Leaded Gasoline

For 2004 Mark Zuckerberg

By David Schaaf

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Recording Link: https://drive.google.com/file/d/1os3mL8y7onP_n6jXPF2EJDT30zealg8k/view?usp=sharing

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Once upon a time...

At the beginning of the 20th century, a new industry was born with the mass production of cars.
Manufacturers like Ford were able to manufacture and sell them at an affordable price, which lead to rapid adoption at scale.
In 1908, Henry Ford introduce the Model T and sold over 10,000 that year. By 1921 Ford had sold it's 5,000,000th Model T.
(Ford, H.)

Automobiles started to change society itself
- How people got around daily
- How people interacted, since travel times were reduced by days
- Even allowed farmers to sell crops into cities that were once too far away
(Lacy, R.)

Photo:
https://www.thehenryford.org/collections-and-research/digital-collections/artifact/204421/#slide=gs-183649

And every day...

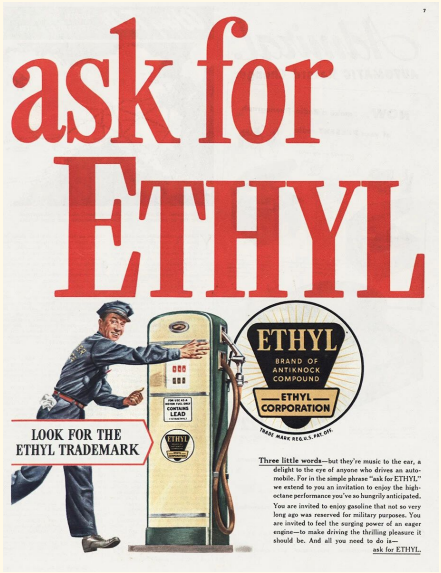
As a new technology, not everything was fully understood and one of the biggest problems of cars from that era was engine knock.

This is a loud, audible knock or pinging sound that resulted from fuel exploding out of cycle.
This caused engines to overheat, lose power, and damage components.

Engine knock was a limitation of the engine technologies of the era and had to be solved for the continued growth of the industry.
Engine manufacturers had 2 options: build smaller more efficient engines, or find an solution to make the large more powerful engines work without knock.
(Nriagu, J. O.)

Photo:
https://www.motorcities.org/story-of-the-week/2017/the-early-days-of-automobile-maintenance-and-repair

Until one day...



On December 9, 1921 Thomas Midgley, a chemist from General Motors, added a small amount of tetraethyllead (TEL) to gas which immediately stopped the engine knocking.
His team had tried over 33,000 different compounds over 6 years to find an additive that could be mixed with gas to solve the knocking problem.
The industry viewed the discovery as a “gift from God” because it solved the problem overnight and give engines an immediate performance boost.

Even today, it is the most powerful octane booster on a pure performance basis.

By April 1922 the first gallon of lead gasoline had been sold to the public - less than 6 months after its discovery.
(Nriagu, J. O.)

Photo: https://www.ebay.com/itm/276138476725

And because of this...

Leaded gas solved the biggest problem of cars, it became the primary type of gas used.
With increased adoption of cars, lead gas production also grew rapidly.
By the 1960s, leaded gas accounted for 90% of all gasoline sold.

In total between 1926 and 1985, 20 trillion liters of leaded gas were produced.
That equates to 7 million tons of lead burned and pumped into the atmosphere.

The US was the biggest consumer of leaded gas. It is estimated that the United States burned 80% of the lead gas produced before 1970.
(Nriagu, J. O.)

Photo: Life Magazine https://rarehistoricalphotos.com/gas-stations-old-photos/

And because of this...

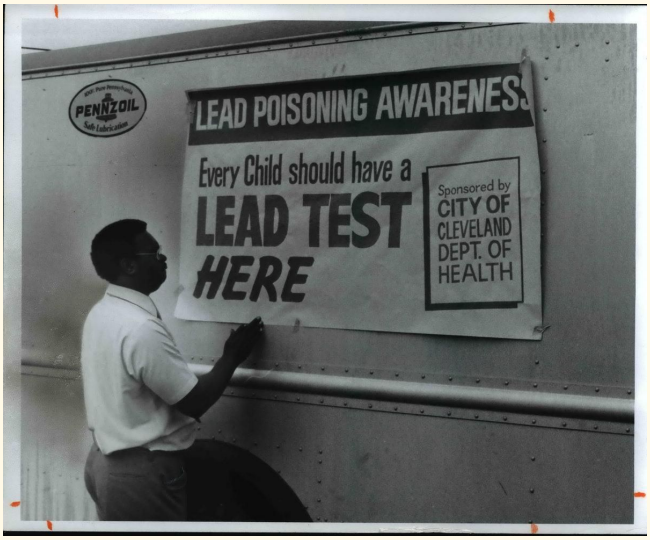
Cars and lead gas were ubiquitous, so lead exposure became unavoidable.
Lead was one of the biggest contributors to smog, which was a problem the world had never seen before.

Dangers of lead were known, but not considered a public health concern.
As early as 1925 production of lead gas was briefly stopped due to workers at the plants dying from lead poisoning.
At the time it was only viewed as an industrial problem, not a public health concern.

In actuality, people were being exposed to 100x the amount of lead as their body would see naturally.
(Rise and Fall of Leaded Gasoline)

Photo: https://waterandpower.org/museum/Smog_in_Early_Los_Angeles.html, photo by John Malmin / Los Angeles Times

Until finally...



In the 1960s, 40 years after the introduction of leaded gas, concerns were finally starting to be raised about the long term effects of chronic exposure to lead.
The problem was not just acute exposure to high concentrations of of lead as in the industrial accidents, but long-term exposure to environmental lead.

Lead was also used in pesticides and paint, which were also being linked to numerous cases of lead poisoning, especially children.
Children are especially susceptible to lead because the human body treats lead like calcium, and once it is absorbed into the body, it cannot be removed.
Lead exposure screening programs were starting to be put into place, which helped reveal that lead exposure was not just a city problem but a national problem for both urban and rural communities.

In the 1970s, a nationwide health survey was finally conducted to examine the health impact of leaded gas.
It showed that upwards of 4 million children had dangerous levels of lead in their blood, and were finally able to prove a causal relationship with lead gasoline.
(Nriagu, J. O.)

Photo:
https://www.cleveland.com/healthfit/2015/10/a_look_at_lead_poisoning_throu.html

And ever since that day...

It took a long time to understand the negative effects of leaded gas, but once proven the US government and United Nations acted to ban leaded gas worldwide.

In the US, the 1970 Clean Air Act finally gave the government power to regulate gas additives like tetraethyllead.
It was phased out over time, and fully banned in the US by 1996.

UN programs were set up to help regulate lead gas in developing nations. The last stockpiles were used up in 2021.
(Domonoske, C.)

The effect of lead gas are still with us today. Environmental lead has been linked to lower IQ scores for nearly half of Americans born during its use.
(Vahaba, D.)

Moral of lead health crisis:

- **Fully understand the health effects of new technologies** as they are developed, not 40 years after adoption
- The standard should be to **prove harmless before general use**, not proved harmful after it's hurt people

(Nriagu, J. O.)

Photo:
https://www.carparts.com/blog/leaded-vs-unleaded-gas-whats-the-difference/?srsltid=AfmBOorYlCK2Z5bF5EusyfpnRNjkB4RWMlhIox2tIz9XUgnNUmnKkgOw

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