

Cases of TEL poisoning
French Manufacturing Plant-Painboeur

MEMORANDUM ON A CASE OF POSSIBLE LEAD INTOXICATION AT THE
ETHYL-KUHLMANN TETRAETHYL LEAD PLANT, FAIMBOEUF,
LOIRE INFERIEURE, FRANCE.

CASE SHEET.

Name:

Employer:

[REDACTED]
Ethyl-Kuhlmann,
Faimboeuf,
Nr. Nantes,
Loire Inferieure,
FRANCE.

Age:

33 years.

Date and Place of Birth:

9th April, 1915 at Brest.

Marital State:

Single.

Family History:

Not known. Parents probably alive.

History of Past Illnesses:

Not known.

Habits and Environment:

A well-known heavy drinker of local
wine.
He resided in lodgings in Faimboeuf.

Previous Employment:

Worked in the arsenal at Brest.
Duration and type of employment not
known.

Employment with
Ethyl-Kuhlmann, Faimboeuf:

He commenced work on the 27th August, 1947
and was passed as medically fit for
employment in the Tetraethyl Lead Plant
on 9th September, 1947.

27th August - 6th
September, 1947.

He worked as a process operator on the
ground floor of the T.E.L. building,
transporting hoppers to and from the
alloy building.

September, 1947.

He was on strike with other employees.

3rd October - 8th
December, 1947.

A second operator on the top floor of
the T.E.L. building engaged in charging
autoclaves and controlling the reaction.

8th December, 1947 -
6th March, 1948.

He worked as a blacksmith on the
ammonia plant on the same site but not
in the T.E.L. section.

6th March - 13th November,
1948 (see exceptions
below)

He was engaged on general maintenance
on T.E.L. Plant. His work was not
supervised. The detail of all work

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History of Past Illnesses:

Not known.

Habits and Environment:

A well-known heavy drinker of local wine.
He resided in lodgings in Paimboeuf.

Previous Employment:

Worked in the arsenal at Brest.
Duration and type of employment not known.

Employment with
Ethyl-Kuhlmann, Paimboeuf:

He commenced work on the 27th August, 1947 and was passed as medically fit for employment in the Tetraethyl Lead plant on 9th September, 1947.

27th August - 6th
September, 1947.

He worked as a process operator on the ground floor of the T.E.L. building, transporting hoppers to and from the alloy building.

September, 1947.

He was on strike with other employees.

3rd October - 8th
December, 1947.

A second operator on the top floor of the T.E.L. building engaged in charging autoclaves and controlling the reaction.

8th December, 1947 -
6th March, 1948.

He worked as a blacksmith on the ammonia plant on the same site but not in the T.E.L. section.

6th March - 13th November,
1948 (see exceptions
below)

He was engaged on general maintenance on T.E.L. plant. His work was not supervised. The detail of all work carried out by him during the last three weeks of employment is not definitely known. He had changed valves on alloy pots, greased reduction gears on stills, installed compressed air lines and forged chisels and picks for the lead recovery building.

26th-29th July, 1948)
11th-13th October, 1948)

He was the second operator on the top floor of the T.E.L. building.

History of Illness:

Saturday, 13th November,
1948.

He complained of chill and attended
the Works' Surgery for treatment.

Monday, 15th November,
1948.

He was absent from work and was visited
at his lodgings in Paimboeuf by the
Nurse/Health Visitor, who found him
agitated. The Works' Medical Officer
was informed and visited him later in
the day when he found him in a condition
closely simulating Delirium Tremens.
He was excited, confused and perspiring
profusely. He was suffering from
hallucinations.

On examination the pulse rate was 100
beats per minute, temperature 99.8°F.
(37.7°C.) and blood pressure 150/100 mm.Hg.
There were no localising signs.

He was removed to the hospital at the
Ethyl-Kuhlmann Plant, Paimboeuf and
kept under observation for several hours.
His condition did not improve and he was
transferred, the same evening, by
ambulance to St. Jacques Hospital, Nantes.

15th November - 1st
December, 1948.

In hospital he was under the care of
Dr. Corman, a Physician, who considered
him to be a typical case of Delirium
Tremens, although Dr. Corman knew of
the possibility of tetraethyl lead
intoxication. Delirium Tremens is a
common condition in the area.

He did not respond to treatment in the
usual manner. His condition progressively
deteriorated; agitation being the most
prominent sign. During the few days
prior to death his condition simulated
meningo-encephalitis. There was a
marked generalised rigidity, dysphonia
and dysphagia. Kernig's sign was
positive. Brudinski's sign not known.
Blood pressure, lumbar puncture and
biochemical examinations were not possible
owing to the locomotor activity. There
were no abdominal symptoms. Myoclonus
and convulsions were not noted.
The temperature was elevated during the
last few days of illness.

1st December, 1948.

Death.

Treatment:

He was treated as a case of Delirium
Tremens. Morphia, hyoscine and barbiturates
were not given.

His treatment consisted of a hypodermic

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Monday, 27th November,
1948.

He was absent from work and was visited at his lodgings in Faimboeuf by the Nurse/Health Visitor, who found him agitated. The Works' Medical Officer was informed and visited him later in the day when he found him in a condition closely simulating Delirium Tremens. He was excited, confused and perspiring profusely. He was suffering from hallucinations. On examination the pulse rate was 100 beats per minute, temperature 99.8°F. (37.7°C.) and blood pressure 150/100 mm.Hg. There were no localising signs. He was removed to the hospital at the Ethyl-Kuhlmann Plant, Faimboeuf and kept under observation for several hours. His condition did not improve and he was transferred, the same evening, by ambulance to St. Jacques Hospital, Nantes.

15th November - 1st
December, 1948.

In hospital he was under the care of Dr. Cormen, a physician, who considered him to be a typical case of Delirium Tremens, although Dr. Cormen knew of the possibility of tetraethyl lead intoxication. Delirium Tremens is a common condition in the area. He did not respond to treatment in the usual manner. His condition progressively deteriorated; agitation being the most prominent sign. During the few days prior to death his condition simulated meningo-encephalitis. There was a marked generalised rigidity, dysphonia and dysphagia. Kernig's sign was positive. Brudinski's sign not known. Blood pressure, lumbar puncture and biochemical examinations were not possible owing to the locomotor activity. There were no abdominal symptoms. Myoclonus and convulsions were not noted. The temperature was elevated during the last few days of illness.

1st December, 1948.

Death.

Treatment:

He was treated as a case of Delirium Tremens. Morphine, hyoscine and barbiturates were not given. His treatment consisted of a hypodermic injection of 15 mg. strychnine sulphate per day for eight days.

Post Mortem - 2nd December,
1948:

There was subcutaneous ecchymosis of scalp and right iliac region.

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Post Mortem (Contd.)

Brain:

The dura mater was normal.
The subarachnoid space contained sanguinous fluid.
The brain was shrunken in appearance, appeared compressed and had a lilac hue. The superficial veins were congested. There were some haemorrhagic areas on its surface. The brain stem and cerebellum exhibited a similar appearance to the cerebrum.
On section of the brain numerous pinpoint haemorrhages were noted.

Lungs:

These were congested without consolidation. Sections floated in water.

Liver:

Normal in size. It felt more crepitant than normal when cut with a knife.

Kidneys:

These were lilac in colour.

Analysis of Biopsy Material.

The samples provided were forwarded to the Courtauld Institute of Biochemistry, Middlesex Hospital, Medical School, London, W.1., where they were analysed under arrangements made with Professor E.C. Dodds. The samples had been forwarded in bottles prepared by Professor Dodds, which were broken in transit. Each sample was weighed after adhering pieces of straw had been removed, then washed under the tap and finally washed with distilled water.

The results are as follows:-

Sample.	Weight.	Mg. Pb. found.	Mg./Pb./100 gm. tissue.
Brain	63 gm.	0.36	0.57
Liver	29 "	0.15	0.52
Lung	20 "	0.097	0.48
Kidney	63 "	0.40	0.64

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COMMENTS.

The deceased, [REDACTED] from existing knowledge of the occupational environment, was subjected to significant exposure to organic-lead compounds in the course of his employment. His work was not adequately supervised and details of his duties during the three weeks prior to his fatal illness are not known. The degree of the significant exposure cannot be ascertained.

The clinical picture exhibited during his fatal illness is common to tetraethyl lead poisoning and Delirium Tremens. It was known that he was addicted to alcohol. Consequently, there will always remain a certain element of doubt in this case. It is bad practice to assume two causes for any pathological process, but in this instance both poisons may be accepted as having played a part. It may remain a matter of opinion as to which was the actual cause of death. The mortality rates in tetraethyl lead intoxication and Delirium Tremens are approximately the same. The biochemical and analytical procedures, which may have been of assistance in ascertaining the main cause of the illness, were unfortunately not carried out. The meningeal irritation and rigidity exhibited in this case are not to be expected in tetraethyl lead intoxication, which, as a rule, does not present any localising signs.

The post mortem findings in tetraethyl lead intoxication are not specific and are common to those resulting from many toxic processes. The picture of congestion, oedema and petechial haemorrhages, such as found in this case, is similar to that found in tetraethyl lead poisoning and chronic alcoholism.

There was considerable delay in the receipt of the pathological specimens for analysis through the post. There is some possibility of the tissues having been contaminated when the bottles containing them were broken. As reasonable steps were taken to remove such possible contamination, it is considered that the results of analysis should be accepted as correct. The following table shows a comparison of these results with the maximum normal standards determined by Dr. R.A. Kehoe:

Standard.	Mg. Pb. per 100 gms. of fresh or formalin-fixed tissue.			
	Brain	Liver	Lung	Kidney
Maximum normal	0.09	0.28	0.06	0.16
Tissues of deceased	0.57	0.52	0.48	0.64

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The concentration of lead in the formalin in which the tissues were fixed was 0.065 mg. per litre. A sample of potable water from the area contained 0.55 mg. of lead per litre.

The concentration of lead in the four tissue samples analysed are obviously very much in excess of normal. This high lead content could not have resulted from contamination of the formalin. The moderately high lead content of the potable water, by British standards, and the very high rate by American standards, is not a likely cause

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of the high concentration of lead in the tissues. There are no other records from the Paimboeuf area with which these results may be compared. The lead content of the local wine is also unknown.

SUMMARY.

Albert Nicolas, an employee of Messrs. Ethyl-Kuhlmann, Paimboeuf, who died on the 1st December, 1948 following an illness simulating tetraethyl lead intoxication, was a known chronic alcoholic. For this reason he should not have been employed in the manufacture of tetraethyl lead, and, further, he should not have been permitted to commence work without a pre-employment medical examination. He had significant lead exposure from his occupation. He was not supervised in work which involved an occupational lead hazard.

The clinical picture, post mortem findings and results of the analysis of four tissues are strongly suggestive of tetraethyl lead poisoning. There is a possibility of another cause, namely, Delirium Tremens, from chronic alcoholism.

In view of all the findings it is considered that it is fair and reasonable to conclude that the most likely cause of death in this case was tetraethyl lead poisoning.

Davison

R. Davison.
(Senior Medical Officer).

7.4.49.

Medical Department,
The Associated Ethyl Company Limited,
LONDON.

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