Origins of the 50th Earth Day

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The very first Earth Day took place 50 years ago – on April 22, 1970.

Did you know that Earth Day is the largest grassroots environmental movement in history? It's also widely recognized as the most widely observed secular holiday in the world. But what led to this massive social movement?

The stirrings of the modern environmental movement began in the 1960s, when people were becoming increasingly aware that our industrial activities were slowly poisoning the environment (and ourselves). This is credited to the publishing of Rachel Carson's Silent Spring in 1962, which exposed the popular pesticide DDT as a poison that was killing birds and wildlife. The famous "Burning River" incident on the Cuyahoga in 1969 also played a role. (The Cuyahoga had actually caught fire at least 12 times previously, and much worse; the fire of 1969 was just the most publicized).

A photo of the destructive 1952 fire (Credit: The Ohio History Connection) →

Another key event on the timeline of pollution awareness was the debate surrounding the prevalence of lead in the environment, spearheaded by geochemist Dr. Clair Patterson in 1963.

Patterson's research initially focused on discovering the age of the Earth by analyzing proportions of uranium isotopes and lead in rocks. Uranium decays into lead, but at the time that rate of decay was not known. If the age of a given piece of rock (in this case, granite) was known, the proportion of uranium to lead could be used to calculate that decay rate. This "atomic clock" could then be used on meteorite samples, which were formed at the same time as the rest of the Solar System – giving him the age of the Earth by proxy.

He thought it would be easy.

He soon found that his equipment and samples were somehow being contaminated with lead, giving faulty results. He cleaned his lab scrupulously, and observed very strict procedures to prevent contamination. He spent years trying to attain the ultimate clean lab, but lead contamination was still sneaking in somehow. He even stripped a room to the studs to rip out the lead pipes and lead wires in the walls, and rebuilt the lab to his lead-free standards. He was finally satisfied with his granite results

and was at last able to prepare his meteorite sample for analysis in his ultraclean lab. He sent it off to the mass spectrometer lab, and demonstrated that the age of the Earth was 4.5 billion years old.

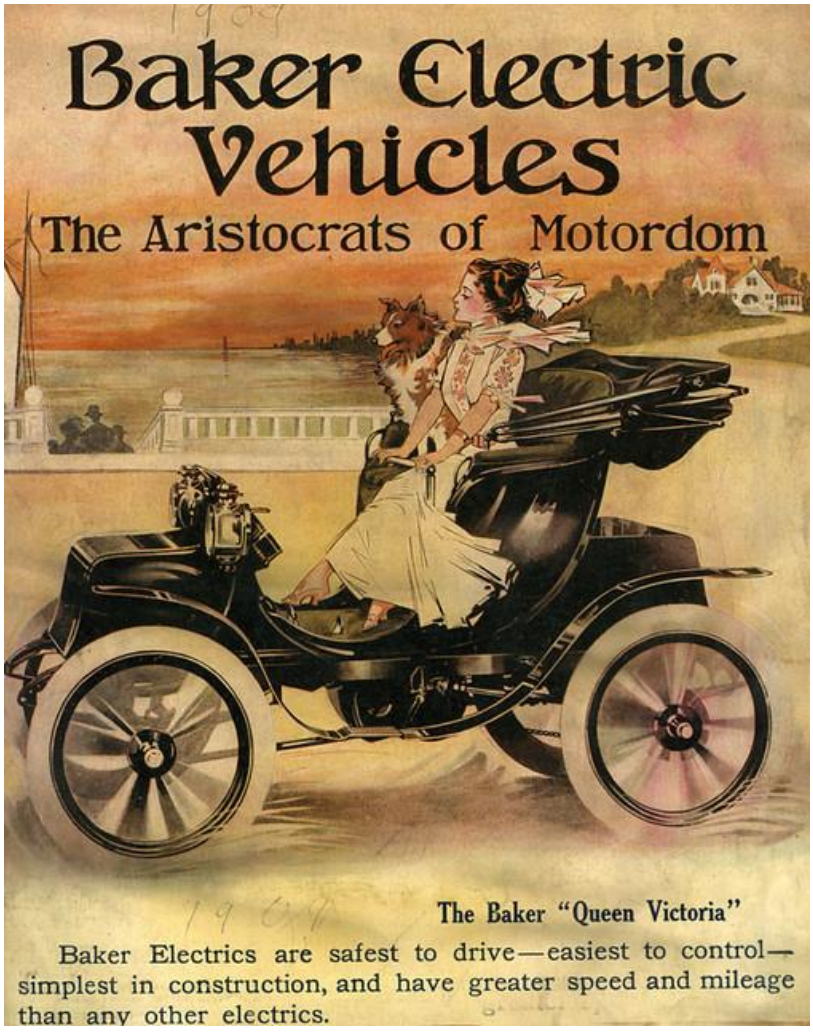
But he couldn't get the lead contamination problem out of his mind. All he knew was that lead was everywhere – in hair, on skin and clothes, on dust particles, even in dandruff – and that it was so concentrated, that even the lead particles shed from a person's hair while walking into a room could contaminate an entire lab.

← *Clair Patterson (Wikipedia)*

He didn't know it at the time, but this discovery would lead him down a path that would ultimately put him in the crosshairs of one of the giants of the fossil fuel industry.

To understand why, we have to go back a bit further to the early 1900s – when automobiles were just starting to become accessible to the working class. Deafening engines, noxious exhaust, and engine knocking made combustion engine vehicles more intimidating to prospective buyers than equally popular electric vehicles, which did not give off dirty exhaust, were clean and quiet, did not require gear changes or crank-starting, and (especially after the widespread installation of home electricity in 1912), could be easily charged at home.

Baker Electric Car ad →



Despite it being a known poison, tetraethyl lead (TEL) was marketed by General Motors engineer Thomas Midgley Jr. as a product that could be added to gasoline to reduce engine knocking, increase fuel combustibility, and make vehicles less noisy and more appealing to prospective buyers. (He'd discovered that ethanol was also an effective anti-knocking agent, but ethanol couldn't be patented.) The gasoline with added TEL was marketed under the brand-name Ethyl and the first tank was sold in 1924.

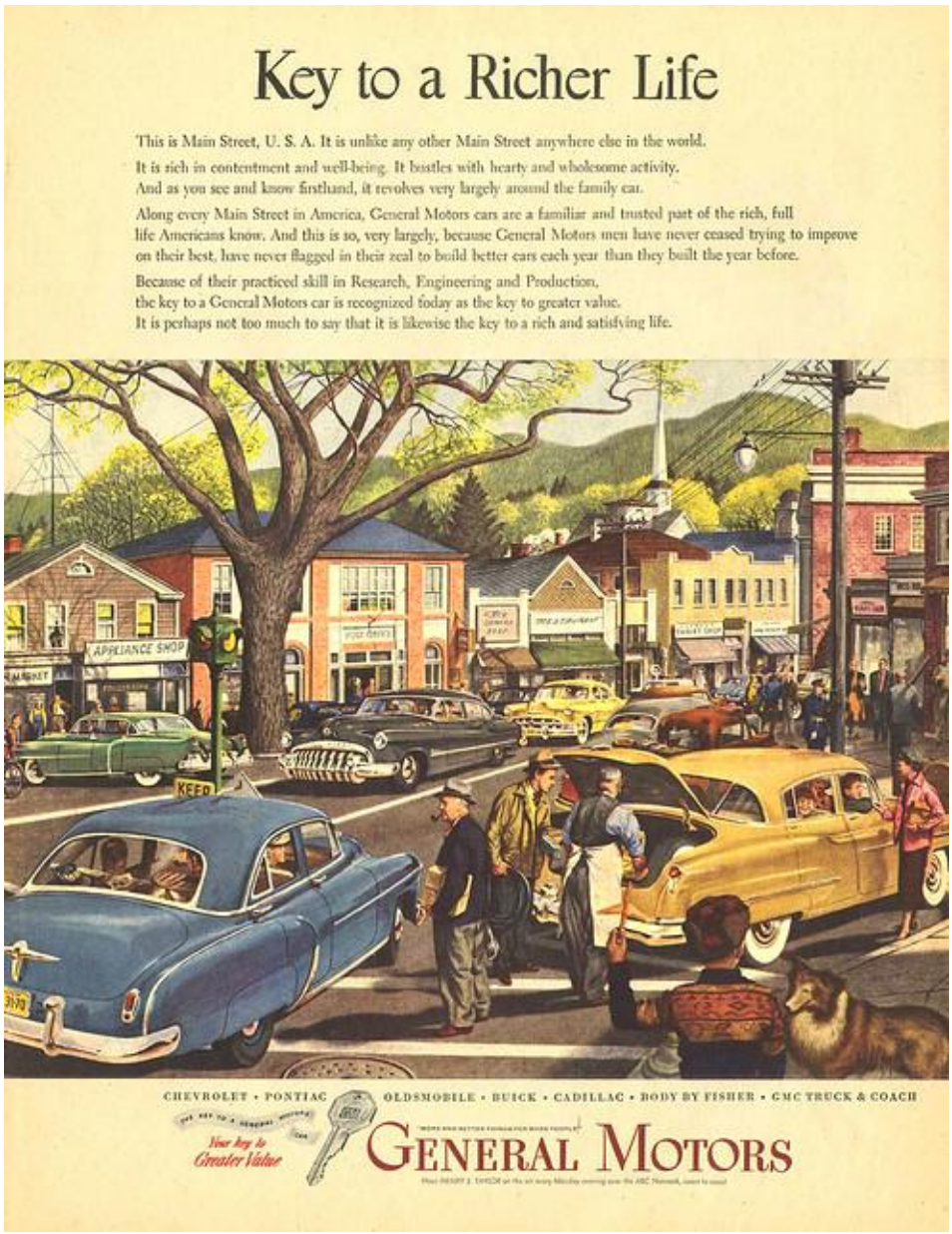
Unfortunately, there was a problem. Upon combustion, the elemental lead in TEL becomes airborne and can be breathed in by people, settle in soil, and be ingested in our food – causing a long list of acute and often insidious, and irreversible chronic health effects. The

health consequences of what was essentially a marketing ploy continue to be felt even today. (I strongly recommend this article to learn more.)

← *A 1953 advertisement in Life magazine for Ethyl leaded gasoline. (Don O'Brien, Flickr)*

But that wasn't the only problem. Nearly 100 workers at 2 separate TEL processing plants in Ohio and New Jersey died or were hospitalized with lead poisoning in 1924. (Midgley himself had become ill with lead poisoning the year before.) An official from Standard Oil insisted the afflicted workers, suffering from hallucinations and exhibiting erratic behavior, had simply "worked too hard", and the danger was downplayed.

As post-World War II prosperity catapulted society into its golden age, the danger was forgotten, and cars were marketed as a status symbol and the ultimate attainment of the American Dream. People bought cars in record numbers, and gasoline combustion rose – as did the amount of lead in our air, water, and soil, as Patterson was about to discover.



← *GM Ad, circa 1950*

After determining the age of the Earth, Patterson continued his research, sampling uranium in seafloor sediments and ocean water to discover how the Earth's crust formed. Instead, he discovered abnormally high levels of lead there, too. He published a series of papers on his results, and in 1965 he submitted a paper in the Archives of Environmental Health that unequivocally implicated the fossil fuel industry in the abnormally high levels of lead he measured. He asserted that this lead contamination would have dire consequences for human health. He was advised by critics to leave biology to the biologists and go back to staring at rocks.

Patterson was undaunted. He believed that science was the path to truth, whether it was popular or not.

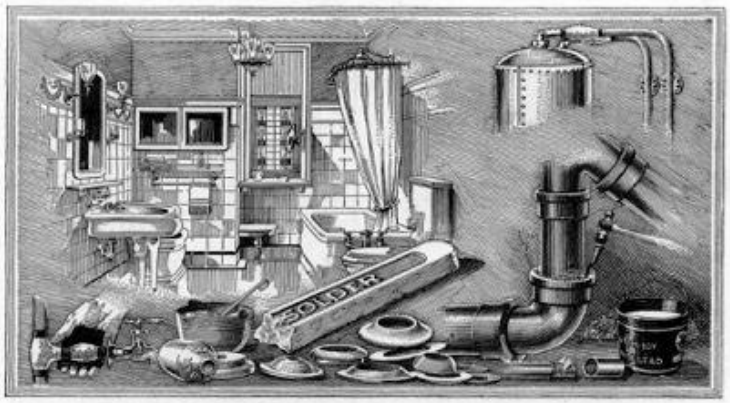
The proper response to the criticism, therefore, was to do more research.

Lead Helps Guard Your Health! →

Patterson traveled to Greenland and Antarctica to sample lead trapped in ice cores dating back before the Industrial Revolution, and the numbers were astounding. The ice showed a 200-300 fold increase in lead levels since the 1700s.

He even found elevated lead levels in ice much further back in time, corresponding to the large-scale smelting of lead by the Romans over 2000 years ago, who used lead in everything – from their famous aqueducts, to cosmetics, various containers and ornaments, weapons, and currency. They even used lead acetate to sweeten wine, despite it being a known poison by the intellectuals of the time. Widespread lead poisoning and "degeneracy of the populace" is thought by some to have played a role in the fall of the Roman Empire.

The use of lead nevertheless continued on through the centuries – it was put in paint, in printing presses, in cosmetics, and in pipes – right up into the 1960s, where Patterson would deduce that the 83 million cars on the road at that time were spewing lead out of their tailpipes.



Lead helps to guard your health

YOU wouldn't live today in a house without an adequate plumbing system. For without modern plumbing, sickness might endanger your life.

Lead concealed in the walls and under the floors of many modern buildings helps to give the best sanitation.

Lead pipe centuries old

Lead, therefore, is contributing to the health, comfort, and convenience of people today as it did when Rome was a center of civilization. Lead water and drainage pipes more than 1800 years old have been found in exactly the condition they were in when laid.

In some cities today the law specifies that lead pipe alone may be used to bring water from street mains into the building.

In drainage systems are lead traps made of lead pipe bent into the shape of the letter S, so that a little water will stay in the bend and prevent gases which collect in the pipe from getting out through the house.

The malleability of lead also makes it easy to change the direction of any pipe through the use of lead bends.

Joining the pipes

A plumber easily "wipes" a joint or repairs a pipe leak with lead and tin solder. Because this alloy melts at the low temperature of 358 degrees it can be applied without melting the lead pipe, which melts at 620 degrees.

Lead is also poured into the flanges of pipe-joints to make them absolutely tight. Pipe threads are painted with white-lead or red-lead to make a tight connection. Where vibration or movement of pipes may loosen a poured joint, lead wool is used; lead shredded into threads is packed into the joint in a dense, compact mass.

Rubber gaskets and ball washers containing lead prevent leaking at joints and faucets.

Lead is used to beautify the modern bathroom. Red-lead and litharge, both lead oxides, are important ingredients in making the glossy white enamel covering the iron bodies of tub and basin and the glazed tile walls.

Lead in paint

While lead is invaluable in assuring comfort and proper sanitation, its best-known and most widespread use is as white-lead in paint. Such materials as wood would soon deteriorate unless protected with paint. And the paints that give the most thorough protection against the weather are based on white-lead.

The loss of invested capital through failure to protect the surface of property adequately has led property owners to paint frequently and well. As days and months go by, more and more of them are learning the wisdom of the phrase, "Save the surface and you save all." And they are using white-lead paint to prolong the lives of their houses.

Look for the Dutch Boy

NATIONAL LEAD COMPANY makes white-lead and sells it mixed with pure linseed oil, under the name and trade-mark of *Dutch Boy white-lead*. The figure of the Dutch Boy is reproduced on every keg and is a guarantee of exceptional purity.

Dutch Boy products also include red-lead, linseed oil, flatting oil, babbitt metals and solder.

More about lead

If you use lead, or think you might use it in any form, write to us for specific information.

NATIONAL LEAD COMPANY

New York, 111 Broadway; Boston, 131 State St.; Buffalo, 116 Oak St.; Chicago, 900 West 18th St.; Cincinnati, 659 Freeman Ave.; Cleveland, 820 West Superior Ave.; St. Louis, 722 Chestnut St.; San Francisco, 485 California St.; Pittsburgh, National Lead & Oil Co. of Pa., 316 Fourth Ave.; Philadelphia, John T. Lewis & Bros. Co., 417 Chestnut St.

Patterson's research on atmospheric lead influenced an amendment to the Clean Air Act in 1970, which gave the newly formed Environmental Protection Agency (EPA) the authority to regulate additives in fuel; but the scientific community was reluctant to cite Patterson directly, who was a known "eccentric". Furthermore, no researchers had been yet able to duplicate his results, because their labs were not following his scrupulous, and often obsessive, decontamination procedures.

Thus, the regulations the EPA proposed in 1972 were a weak gesture – they required a gradual reduction of TEL in gasoline, from 65% to 60%, over the next 5 years.

Patterson was livid, and so was the TEL industry. Patterson felt the regulations did not go nearly far enough, while the TEL industry felt it was too harsh and threatened their bottom line.

Patterson once again decided that the only response was to return to the field to do more research.

This time, Patterson recruited some grad students and traveled to a remote part of Yosemite National Park, where they hiked to the top of a mountain and sampled everything – air, plants, trees, streams, rain, rocks, snow, soil, and even the tissue of meadow mice and martens (a type of weasel). Four years later, after rigorous analysis, yet again Patterson found that lead was contaminating the food chain even in that remote and undisturbed place. The combustion of leaded gasoline from Los Angeles and San Francisco accounted for 95% of it.

← *An American Marten (Martes americana), a large member of the weasel family (Mustelidae)*

Patterson went on to sample lead levels in the bones of cadavers, as well as 4500 year old Peruvian individuals and one 2200 year old Egyptian mummy. He found that the samples from modern Americans contained 600 times more lead than the ancient remains.

Meanwhile, the TEL industry was doing all it could to stay in business, and even sued the EPA to buy more time, arguing that the science on leaded gasoline wasn't settled. (Sound familiar?) The EPA lost the case and demanded a full review in the U.S. Court of Appeals, which they won. Two more medical studies had been published, finding that children with higher blood lead levels had lower IQs. Lead companies attempted to take their case to the Supreme Court, but the jig was up. The Supreme Court refused to hear the case. Lead's heyday was finally over.

The EPA regulations on gasoline additives went into effect in 1976, and lead in the atmosphere began to decline steadily – just as Patterson said it would.

Patterson doggedly continued his research, unwilling to declare victory until lead was out of our lives forever. In the 1980s, he even had himself air dropped near an active Hawaiian volcano to take air samples that would demonstrate that geologic activity was not the culprit.

Once dismissed as a crotchety firebrand, the scientific community had finally accepted Patterson's work. His scrupulous lab methods were championed and passed on by his graduate students, who in some cases had been working with him for decades, and other researchers were finally able to replicate his results. Patterson is the father of standard laboratory contamination control protocol, although he is not widely recognized as such.

Lead levels in the atmosphere continued to drop until it reached concentrations not seen since the medieval period. The EPA called for a near ban of leaded gasoline in 1986, and an amended Clean Air Act required that all leaded gas be removed from service stations by the end of 1995.

Patterson would not live to see the end of leaded gas; he died just three weeks before New Year's Eve in 1995, at the age of 73.

"True scientific discovery renders the brain incapable, at such moments, of shouting victoriously to the world 'Look at what I have done! Now I will reap rewards of recognition and wealth!' Instead, such discovery instinctively forces the brain to thunder, 'WE did it!'"

–Clair C. Patterson

A wonderful write-up on Patterson's tireless and groundbreaking work, which I have referenced to write this blog, can be found here, and read more about Patterson here.

The first Earth Day broadcast of 1970 can be viewed here.

In the decade that followed that first Earth Day celebration in 1970, aside from the establishment of the EPA, a barrage of other environmental legislation was passed:

- 1971: The Water Quality Improvement Act
- 1972: The Federal Insecticide, Fungicide and Rodenticide Act, the Federal Water Pollution Control Act, and the Marine Protection, Research, and Sanctuaries Act
- 1973: The Endangered Species Act
- 1974: The Safe Drinking Water Act
- 1975: The Hazardous Materials Transportation Act
- 1976: the Toxic Substances Control Act and the Rescource Conservation and Recovery Act
- 1977: The Clean Water Act and the Surface Mining Control and Reclamation Act
- 1978: The National Energy Conservation Policy Act
- 1980: The Fish and Wildlife Conservation Act and the Comprehensive Environmental Response, Compensation, and Liability Act (which created the Superfund program)

Earth Day, at its core, is a celebration of people over profit. The example of leaded gasoline I've given here is just one example among multitudes, in which science and the people prevailed over corporate

greed. Time and again, corporations have demonstrated that their profits take precedence over the public good. When informed by rigorous, unbiased, and peer-reviewed science, government regulation and legislation are essential tools against corporate greed and exploitation, and shields to protect public health and our natural resources.

In recent years, many of those protective regulations have been rolled back, placing public health and the environment in jeopardy once again.

The theme of this year's Earth Day is Climate Action. Climate change is an unprecedented threat not only to biodiversity and the environment, but also to human health and economy, as they are inextricably linked.

The science on climate change is not only settled, it's resounding and unequivocal: climate change is happening, and the fossil fuel industry is responsible. Fossil fuels propelled us into our age of prosperity, but will also be responsible for its downfall if urgent action is not taken. Then as now, corporate profits have once again taken precedence over human health and well-being. The economic disruptions we are experiencing under the covid-19 pandemic are only the faintest whiff of what's to come if we continue "business as usual". Now is the time to remind our governments who they work for, and to leverage them to act swiftly and in concert for the people of Earth's best interests – not for those of the fossil fuel industry.

Everything you know lives here:

It is a complex challenge of a magnitude our society has never seen, and it must be met with steadfast resolve and decisive planetwide action. We must reduce our energy use; embrace sustainable energy; switch to a circular economy; address socioeconomic inequality; empower women and people of color; adopt regenerative agricultural practices; and begin carbon recapture and storage on a massive scale. Most important of all, we must work together to adapt to the changes that are required of us to bring our future into being, if this complete and utter disaster is to be at all mitigated.

There is a striking parallel between the covid crisis and climate action. As our own Ohio Department of Health Director, Dr. Amy Acton, put it succinctly:

> **"On the front end of a pandemic, you look a little bit like an alarmist. You look a little bit like a Chicken Little – the sky is falling. On the back end of the pandemic, you didn't do enough."**

It's time to look like climate change alarmists.