



WATER AND AIR POLLUTION

Along with amazing technological advances, the Industrial Revolution of the mid-19th century introduced new sources of air and water pollution. By the middle of the 20th century, the effects of these changes were beginning to be felt in countries around the world. In the 1960s, an environmental movement began to emerge that sought to stem the tide of pollutants flowing into the planet's ecosystems. Out of this movement came events like Earth Day, and legislative victories like the Clean Air Act (1970) and the Clean Water Act (1972).

In the latter part of the 13th century, in an effort to reduce air pollution, England's King Edward I threatened Londoners with harsh penalties if they didn't stop burning sea-coal. However, the king's regulations—and those of subsequent leaders—had little effect.

By the late 18th century and first part of the 19th century, coal came into large-scale use during the Industrial Revolution. The resulting smog and soot had serious health impacts on the residents of growing urban centers. In 1952, pollutants from factories and home fireplaces mixed with air condensation killed at least 4,000 people in London over the course of several days. A few years earlier, in 1948, severe industrial air pollution created a

deadly smog that asphyxiated 20 people in Donora, Pennsylvania, and made 7,000 more sick. Acid rain, first discovered in the 1850s, was another problem resulting from coal-powered plants. The release of human-produced sulfur and nitrogen compounds into the atmosphere negatively impacted plants, fish, soil, forests and some building materials.

Today, the leading cause of air pollution in the U.S. is motor vehicles, which were first mass-produced in the U.S. by Henry Ford in the early 20th century. Auto emissions also increase the amount of greenhouse gases in the atmosphere, which in turn contribute to global warming.

In 1963, in an effort to reduce air pollution, the U.S. Congress passed the Clean Air Act, legislation which has been amended and strengthened in the ensuing decades. However, in 2007, almost half (46 percent) of all Americans resided in counties with unhealthy levels of either ozone or particle pollution, according to the American Lung Association (ALA). Ozone, or smog, is described by the ALA as “an irritating, invisible gas that is formed most often by a reaction of sunlight and vapors emitted when fuel is burned by cars and trucks, factories, power plants and other sources. Ozone reacts chemically (“oxidizes”) with internal body tissues that it comes in contact with, such as those in the lung.” It irritates the respiratory tract and can lead to a number of health problems, including asthma attacks, chest pain and even death. The ALA defines particle pollution (formerly referred to as soot) as “the most dangerous, and deadly, of the widespread outdoor air pollutants.” Particle pollution is microscopic and derived from “a complex mixture that can include ash, soot, diesel exhaust, chemicals, metals, and aerosols. In the eastern U.S., many particles come from power plants that burn coal to produce electricity. In the western U.S., many come from diesel buses, trucks, and heavy equipment, as well as agriculture and wood burning,” according to the ALA. “Breathing particle pollution year-round can shorten life by one to three years. It

causes many other health effects, premature births to serious respiratory disorders, even when the particle levels are very low. It makes asthma worse and causes wheezing, coughing and respiratory irritation in anyone with sensitive airways. It also triggers heart attacks, strokes, irregular heartbeat, and premature death.”

Just like air, water is under assault from numerous types of pollution. For centuries, humans unknowingly contaminated sources of drinking water with raw sewage, which led to diseases such as cholera and typhoid. According to a CNN report, one gram of human excrement contains approximately “10 million viruses, 1 million bacteria, 1,000 parasite cysts and 100 parasite eggs.” Today, over 1 billion people worldwide lack access to safe water and every 15 seconds somewhere on the planet, a child dies from a water-related disease, according to WaterPartners International (www.water.org) .

Water pollution intensified with the advent of the Industrial Revolution, when factories began releasing pollutants directly into rivers and streams. In 1969, chemical waste released into Ohio’s Cuyahoga River caused it to burst into flames and the waterway became a symbol of how industrial pollution was destroying America’s natural resources. In 2007, CNN reported that “up to 500 million tons of heavy metals, solvents and toxic sludge slip into the global water supply every year. In the developing world [according to UNESCO] as much as 70 percent of industrial waste is just dumped untreated into the rivers and lakes. China is a perfect case in point. According to Greenpeace, around 70 percent of China’s lakes and rivers are now polluted from industrial waste, leaving 300 million people ‘forced to rely on polluted water supplies.’” Water sources are also contaminated by rain runoff from such things as oil-slick roads; construction, mining and dump sites; and livestock wastes from farm operations. Leaky septic tanks, pesticides and fertilizers are among the other sources that can contaminate

groundwater. Over half the American population (including the majority of those living in rural areas) relies on groundwater for drinking water, according to The Groundwater Foundation (www.groundwater.org), which also notes that the largest use for groundwater is crop irrigation.

In 1972, Congress passed the Clean Water Act to reduce water pollution. Various pieces of anti-pollution legislation have followed since that time and today the U.S. has relatively clean, safe drinking water compared with much of the world. However, water pollution is still a problem. In 2006, the Environmental News Service (ENS) reported that “more than 62 percent of industrial and municipal facilities across the country discharged more pollution into U.S. waterways than their Clean Water Act permits allowed between July 2003 and December 2004.” The ENS also noted that over 40 percent of American waterways were unsafe for swimming and fishing. Additionally, water resources face an ongoing threat from man-made environmental disasters such as the 1989 Exxon Valdez oil spill, during which approximately 11 million gallons of crude oil were accidentally dumped into the sea off Alaska’s Prince William Sound. The disaster, which created a 3,000-square-mile oil slick, instantly killed hundreds of thousands of birds, fish and other wildlife and devastated the area for years afterward.

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