Case of [redacted]

Employee of Joseph Forcier, Gravelbourg, Saskatchewan, Canada.

In September of 1929 [redacted] began to feel ill, with a headache, insomnia, abdominal cramps, diarrhoea, vomiting, and weakness. The condition progressed until he finally was forced to quit work and later was taken to a hospital for observation and treatment. The following is a resume of his occupational history, and the onset and course of his illness up to the present, December 3, 1929.

Age 41 - Unmarried

Past History - Negative

Occupational History - Started to work about 1920 in butcher shop. There for one year. Machine shop four years. As machinist in stone cutting yard for one year. Drove a dray and trucks one year. Helped tinsmith about two years ago for about three months, did no soldering. With present company for one and one half or two years. No known lead exposure.

First started handling Ethyl Gasoline June 27, 1929. Work consisted of pumping gas from tank car to barrels and then from barrels into truck and subsequently delivering gas to filling stations. On June 27, 1929 (first shipment) 1645 gallons were handled in a period of four to five hours. On August 19, 1929 a shipment of 1638 gallons, and on September 23, 1929 one of 1657 gallons was received and handled in approximately the same time as the first shipment. This man states that he worked very rapidly using no precautions to avoid contact with the gasoline, and as a result was

thoroughly soaked with the gas from above the waist to his feet. His hands during this period were constantly wet with the gas. The clothing after being wet was not changed and was worn every day up until his entrance to hospital. The man at this time had a habit of biting his nails and probably had his fingers in his mouth a great deal after filling his truck. The barrels were filled in a corner of a closed structure where two small doors offered the only ventilation.

On the second occasion of barrel filling, he became dizzy while at work and went outside for fresh air. Returned and finished job. He vomited on the next morning and did not feel well for days, having a headache which usually began in morning on arrival at work and lasted through the day and sometimes in the night. He slept poorly and felt tired. He had no delightful dreams, but was restless.

After the third experience of barrel filling his symptoms became worse. Whether after this or before (subject is not sure) he developed abdominal cramps of a dull, aching character, a diarrhoea, with two or three loose stools per day. The pain was not relieved by defecation, nor was it localized, but was most severe on the sides low down, and radiated to the back at times, sometimes up toward throat.

Nausea and vomiting occurred daily with or without meals, but began only after arriving at work where exposure to gasoline was resumed. The vomiting was followed by a bad taste (not adequately described - "everything tasted same". Later described as "coppery".) The appetite was very bad, but he forced himself to eat. He slept badly, and was "jumpy", his

roommate complaining of his grinding his teeth and moving about. He wakened tired, felt weak, had double vision and "spots in front of eyes", had weakness of knees, vertigo, pains in arms and legs, and abdominal pain.

At this time he consulted a doctor who made a diagnosis of lead poisoning (without knowledge of his occupation). The next day saw another doctor who made the same diagnosis (without knowledge of other doctor's diagnosis or of occupation). Was now too ill to continue work and went into hospital on advice of doctors. At this time he seems to have had a lapse of memory for he got a haircut, about which he had no knowledge until his barber later told him about his peculiar behavior while in the shop. He now developed considerable pain in arms and legs - (having had weakness of legs and knees before). On lifting the arm he had pain in the right deltoid muscle and in wrist. After a day or two he developed a right wrist drop, which lasted one day.

His hospital record is largely valueless. It indicates that on admission his temperature was normal, his urine showed a trace of albumen. Pain over the right parotid gland developed which lasted four days. Nausea without vomiting persisted at first while in hospital. Examination notes at hospital show that there was a generalized tenderness over abdomen, flanks and back, and A punctate pigmentation of the lower gums some distance from the teeth. Patient says that while in hospital he noted prickly sensation over entire body. He describes a peculiar "old coin" taste in mouth when back was rubbed with an ointment of menthol, methyl salycilate, and chloral hydrate. Some

muscular incoordination of hands was noted in that it was "hard to do things with hands".

The condition gradually improved and the symptoms abated after about two weeks in the hospital. Did not return to work for about a month and in this time gained back the weight he had lost (about 12 lbs.). Was seen by Dr. Lester W. Sanders of the Ethyl Gasoline Staff at this time. (Dr. Sanders' findings appear in records of examination.) Dr. Sanders investigated various possibilities of lead absorption, obtaining samples of the subject's blood, excreta, drinking water from two sources. He also obtained the subject's unlaundered clothing for a study of its lead content. (See appended data.)

He returned to work about November 15th, working at light work with no appreciable gasoline exposure. A week later began work in earnest and handled gasoline, filling tank wagon and hauling. On way home in evening cramps began to become severe again, increasing in severity until he was scarcely able to walk. Was very weak and had continuous pain on both sides low in abdomen. Did not return to work, but improved sufficiently to come to Cincinnati on December 2nd at request of Dr. Kehoe.

Entered Holmes Hospital December 3nd for observation. At this time his symptoms were confined to discomfort in the abdomen, some muscular soreness in the back, and inconstant headache. On the way to Cincinnati he had noted weakness of the legs, especially the right, and an ache in the right arm.

Physical examination disclosed the following facts. (Composite findings of Dr. Sanders, Dr. Kehoe, and Dr. Koshay.)

The general appearance was that of a healthy strong

young man, of ruddy complexion and stout build. His abnormal findings were:

(1) Hypertrophy and edema of the left inferior turbinate, with impingement on the septum and a partial obstruction of the left nostril; some opacity to transillumination of left ethmoid or sphenoid region, and some tenderness; congestion and edema of mucous membranes of nose and posterior pharynx with a post nasal discharge. Posterior cervical lymph glands on left sore to palpation. Tonsils red, edematous and containing liquid pus in deep crypts. Left sided sinusitis involving ethmoid region verified by X-ray examination.

(2) Abdominal tenderness over caecum and sigmoid especially but involving entire large bowel. Distension of caecum and ascending colon.

(3) Paresis (somewhat variable from day to day, and apparently absent at times) of the hands and forearms, equal on the two sides, more pronounced in the extensors than the flexors, and more pronounced in the hands than in the forearms. Reflexes were present in all, and there was no demonstrable atrophy. There was tenderness along the musculo-spiral nerve. No sensory disturbances were present.

(4) No lead line was present at any point.

LABORATORY FINDINGS

Blood Wasserman - negative

Red Blood Count - (2 counts) 4,000,000

White Blood Count - 6,000

Differential:

Polymorphonuclear neutrophiles	75%
Lymphocytes	22.5%
Eosinophiles	2%
Basophiles	0.5%

Stippling per 50 fields:

November 21, 1929	10
December 2, 1929	6
December 9, 1929	12

Haemoglobin - 90

Analysis of blood for lead - three samples of 50cc each - Nil

Urinalysis - Negative on three occasions

Stool - Moist, unformed, with excessive mucous and no blood. No intestinal parasites found. Bacteriological culture shows presence of an haemolytic streptococcus. The stool is such as is seen in a low grade colitis.

X-Ray examination of Gastro Intestinal Tract - Negative except for spastic condition of colon.

Analysis of Excreta for Lead.

Dates	Urine - Mgs/Liter	Faeces - Mgs/gm ash
11/11/29	0.03	0.17
13/1/29	0.04	0.13
13/2/29	0.02	0.13
12/3/29	0.03	0.13

Analysis of Drinking Water.

(1) From garage in Gravelbourg - 0.02 mgs. per liter
(2) From residence in Gravelbourg - 0.06 mgs. per liter

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Analysis of Trousers used in work.

Front of trousers	-	79.50 grams of cloth contain	4.20 mg Pb
Back of trousers	-	101.75 grams of cloth contain	7.50 mg Pb

Discussion:-

The history of this patient strongly suggests to me a primary intoxication from gasoline inhalation. The alimentary symptoms, the nausea and vomiting (on exposure only), and especially the quick recurrence on a single exposure after apparent recovery, point so strongly in this direction that it is difficult to avoid the conclusion that gasoline was the primary cause of his illness.

On the other hand there is the opinion of two physicians who saw him at the time of his severest illness, who attributed his symptoms to lead, and who say that a "lead line" was seen at this time. In my experience lead lines do not disappear in from four to six weeks, but one cannot arbitrarily say that no such lead line existed.

The important physical findings are limited to a slight degree of muscular weakness involving the extensor and pronator muscles of the forearm and hand. I cannot say with any certainty that this condition occurs as a result of severe gasoline intoxication, while it is well known to be a characteristic feature of lead intoxication. An experienced and capable internist (without direct experience of gasoline intoxications) Dr. Lee Foshay of Cincinnati, who was called in consultation, believes the condition to be the result of lead intoxication.

The alimentary symptoms are due to a spastic colitis and in my opinion bear no relationship to lead intoxication. Their onset

at the time of severest exposure corresponds to one's expectations of gasoline intoxication.

The stippling is not of a magnitude which would be considered significant of lead poisoning. The lead excretion is distinctly within the normal range, giving no evidence of a significant and recent lead exposure. It is true that the analytical results have been obtained after two months discontinuance of exposure, but experience leads me to expect to find evidence of significant exposure months after discontinuance.

The diagnosis, therefore, hinges upon whether or not one is willing to accept the statement that a lead line originally existed, and whether one regards the neuro-muscular signs as specific for lead intoxication. The simplest and easiest conclusion would be that of a sudden mild lead intoxication. Such a diagnosis, however, must rest upon a history of significant exposure, or in the absence of such history, laboratory evidence of significant exposure such as significant excretion of lead, lead line, and stippling of a degree associated with lead absorption - one or the other of these, together with characteristic physical signs. In this case, the history, in terms of wide experience, is very doubtful, the evidences of lead absorption are not present, and the physical findings are meager, and in my opinion, non-specific for lead.

I would regard the diagnosis of gasoline intoxication as a practical certainty if it can be found that a peripheral ascending neuritis of a mild type is a sequel of such an intoxication.

Investigations now under way will probably determine this point. Meantime one must make a fallible choice as to which causative factor to assign to this case.

Robt. A. Kelloe, M. D.

December 26,1929