips of the papillae, and therefore appears most plainly about pyorrheic gums. When examined with a lens it has a punctate appearance and is seen to lie a little below the margin of the gum. A piece of paper inserted between the gum and tooth distinguishes stippling from staining of the tooth root. The peculiar localization distinguishes this from the other pigmentations of the mouth which are more diffuse. The lead line is practically pathognomonic of lead absorption, but not of poisoning. It may persist for many months after exposure to lead has ceased. It must be distinguished only from the line produced by bismuth.

"(c) Colic. - Abdominal colic is also a common early manifestation of lead intoxication, and occasionally occurs in susceptible people after only a slight exposure. It is usually preceded by constipation and indefinite abdominal pain. While the character of this colic in individual cases varies greatly, it is usually very intense and prolonged. The pain which is generally felt below the umbilicus is often relieved by pressure. During attacks the abdomen is scaphoid in shape, not tender to pressure, and while resistant, shows no evidences of true abdominal muscle spasm. Probably paroxysms of pain occur when peristaltic waves approach areas of marked tonic spasm in the intestines. This lead colic is often very difficult to differentiate from an acute abdominal inflammation; but diagnosis is aided usually by other signs of lead poisoning. It should also be remembered that in lead poisoning the white count is only slightly increased, if at all, that there is a relative lymphocytosis, and usually no fever. The intense pain in most cases stops within about a week after absorption of lead has ceased, but may be remittent for some time thereafter.

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"(d) Palsy. - Palsy has been recognized as one of the symptoms of lead poisoning for many years. Although in 1834 Tanquerel des Planches reported it occurred in 10 per cent of the 1,200 cases he had examined, it is now relatively rare, because of improvements in industrial processes. A general weakness and tremor usually precedes the actual onset of paralysis. This tremor, which is an early and relatively common symptom, is well demonstrated by extending and actively spreading the fingers. The paralysis which may follow is similar to peripheral neuritis and is usually rapid in onset and painless. One of its very striking characteristics is its early localization in the most used muscles of the arms: the extensors of the wrists and fingers of the right hand are first attacked in a startlingly specific manner producing the characteristic finger-and-wrist-drop. Paralysis may also appear in the peroneal muscles of the legs and produce a steppage gait, and occasionally in the back and eyes. Optic neuritis is known to occur. After absorption of lead stops, function may be recovered within several weeks, but usually there is gradual improvement for many months. If exposure to the poison continues, paralysis may be permanent and progressive, and may simulate a progressive muscular atrophy.

"(e) Psychosis. - In many cases of lead poisoning there is mild mental depression, while occasionally transient delirium and convulsions or hysterical attacks occur. Rare cases show severe cerebral involvement characterized by marked delusions and mania leading to convulsions and death. This psychosis may closely simulate general paresis in its clinical manifestations, though the Wassermann reaction is not positive.

"(f) Gout. - In England gout is frequently reported in chronic cases, disappearing within a few days of cessation of exposure, while anorexia, constipation, and general debility

"(g) Degenerative changes. - That the late manifestations of lead poisoning are largely degenerative, and are caused by the continued action of the lead stream, is said to be shown by the frequent appearance of arteriosclerosis, contracted kidneys, and a resulting high blood-pressure and hypertrophy of the heart.

"Occasionally acute attacks of poisoning develop in workers long considered immune, or even in individuals no longer exposed to lead. These late developments do not differ from other acute manifestations of plumbism.

"Diagnosis: The diagnosis of lead poisoning is often difficult because evidence of absorption without signs of actual

intoxication may frequently be observed. Usually, unless at least two symptoms characteristic of the poisoning appear, a definite diagnosis of plumbism should not be made. The best evidence of intoxication is marked stippling of the red cells; but lead line, colic, constipation, anemia, muscle weakness, and wrist-drop are also important. The excretion of lead in the urine and feces is also very significant. A majority of the lead excreted is to be found in the feces, but its presence is of little diagnostic value unless all possibility of swallowing lead has been removed. Lead in the urine, however, always denotes that absorption has occurred. Excretion may continue long after exposure has ceased; it merely proves that lead has been absorbed by the organism, and is not in itself a proof of intoxication.

"Final diagnosis depends upon all of these considerations, but usually requires at least two of the described features. Although in some cases both the lead line and slight stippling appear in workers without other evidences of poisoning, marked anemia, colic, or nervous lesions are usually deciding factors in diagnosis.

"Lead poisoning often appears after prolonged exposure, but sometimes even after exposure has ceased. This tardy development of symptoms is probably caused by liberation of the lead deposit in the bones which occurs during severe illness, or alcoholic debauches. It has also been reported, rarely, after taking potassium iodide. Thus if lead is held harmlessly within the body some change in the general metabolism may precipitate an attack of poisoning. The disease should always be thought of in acute abdominal crises, as it is not infrequently the cause of unnecessary surgery.

"Prognosis: The prognosis depends upon the type of symptoms. Colic usually disappears within a few days with suitable treatment, while anemia, constipation, and general debility hang on for many weeks. Palsy disappears very slowly, and in some cases is permanent. Severe psychoses are often fatal but they may become chronic, and in rare cases they disappear promptly and completely. The mild depression, which is so common a symptom, is lost as other acute symptoms subside.

"Prophylaxis: Dust and the contamination of food and tobacco are the most common sources of poisoning at the present time. If proper precautions are taken by workmen and employers to avoid all dust hazards by suitable ventilation, aided by the use of respirators, intoxication may be very largely prevented. The incidence of poisoning among painters may be greatly reduced by the use of sand-paper which can be moistened. Clean hands and clean places to eat must be

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insisted upon. The toxicity of lead varies so much with individuals that no definite prediction may be made as to the amount which will cause symptoms of poisoning to appear, although Legge states that a continued absorption of more than 2 mgm. per day may produce intoxication.

"Treatment: Relief of the severe colic of lead poisoning often demands much medical ingenuity. Amyl nitrite or nitro-glycerin frequently brings prompt relief, also atropine in large doses, or intravenous calcium chloride. A hot-water bottle may be comforting. If diagnosis is certain, a saline cathartic or an enema is also desirable. Morphine is rarely necessary to relieve the pain.

"After the subsidence of acute symptoms the purpose of the treatment is to gradually eliminate lead from the body. Since it was first recommended by Melsens in 1840, potassium iodide has been employed to increase the excretion of lead. Because it is said to precipitate occasionally acute symptoms, the initial doses should not exceed 1 gm. per day, and the amount should then gradually be increased.

"Recently, a new method of treatment has been developed which is dependent upon the parallel metabolism of lead and calcium (Aub and Minot). When patients are suffering from lead colic a prompt relief may be obtained by the slow injection of sterile calcium chloride solution. Ten to fifteen cc. of a 5 per cent solution is injected intravenously over a period of five minutes. After the pain has been relieved by this method a strenuous cathartic is given. In acute cases a diet containing much calcium should be given. This consists of 2 quarts of milk and 3 gm. of calcium lactate daily, and tends to reduce the excretion of lead. After disappearance of acute symptoms such a diet should be replaced by one containing as little calcium as possible. With this, large doses of phosphoric acid or of ammonium chloride should be given to produce a negative calcium balance and thus tend to liberate lead from the bones.

"Saline cathartics have long been recommended to relieve constipation. They probably do not increase the excretion of lead. Treatment for the anemia of lead poisoning should be like that for any secondary anemia. Palsy best responds to galvanic current and massage and should be treated like a peripheral neuritis. Disappearance of the acute symptoms of plumbism does not signify that the disease is cured. Treatment to stimulate elimination of lead and to regulate the bowels should be continued for a long time after the more distressing symptoms have been alleviated.

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"It is always desirable for a patient suffering from any of the symptoms of lead poisoning to avoid further exposure to lead. JOSEPH C. AUB."

MR. DETHELTSEN: And this article is signed "Joseph C. Aub," now if the chemical salts or combination of chemicals lead who is he, a doctor?

A Dr. Aub is in the Physiology Department of Harvard University.

And he has written some books on lead poisoning?

A Yes, quite considerable.

Q And he is an authority on the subject?

A Yes, I think on many phases Dr. Aub is very fine.

MR. DETHELTSEN: That is all.

A Dr. Aub and I are in definite disagreement recorded in

medical literature on certain phases of these subjects, particularly the treatment of lead poisoning with respect to

adequacy. Dr. Aub believes one set of things on adequate

evidence, in my opinion, and I believe certain others.

REFEREE: I have a few questions.

Q Now, Dr. Kehoe, as I understand it, tetraethyl lead is a

rather tetraethyl upon the physiology of lead individual

chemical salt, a combination of the lead and the ethyl radi-

cal, is that right?

A Yes, it is a liquid lead compound, but could perhaps best

be expressed chemically as a combination of the chief radicals

of grain alcohol with the metal, with the metal lead,

And they are chemically combined?

A They are chemically combined to form a liquid substance.

Do you happen to remember what the proportions of the ethyl

radicals and lead are?

- 1 A Four ethyl radical to one lead, hence the name "tetraethyl,"
2 which means four ethyl lead.
- 3 Q Now if the chemical salts or combination of tetraethyl lead
4 is decomposed or split up into its component parts are
5 metallic lead and the ethyl radical, will free metallic
6 lead be liberated?
- 7 A Not in the body, no. It is quite probable, although the
8 detailed chemical steps cannot be described accurately,
9 that the ethyl radicals will oxidize, leaving ionic lead
10 to combine with free radicals which may be available in the
11 body.
- 12 Q Forming some variety-----.
- 13 A (Interrupting) Forming some compound of lead with the materia
14 available in the body, whether salts or protein or what,
15 would be at this time essentially speculative.
- 16 Q And what particular combinations might be formed would depend
17 rather fortuitously upon the physiology of that individual
18 body, would it not?
- 19 A It seems quite probable that the decomposition occurs in a
20 definite and orderly manner, but the precise nature of the
21 chemical steps simply cannot be stated at this time, because
22 of technical difficulties of getting that information.
- 23 Q Now if tetraethyl lead is ingested or otherwise taken into
24 the living human body in small quantities over a long period
25 of time, will free metallic lead be liberated in that living
26 body?

KE 0022227

REFEREE: ((

R. KIMHOE:

1 A No, I think it is practically certain that free metallic
2 lead is not even found in the living body, except when
3 there are bullets or shot in the tissue.

4 Q And in conformity with your belief, your opinion would be
5 it is liberated in some form of ionic lead, which combines
6 with some of the other radicals composing part of the body
7 tissue?

8 A Yes, some evidence has been obtained that it occurs in com-
9 bination with phosphorus. The organic compounds of phosphorus
10 in the tissue is not quite clear.

11 Are all forms of lead cumulative poison?

12 A The question as to whether lead is cumulative or not depends
13 in large measure upon the quantities actually taken into
14 the body. That is to say whether the body can handle and
15 eliminate lead depends on the amount actually absorbed into
16 the tissue. That is to some degree a theory.

17 Q Yes.

18 A But that point of view is in harmony with the facts.

19 Q And what is the general belief or definition of a cumulative
20 poison?

21 A A poison which accumulates in the tissues and tends to in-
22 crease in amount as the consequences of failure in some way
23 of the eliminative process.

24 Q Do individuals vary in their capacity to ingest lead in small
25 quantities over a long period of time without manifesting
26 toxic symptoms?

KE 0022228

1 That again depends on the quantity, the quantity which is
2 toxic for one individual may not be toxic for another
3 individual and vice versa. On the other hand, it has been
4 amply shown that if the quantities be small enough no toxic
5 effect is produced in any individual either in good health
6 or diseased. That is to say it is now quite generally
7 accepted that lead is absorbed by all persons of all ages
8 and that lead is excreted by all persons; obviously, then,
9 one must regard lead as a normal element to which we are
10 exposed in our environments, and yet lead poisoning does
11 not occur in the general population except as a result of
12 what may be called , for lack of a better qualitative infor-
13 mation, in abnormal amounts.

14 Some of these questions are rather long, but I think you
15 can follow them. Is it not a fact that the symptoms of
16 disease or the symptoms manifested by a slow cumulative
17 poisoning vary almost as widely as do individuals vary
18 in the various ways they do vary and almost as much as the
19 possible variations of the physiological processes within
20 the living body, according to age, the condition of health
21 or disease of the various organs of the living body, the
22 race, the temperament, heredity, personal and hereditary
23 antecedents of the individual, the tolerance or idiosyncrasy
24 to a drug or poison, the physical reserves and psychiat-
25 ric state of the individual during the time he is subjected
26 to the disease or drug?

KE 0022229

REFERENCES: (79)

DR. CEBEC:

1 A I think I am quite clear on what you ask in substance and
2 what you said up there is unfortunately all true, but
3 within certain very definite limits. The question of
4 susceptibility to lead as the result of the variances
5 postulated in your question has been regarded for a long time
6 as a very great factor, not only in the occurrence of poison-
7 ing but in the nature of the clinical picture which develops
8 when poisoning occurs. Only within recent years have we
9 become quite certain that lead poisoning does not occur
10 below certain ranges of actual lead intake, and our industrial
11 hygiene experience and practice has proven, I believe,
12 beyond all doubt that if the lead exposure is within certain
13 limits cases of poisoning will not occur even in the more
14 susceptible persons. Moreover, since we have been able
15 to show by chemical means the distribution of lead in the
16 tissues and in the excreta of persons abnormally exposed to
17 lead the precise clinical pattern of lead poisoning has
18 lent itself to some considerable classification, and there
19 isn't as much variation in the picture as we had previously
20 believed, and this classification has come out of the fact
21 that it is now possible to determine whether a man has in
22 his body abnormal quantities of lead, whereas previously
23 because of lack of adequate methods one had to assume that
24 when there was exposure of whatever hypothetical magnitude,
25 it might be that anything which arose out of that exposure
26 might be due to the exposure and to the absorption itself.

KE 0022230

REFEREE:

DR. KEHOE:

1 That is to say we were compelled because of the lack of
2 adequate scientific facilities to assume that if an illness
3 occurred during a hypothetical exposure, that it occurred
4 as a consequence of that exposure when as a matter of fact
5 that argument is obviously without the merit of accuracy.
6 This problem, I may say, will not be entirely classified
7 without a great deal more experimental work.

8 Q In gasoline, it is a central nervous system poisoning?

9 A Yes, it is. Gasoline in the atmosphere, in concentration
10 of one and one-half per cent is an immediate intoxicant and
11 anesthetic, and at such concentration people become drunk
12 and quickly unconscious. Concentration as low as one-half
13 in the atmosphere, definite symptoms of vertigo and headache
14 and drunkenness, not wholly unlike that of alcoholism, are
15 seen.

16 Q Do the symptoms produced by the ingestion of lead or other-
17 wise taking into the living body of lead in such quantities
18 that if the period of exposure was less than two or three
19 years, you would say that there was no danger to the man
20 exposed thereto, but an exposure to an amount of ingestion
21 or otherwise taken in, if continued over a period of ten
22 years, would expose the man so exposed to the dangers of lead
23 intoxication, vary from the symptoms produced by the exposure
24 to such an amount of ingestion or lead otherwise taking in
25 of lead as to produce symptoms of lead intoxication in
26 a period of six months to one year?

KE 0022231

REFEREE: (80)

DR. KENHOL:

1 A That, Mr. Referee, is a controversial point whether the
2 exposure which is capable of producing lead poisoning in six
3 months or two years or three years can produce such a poison
4 if extended on to eight or ten or twelve years is definitely
5 controversial. So much is that the case that with reference
6 to exposure to leaded gasoline on the part of the public,
7 experimental observations are still under way, despite the
8 negative evidence of almost fifteen years in the case of
9 men who have been, in my opinion, the most heavily exposed
10 persons, that is to say, garage mechanics, filling station
11 attendants, tank-wagon distributors of gasoline. We are
12 just now engaged in some further studies of men under those
13 conditions of exposure, who to our knowledge and under our
14 supervision have been carrying on work involving this type
15 of exposure since 1923. As yet not only have we been unable
16 to find any evidence of lead intoxication in such persons,
17 but we have been quite unable to find any elevation in their
18 lead excretions. Now in order to settle that problem with
19 a finality which could be scarcely questioned, even by the
20 most skeptical, we confidently anticipate making analyses
21 of tissues of such persons as may die within our own lifetime,
22 if we are able to maintain circumstances under which those
23 tissues can be obtained; the opportunity has not yet presented
24 itself in the case of persons exposed longer than four or
25 five years, particularly because of the labor turnover in
26 these fields of activity, but we do have a group of men now

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REFERENCE: (81)

DR. KEMMER:

1 under observation who have been steadily in this work since
2 the first introduction of leaded gasoline in commercial use,
3 and fortunately for us that occurred in Cincinnati, in
4 Dayton and Cincinnati, and its environments, so that there
5 are now in our immediate vicinity the most exposed and longest
6 exposed persons in connection with this public health hazard.

7 REFERENCE: Q. Is there any data that would enable you to say
8 how long symptoms of lead intoxication would be deferred where
9 the ingestion or otherwise taking in is in such small quantities
10 as not to produce symptoms within a period of five
11 years?

12 A I am sorry, but I will have to ask you to read that over.

13 (Question read)

14 A Well, some of my own observations of the lead trades, which
15 is fairly extensive, I am extremely skeptical of the develop-
16 ment of symptoms in men who have continued without illness
17 and without obvious evidence of abnormal lead absorption over
18 a period of five years, and I may say that latent lead
19 poisoning in the sense of symptoms and signs and illness and
20 injury developing following the cessation of exposure, that
21 is entirely after the exposure has been ended and after as
22 long as three months thereafter, in my experience such cases
23 do not occur. I have not seen a single one in an experience
24 of fifteen years, and that involves some thousands of persons
25 in continuous hazardous lead exposure. I mean in the regular
26 lead trades.

REFERENCE: (E)

DR. KENNER:

1 Is it a fact, Doctor, that toxicologists generally agree
2 that there are some individuals so susceptible to some poison
3 that they would be seriously injured or even killed by a dose
4 so small that it would not adversely affect the ordinary
5 individual at all?

6 That point of view is held, I am quite confident, by many
7 men and perhaps even particularly with relation to lead
8 compounds. On the other hand, that point of view with
9 reference to those very minute quantities such as are normal
10 to our diet and are normal to our environment, exclusive of
11 the occupational factors, is definitely no longer tenable,
12 since it has been shown quite clearly that not only do we now
13 take in daily measurable quantities of lead, but that we have
14 done so since our birth in our normal food and in the variety
15 of other minute contaminations of our food with lead com-
16 pounds from a very large number of sources. I think one can
17 say confidently that lead poisoning does not occur in the
18 general population amongst the healthy or amongst the ill,
19 except as a consequence of exposure that is measurably larger
20 than that to which we are normally exposed.

21 Well, since we are all involved in taking in a certain amount
22 if an individual had an idiosyncrasy to lead and the normal
23 amount he took in by his food and other means were augmented
24 by the additional small quantities, would he be in danger?

25 If that additional quantity were of sufficient magnitude he
26 would. My point of view, however, is that that would have to

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1 be of such a magnitude as to go entirely outside the
2 experience of the most unfortunately situated person in the
3 modern community. The safety factor in lead absorption is,
4 in my opinion, certainly larger than we have previously
5 believed, and that conclusion has been forced upon me by
6 years of experience in which I have been able to show with
7 accuracy what has gone into the body and what has come out.
8 In other words, susceptibility, in my opinion, is not any-
9 thing like the important factor we believe it to be, that I
10 myself believed it to be ten years ago.

11 Q Do individual metabolic and dietetic factors influence the
12 length of time during which lead intoxication as the result
13 of the ingestion or otherwise taking in of such minute
14 quantities over such a long period of time, would symptoms
15 be delayed for more than five years or longer delayed?

(82)

16 A They probably do. Dietary factors almost certainly influence
17 the rate at which lead is excreted from the body. Incident-
18 ally they also influence very strikingly the rate at which
19 lead is taken into the body, for on a selected diet one could
20 double or treble the lead content of his normal diet. In
21 my opinion any lead exposure to be regarded as significant
22 from the point of view of intoxication must be sufficiently
23 above the range of normal experience to give a demonstrably
24 elevated urinary lead excretion and a demonstrably elevated
25 lead concentration in the blood. I say that because over
26 the period of years in which I have been studying lead

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REFERENCE: (7)

DR. REEVE:

1 poisoning I have not found a case with active symptomology
2 without a definite elevation of the lead in the body, as
3 shown by the lead content of the blood and of the urine.

4 Q You have no doubt, I suppose, that if a man died of uremia--

5 A (Interrupting) I am only entitled to one doubt on that
6 score, and I don't know to what extent to give that weight.
7 The necropsy as reported makes mention of a yellow atrophy
8 of the liver. Now yellow atrophy of the liver is not a
9 very frequent finding and I presume it means that there was
10 a fatty degeneration of the liver. Such degenerative cases
11 are seen, in my experience, only in a relatively few disease
12 processes, in which the most important is phosphorus poisoning
13 and the next most important is arsenic poisoning, and the
14 next most important are a group of organic sulphates, in-
15 cluding chloroform, carbontetrachloride, and I don't know
16 what to make of that finding in the record, but I suspect it
17 is merely a prolonged degenerative process related in some
18 way to the terminal serious illness, with circulatory dis-
19 turbance, and so forth, but I don't know quite what to
20 make of that -- it puzzles me somewhat.

21 Q And you are not all certain as to what the cause of death was

22 A I think it is logical to conclude, because of Dr. Reeves'
23 extensive experience, that death was from uremia, secondary
24 chronic nephritis, and Dr. Reeves himself had regarded this
25 finding as rather unimportant and merely evidence of the
26 presence of a chronic degenerative disease. I think this is

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1 by large the most logical conclusion. Incidentally, the
2 fatty degeneration of the liver and yellow atrophy has never
3 been described in relationship with lead poisoning, either
4 tetraethyl or ordinary lead.

5 Q Would it be your opinion that it is within the realm of
6 possibilities that four doses of bismuth injection adminis-
7 tered by a physician for the treatment of a syphillitic
8 infection could have caused secondarily the uremia?

9 A I think not, because of the long time factor intervening. It
10 is certainly highly improbable. It is not impossible,
11 however.

12 Q Do you think it could have caused the liver condition observed?

13 A I doubt that also, for the same reason. I would expect an
14 overwhelming portion of the bismuth to have been eliminated
15 from the body during that time interval.

16 Q Isn't it a fact that recent chemical processes have made it
17 possible to entirely eliminate the arsenic from bismuth
18 and that arsenic that was formerly the cause of toxic effects
19 that were attributed to bismuth?

20 A No, I would not say that; I have seen a rather large series
21 cases treated with bismuth, more in one person than another,
22 and although arsenic very definitely produces more bad
23 reactions and more evidence of intoxication than does bis-
24 muth, bismuth, through bismuth injections, has produced
25 rather striking symptoms when the dosage has been high. In
26 this country the general practice is to use much lower

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3 treatment.

4 You did not attend the coroner's inquest?

5 A. No, I did not.

6 Q. You did not see the body of the deceased?

7 A. I did not.

8 REVEREND: I think that is all.

9 My information as to the necropsy has come from the record
10 and from personal conferences with Dr. Reeves, who did the
11 autopsy.

12 ANSWERER: I think that is all.

13 MR. DETHELFSEN: That is all with me.

14 MR. HONE: I will try to be brief, Doctor, and see if we can
15 make the answers brief. All of the questions asked you by
16 Mr. Dethlefsen relating to dangers and hazards of exposure,
17 etc., were in connection with and tied directly in with
18 tetraethyl lead concentrated fluid, that is correct, is it
19 not?

20 MR. DETHELFSEN: (Interrupting) Not all the questions.

21 MR. HONE: Q. Related to the dangers -- I will withdraw the
22 question and reframe it.

23 REVEREND: Yes.

24 MR. HONE: In testifying in this case you have drawn a careful
25 distinction between the phrase "tetraethyl lead" and the
26 phrase "leaded gasoline" or gasoline containing tetraethyl
lead?

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MR. HONE:

DR. KEMMER:

A Yes, I have.

Q And the phrase "tetraethyl lead" refers to the concentrated fluid?

A Yes, to the chemical compound, to tetraethyl in its undiluted form.

Q And gasoline containing lead or containing tetraethyl lead refers to a fluid in which gasoline and tetraethyl lead are mixed?

A In concentrations, yes, not in excess of the commercial concentrations.

Q And these commercial concentrations go up as high as one part of lead in 75 parts of gasoline, as testified to by Mr. Mittleman, that is correct?

A It is not within my knowledge to say whether it is correct or not; I can say quite definitely that the concentrations do not exceed one part in 1260, because no such concentrations have ever been available commercially.

Q Summarizing your answers to a great many questions, you feel that there are no hazards or dangers or significant exposure or danger of the absorption into the body or tissues of significant quantities of lead, or any other harmful consequences from the handling of leaded gasoline?

MR. DETHELFSEN: Objected to as not being proper on the testimony.

MR. HONE: I am trying to put 50 questions into one.

MR. DETHELFSEN: We will withdraw the objection.

A It is my very definite opinion with the handling of leaded

MR. DETHLEFSEN: ()

DR. HONE:

1 gasoline in any and all the ways in which it may be handled
2 is without danger to persons so engaged; that, I may say,
3 has been the burden of some fifteen years of experimental
4 study, critically examined by experts in this country and
5 abroad in an effort to determine whether there is any actual
6 danger either to the public or to persons employed in the
7 occupations which require exposure to leaded gasoline, and
8 my answer is very definitely "no." If my answer were to
9 the contrary I would convict myself of an entire willingness
10 to see a large portion of the population, including myself,
11 seriously disabled by lead poisoning, for this is a public
12 health problem that involves millions of people in the world.

13 Q Mr. Telepnev did not handle concentrated fluid of tetraethyl

14 MR. DETHLEFSEN: (Interrupting) How does he know?

15 MR. HONE: So far as the record of this case discloses; he has
16 read the entire record of the case.

17 REFERENCE: I don't think the record shows he ever handled any
18 pure tetraethyl. You can answer it.

19 A From my understanding of the record, or from any other infor-
20 mation that I may have, I have no reason to believe that Mr.
21 [REDACTED] ever handled the concentrated fluid.

22 MR. HONE: Q. With regard to your experience and the medical
23 literature on the subject of leaded gasoline, so far as you
24 know all the medical literature confirms the opinions you
25 have given in this case?

26 A I believe that is the case. There were some opinions

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MR. HONE: (23)

DR. KITHOM:

1 expressed to the contrary in the earlier and more contro-
2 versial period of the discussion on this public health
3 subject, but the opinions of all of the investigators in
4 this field, whether governmental or otherwise, are in agree-
5 ment in saying they have failed to find evidence of danger
6 of lead absorption from the handling and use of leaded
7 gasoline in the commercial concentrations.

8 Q What, if any, is your interest in this case?

9 A I have no interest except that of a person who has been
10 engaged in this field of work for many years in saying what
11 I believe to be true in this record.

12 Q You have given as your opinion that Mr. [REDACTED] did not
13 suffer from lead poisoning and did not die therefrom; going
14 further, is it your opinion that Mr. [REDACTED] work and
15 employment, as described in this case and as shown by the
16 record, contributed in any way to any of his disability or
17 to his death?

18 A Insofar as lead exposure is concerned, I am entirely con-
19 vinced that his occupation in no way contributed to his
20 illness or to his death, for the reason that in my opinion
21 he did not absorb lead as a consequence of his occupation.

22 Q The referee has asked you a number of questions, asking you
23 to take into account a number of different speculations and
24 circumstances, including the time element and the quantity
25 absorbed over a large number of years and variations in
26 individuals, etc. I am asking again a moot question; in

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MR. HONE: ()

() DR. KENOE:

1 reaching your opinion which you have given in this case,
2 did you take into consideration those various factors; in
3 other words, prior to giving your opinions in this case, had
4 you taken into consideration these various factors mentioned
5 by the referee, and then, notwithstanding these factors, you
6 still gave your opinion that Mr. [REDACTED] did not suffer
7 from lead poisoning?

8 A Yes, quite. I have taken those factors into account in
9 arriving at my judgment in this instance.

10 Q So that if all the questions which were asked you in this
11 case regarding the nature of his exposure and whether or
12 not there was any danger to him from his work, and if I would
13 specifically name each and all of those various circumstances
14 referred to by the referee, your answers and opinions would
15 have been the same?

16 A Precisely.

17 Q I am doing this to avoid going through it again.

18 MR. BETHLEFSEN: It is all right.

19 REFEREE: It is all right.

20 MR. HONE: Q You gave a number of answers involving qualifi-
21 cations that such results would not show unless Mr. [REDACTED]
22 had been exposed to significant amounts of lead; is it your
23 opinion that Mr. [REDACTED] was not exposed as the result of
24 his employment to significant amounts of lead?

25 A It is my very definite opinion. I probably used the word
26 "exposed" quite frequently in the general sense of hypotheti

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MR. HONE: (84)

DR. KEMOE:

1 exposure, but when I speak of significant exposure with
2 reference to Mr. [REDACTED] case I meant in my opinion there
3 was no measurable exposure to lead in his occupation.
4 In your opinion, is there anything in this record which would
5 indicate to you that Mr. [REDACTED] absorbed in any manner
6 quantities of lead which became cumulative and accumulated
7 in his body over a period of time?
8 A No, there is no evidence which I can accept as competent to
9 demonstrate that Mr. [REDACTED] at any time accumulated lead
10 in his body as a consequence of his repeated small exposures.
11 In connection with the book by Alice Hamilton referred to on
12 cross-examination, is there any mention in that book of tetra
13 ethyl lead or leaded gasoline?
14 A I believe there is, either in this edition or in the second.
15 With respect to Alice Hamilton's reference to cases of lead
16 poisoning seventeen years after exposure, would you let me
17 have your comments, I wasn't quite clear on that. In other
18 words, you have given some testimony here in which the period
19 of eighteen months was given as a significant period?
20 A I think one could probably find in the literature references
21 to what is known as "latent lead poisoning," in which certain
22 symptoms suggestive of lead poisoning occur many years after
23 the cessation of exposure; obviously, in those case the ques-
24 tion of diagnosis is in issue, and in many instances has been
25 a very controversial issue. In citing the literature, one
26 would naturally refer to such cases, citing the reference

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MR. HONE: (7)

Q. KEMCE:

1 for what it is worth, perhaps recognizing that in many
2 instances the diagnosis was not substantiated as it would
3 be required in these days with more accurate methods of
4 observation. The whole question, therefore, of latent lead
5 poisoning in the sense of regarding such cases as evidence,
6 is not much better than speculative.

7 You have testified on cross-examination that tetraethyl may
8 be absorbed through the skin, and in that connection you
9 referred to the concentrated fluid, is that correct?

10 A I did.

11 Is there any chance, in your opinion, that where lead in
12 gasoline is spilled or otherwise comes in contact with the
13 skin that lead may not be absorbed as the result of that?

14 A There has been no change in my opinion as the result of
15 further study of this problem.

16 Q So far as you know, is there any conflict between the
17 opinion you have given in this case and all of the litera-
18 ture and writings which you have written and published?

19 A There is no such conflict.

20 Q In regard to the testimony given on cross-examination relating
21 to the persons handling tetraethyl lead, all of those exper-
22 iences occurred in connection with the handling of concen-
23 trated fluid?

24 A Yes, that is true.

25 And the statistics which were given were in connection with
26 lead poisoning and workers with tetraethyl lead were all at

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MR. HONE: (85)

DR. KENICE:

- 1 places where the concentrated lead was handled and not the
2 loaded gasoline?
- 3 A Yes, that is correct.
- 4 Q And that was in the manufacturing process?
- 5 A Yes.
- 6 Q And the reference to a laboratory worker was with reference
7 to a laboratory worker handling concentrated tetraethyl lead?
- 8 A Yes, actually engaged in the operations incident to the manu-
9 facture of the product.
- 10 Q And your reports and findings in connection with the examina-
11 tion of still operators and laboratory workers, after five
12 years operations, were with those working with the concentrated
13 fluid?
- 14 A That is right.
- 15 Q And with them even you found no case of lead poisoning and
16 nothing above some concentrated lead excretions?
- 17 A We were able to set up conditions of control for eliminating
18 cases of lead poisoning from that occupation.
- 19 Q With reference to experiments on rabbits, that involved the
20 concentrated fluid, is that not true?
- 21 A Some of them.
- 22 Q The ones referred to in the cross-examination?
- 23 A The ones referred to were all referred to experiments with
24 the concentrated tetraethyl.
- 25 Q And that is not gasoline containing tetraethyl lead?
- 26 A That is not, but there were in the same articles references to

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MR. HONE: (8)

(. KENOE:

1 experimental work which demonstrated in my own mind clearly
2 that lead was not involved when animals were subjected to
3 gasoline containing commercial concentrations of tetraethyl
4 lead.

5 Q In your opinion, was there any lead in significant quantities
6 in the air in the laboratory in which Mr. [REDACTED] worked?

7 A No, obviously not; that is my opinion.

8 REFEREE: Q. I think I asked you, did you ever visit this labora-
9 tory?

10 A I did not visit that particular laboratory, no, I did not.

11 I know the methods generally used from general knowledge.

12 MR. HONE:

13 Q It is your opinion that the death of Mr. [REDACTED] is com-
14 pletely explainable independent of lead?

15 A Yes, adequately so.

16 Q It is your opinion that there was no significant contact or
17 exposure of Mr. [REDACTED] to lead?

18 A Yes, in the course of his occupation.

19 Q It is your opinion that Mr. [REDACTED] could not and did not
20 inhale sufficient, if any, lead vapors to cause any of his
21 symptoms or any disability?

22 A That is my opinion, yes.

23 Q Or to contribute thereto?

24 A Yes, that is my opinion.

25 Q Or to aggravate or exacerbate any disability he may other-
26 wise have had?

A That is my opinion.

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MR. HONE: (85)

DR. REHOE:

1 Q It is your opinion that the picture of Mr. [REDACTED] case
2 is the opposite or at least differs in many material res-
3 pects from the typical picture of lead poisoning?

4 A It is my opinion that the condition suffered by Mr. Telepnev
5 was distinctly atypical, that is to say not typical of lead
6 intoxication.

7 Q In a typical case of established lead intoxication, where
8 on proper urinalysis as far as lead is found, what quantity
9 would you expect to find, what quantity of lead would you
10 expect to find in the urine under the worst conditions?

11 A The quantity found under conditions of abnormal exposure
12 vary with the severity of the exposure from one-tenth of
13 a milligram per litre of urine. It goes as high as .6 or
14 rarely .7 milligrams per litre.

15 Q And what is the highest you could possibly account for as
16 presenting a true picture of lead content without contami-
17 nation?

18 A I am afraid I do not understand the question.

19 Q The last figure which you gave of .6 milligrams per litre
20 as high as you could reasonably expect to find as a true
21 picture of excess of lead without contamination of the
22 sample examined?

23 A Yes, in my experience that reaches a high concentration, as
24 high a concentration that would be expected under the most
25 severe conditions of lead exposure.

26 Q And anything higher than that would indicate what to you?

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MR. HONE:

DR. REECE:

1 A Anything grossly above that level would strongly suggest
2 contamination from the sample to me to such an extent that
3 I would want to check the result before drawing a con-
4 clusion from it.

5 Q The fact that you find as a cause of death uremia secondary
6 to interstitial nephritis, without any further finding as
7 to the cause either of the uremia, if it is interstitial
8 nephritis, there is nothing unusual in that?

9 A That is not an uncommon necropsy finding and diagnosis.

10 Q And would there be any reason in your mind based upon the
11 fact that the causes of these disabilities are not definite-
12 ly ascertained to ascribe such cause to lead poisoning be-
13 cause of the fact that the person involved had been working
14 for a number of years in the laboratory under the conditions
15 present in this case?

16 A Obviously not. I have definitely concluded his occupation
17 had nothing to do with the development of this disease
18 process, and this disease process in conditions in which
19 there was no possible occupational exposure.

20 Q And finally, Doctor, taking into consideration now everything
21 you know about this case, including various hypotheses and
22 speculations and circumstances which either might have been
23 present or were supposed to be present, or merely presumed
24 to be present, including those which Mr. Dethlefsen has
25 suggested and the referee has suggested and I have suggested,
26 is it your final opinion that Mr. [REDACTED] did not absorb

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1 either in small quantities daily or otherwise quantities of
2 lead over a period of several years such as to produce a
3 case of lead poisoning, or such as to cause his disabilities
4 or any of them, or as to cause his death?

5 A I say without any reservation that I do not believe Mr.

6 [REDACTED] suffered any disability or injury from lead as a
7 consequence of his occupation either as a primary, secondary
8 or contributory factor in his illness and death.

9 MR. HONE: That is all.

10 REFEREE: I believe you testified a little while ago that some
11 authorities of some eminence held the theory that nephritis
12 was one of the common concomitants of the result of lead
13 poisoning, didn't you?

14 A Yes, I quoted Lockhart Gibson as believing that in children
15 chronic nephritis could come and, in his opinion, did come
16 from a previous existing lead intoxication. Authorities
17 disagree with him on that point, but that is his opinion.

18 MR. HONE: Q But in this case you do not believe it did?

19 A It did not, definitely.

20 Q In fact, that is your opinion, it did not.

21 MR. DETHLEFSEN: That has been gone into a hundred and eighty-four
22 times.

23 A It is my opinion it did not, because in my opinion he did
24 not absorb lead as a consequence of his occupation.

25 MR. DETHLEFSEN: Q And that is the basis of your opinion, that
26 lead cannot be absorbed?

1 A It is not the whole basis of my conclusions, but is an
2 important factor in my conclusions.

3 MR. HONE: I would like it understood that our offering of
4 testimony in this case is not a waiver of, but if anything
5 is in support of all the defenses which we have raised, and
6 in that connection I call particular attention to the de-
7 fense raised in our answer that this whole matter is
8 res adjudicata, that this Commission has already passed
9 upon whether or not the disability of Mr. [REDACTED] arose
10 out of or in the course of his employment and decided that
11 they did not, and that there is only one cause of action and
12 that, therefore, the Commission would be without authority
13 to find that the disability complained of arose out of or
14 in the course of the employment, and therefore that the
15 death resulting from the disability was compensable under
16 the Act.

17 REFEREE: Mr. Kiessig raised the lack of jurisdiction to this
18 death claim on account of the other claim being res adjudicata.

19 MR. HONE: I imagine you would have jurisdiction to hear the
20 claim, but I do not think an award contrary to the previous
21 award would be proper.

22 REFEREE: If I were in your place I would probably regard it
23 that way, too.

24 CASE SUBMITTED.

25 * * * *

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