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Air Pollution Goes Back Way Further Than You Think

Thousands of years ago, humans were adding lead fumes and other pollutants to the air



Pollutants hang in the air at a coke plant in Pennsylvania. This plant was photographed in 1973, but humans have been polluting their air for many years before that. (National Archives/US EPA)

By [Jim Morrison](#)
smithsonian.com
January 11, 2016 6:00AM

When Beijing issues a red alert closing schools and restricting traffic because air pollution is ten times the World Health Organization's recommended level, it seems like another symptom of modern life.

But fouled air has a long and unhealthy history, and the deadly haze that plagues Beijing, Delhi, Mumbai and Karachi, among other cities, has been around in one form or another for thousands of years.

First it was wood fires in ancient homes, the effects of which have been found in the blackened lungs of mummified tissue from Egypt, Peru and Great Britain. And the Romans earn the dubious credit of being perhaps the first to spew metallic pollutants into the air, long before the Industrial Revolution.

"We saw the harmful effects of air pollution even in Roman times," says [Mark Z. Jacobson](#), professor of [civil and environmental engineering](#) at Stanford University, director of the [Atmosphere/Energy Program](#) and author of the textbook *Air Pollution and Global Warming: History, Science, and Solutions*.

The residents of ancient Rome referred to their city's smoke cloud as *gravioris caeli* ("heavy heaven") and *infamis aer* ("infamous air"). Several complaints about its effects can be found in classical writings. "No sooner had I left behind the oppressive atmosphere of the city [Rome] and that reek of smoking cookers which pour out, along with clouds of ashes, all the poisonous fumes they've accumulated in their interiors whenever they're started up, than I noticed the change in my condition," wrote the philosopher and statesman Seneca in A.D. 61.

Roman courts considered civil claims over smoke pollution 2,000 years ago, notes [Stephen Mosley](#), a lecturer at the [School of Cultural Studies at Leeds Metropolitan University](#) who has written extensively about the history of air pollution. The jurist Aristo declared, for example, that a cheese shop could not discharge smoke into the buildings above it.

The empire even tried a very early version of the Clean Air Act. In 535, then Emperor Justinian proclaimed the importance of clean air as a birthright. "By the law of nature these things are common to mankind—the air, running water, the sea," he wrote.

Later, smelting to create lead and copper came along, fouling medieval air. Analyses of ice cores from the Arctic reveal that extraction and smelting on the Iberian Peninsula, England, Greece and elsewhere increased lead in the environment by a factor of ten.

By 1200, Jacobson notes, London had been deforested and a switch began to "sea-coal," coal that washed up on beaches. As early as the 1280s, there were complaints about smoke from burning coal. Attempts to ban burning then and 250 years later during the reign of Queen Elizabeth I failed.

Europeans imported air pollution to the New World. Spanish conquistadors mining silver in what is now Bolivia in 1572 used amalgamation, a technique that grinds ore into powder and that [shot lead plumes into the air](#). Researchers at Ohio State University discovered the dust in ice cores from Peru while investigating climate history.

“This evidence supports the idea that human impact on the environment was widespread even before the Industrial Revolution,” says [Paolo Gabrielli](#), a research scientist at the [Byrd Polar and Climate Research Center](#) at Ohio State.

The worst was yet to come.

By the 1600s, smoke from burning coal was damaging the architecture in London and other major cities. The invention and eventually widespread use of the steam engine, Jacobson says, really accelerated pollution. Until then, businesses were artisan shops dispersed throughout a city. But centralized factories on a large scale meant even more air pollution.

The shift to fossil fuels eliminated constraints on urban expansion as factories, powered by steam created by burning coal, attracted new workers. In 1800, Mosley says, there were just six cities worldwide with more than 500,000 people. By 1900, there were 43. Residents of emerging industrial giants—Birmingham, Leeds, Manchester, Chicago, Pittsburgh and St. Louis, among others—found acrid smoke stung their eyes and hindered their breathing.

Thick fogs, especially in colder weather, blanketed the cities. Societies to campaign against the smoke scourge emerged. Among the first in 1842 were the Committee for the Consumption of Smoke at Leeds and the Manchester Association for the Prevention of Smoke. By the late 1890s, the campaigns had extended to U.S. cities, including Chicago, Cleveland, St. Louis and Pittsburgh.

Laws were passed in Britain, the United States, and Germany, but with little teeth. They called for “best practicable” solutions—an easy out—levied insignificant fines and contained numerous exemptions. Coal remained cheap. No one was willing to slow the industrial engine.

“The ‘smoke problem’ intensified as new coal-burning industrial cities proliferated from the later 18th century onwards; first in Britain, and then Europe and the wider world,” Mosley says. “By the turn of the 20th century, the respiratory disease bronchitis was Britain’s biggest killer.”

Just around the corner was a new source of air pollution: the automobile.

By 1940, Los Angeles had more than a million cars. At the time, no one realized the effect of all that exhaust, so when the city was smogged in on July 26, 1943, residents feared it was some kind of Japanese chemical attack. Four years later, the county established the first air pollution control district in the country. California went on to become a leader in regulating air pollution, Jacobson says.

But it took two other smog incidents to galvanize action in the United States and Great Britain.

On October 27, 1948 thick smog began to cover the river town of Donora, Pennsylvania. A storm rolled in four days later that cleared the air, but in the aftermath 20 died and 6,000 were sickened. In 1963, the U.S. Congress enacted the first Clean Air Act. Two years later, national emissions standards for cars were set. But it wasn’t until the 1970 Clean Air Act that Congress set the framework for air pollution regulation tied to public health.

Similarly, across the pond on December 5, 1952, a fog enveloped London, killing roughly 4,000 people before it dissipated four days later. Parliament acted with dispatch, passing the U.K. Clean Air Act in 1956, effectively reducing the burning of coal.

Legislation in the United States, Great Britain and other countries has generally improved air quality (and, as a byproduct, water quality). Even Los Angeles and London are breathing easier.

But worldwide is another story. International efforts to deal with air pollution began in 1972 and continue with limited success. The World Health Organization says seven million premature deaths resulted from air pollution exposure (inside and outside) in 2012. Dirty air, WHO says, is the [world’s largest environmental health risk](#).

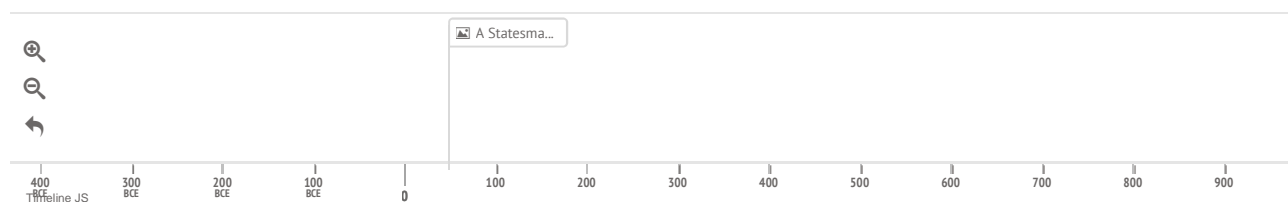
“Urban air pollution is now re-emerging as one of the world’s leading environmental problems,” Mosley says. “The smog associated with rapid industrialisation in India’s and China’s cities isn’t as black and gloomy as that of Britain during the Industrial Revolution, when contemporaries regularly experienced ‘night at noon.’ But it is just as deadly as in the past, perhaps more so when mixed with traffic fumes. It is worth remembering that we in the West, where heavy industries are fast declining, have outsourced our air pollution to the developing world.”



“Baños Romanos, Bath, Inglaterra, 2014-08-12, DD 39-41 HDR” by Diego Delso. Licensed under CC BY-SA 4.0 via Commons - [commons.wikimedia.org/wiki/File...](#)

LEAD SMELTING PRODUCES NOXIOUS FUMES

Smelting began in about 5,000 BC and increased sharply over thousands of years. For Romans, lead was used for everything from pipes (like those feeding water to the famous baths in Bath, England, pictured) to coins and even as a sweetener of wine. Ice cores show lead in the environment increased tenfold during this time.



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