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American Literature

19 March 2012

Air Pollution

According to the World Health Organization, more than 3 million people die prematurely each year from the effects of air pollution (*Miller/Spoolman 487*). That's almost six people a minute. Air pollution used to be a local problem, back in the Middle Ages a haze of woodsmoke would hang over population centers, and even further back, early humans lit fires in poorly ventilated caves. And indoor air pollution is still a major threat to health, but outdoor air pollution has escalated out of all proportion. In Southeast Asia, over China and much of India, lies the infamous Asian Brown Cloud. It is the product of rapidly developing countries burning massive amounts of fossil fuels and other things with little to no pollution control. This cloud of death hangs two miles thick over an area the size of the continental US (*Miller/Spoolman 468*). And don't go thinking this is their problem so they have to deal with it and it's nothing to do with us. Because we help create it, and it can blow across the entire Pacific Ocean all the way to the West Coast (*Miller/Spoolman 468*). The air you're breathing right now may very well contain pollutants that originated in the power plants of Shanghai. Air pollution is now a global problem due to the immensity of the volume produced, and we need to act now to have any hope of returning the air that gives us life to a semblance of normality.

1. Outdoor Air Pollution

“Air pollution is the presence of chemicals in the atmosphere in high enough concentrations high enough to harm organisms, ecosystems, or human-made materials” says

Living in the Environment, my AP Environmental Science textbook. There have always been natural releases of pollutants, volcanic eruptions, dust storms, wildfires, etc. But ever since about 1750, the beginning of the Industrial Revolution, humans have been making major inputs of Carbon dioxide (CO_2), Methane (CH_4), Carbon monoxide (CO), Nitric oxide (NO), Nitrogen dioxide (NO_2), Nitric acid (HNO_3), Nitrate (NO_3^-) salts, Nitrous oxide (N_2O), Sulfur dioxide (SO_2), Sulfuric acid (H_2SO_4), Sulfate (SO_4^{2-}) salts, Particulates, Ozone (O_3), and Volatile Organic Compounds (VOCs). And now, 1.1 billion people -one out of every six- live in urban areas where outdoor air is unhealthy to breathe (*Miller/Spoolman 471*).

CO_2 , CH_4 , and N_2O , are all *greenhouse gases*, meaning they contribute to the natural effect of the atmosphere absorbing some of the sun's energy as heat and keeping the earth warm. The overproduction of these is leading to *global warming*, but that's another report. Extra CO_2 is being absorbed by the ocean, making it warmer and more acidic, but that's also another report. As is HNO_3 , NO_3^- , and H_2SO_4 causing harmful *acid deposition* (rain/snow/etc.).

The pollutants with direct effect on our health are the ones that cause *photochemical smog* (NO , NO_2 , and O_3), a type of smog formed from a reaction with the sun, *particulates* that can cause everything from asthma to cancer, and the chemicals in *industrial smog* (SO_2 , H_2SO_4 , and particulates) that are mostly from burning coal and other dirty fossil fuels. All of these pollutants cause respiratory issues like asthma, bronchitis, and cancer. In the US alone, about 14 people die every day from asthma attacks (*Miller/Spoolman 487*), and respiratory issues are a leading cause of school absenteeism (*Rogers/Kostigen 44*).

Photochemical smog comes from pollutants released from the tailpipes of cars/vehicles reacting with the UV radiation in sunlight. The increasing numbers of automobiles contribute to it hugely, and it gets worse on hot days. Of which there will be more of because of CO_2

emissions from more cars. Leading to more people using air conditioning, releasing more GHGs. It's a never-ending feedback loop. Photochemical smog creates compounds that react in the oxygen in your lungs (*Miller/Spoolman 477*), causing respiratory illness.

Cars are so unhealthy, and horribly polluting. People who live two miles or less from their workplace spend \$384 driving back and forth, and if just 1,000 people could walk or bike, we'd save 64,000 pounds of harmful chemicals a year being released, roughly the industrial emissions of Washington D.C. (*Rogers/Kostigen 55*). Or try switching to an electric or hybrid vehicle, though you shouldn't get too pumped about your Prius. Unless you have some serious solar energy going back into the grid, your 'zero emissions vehicle' is just an 'emissions *elsewhere* vehicle', not producing tailpipe fumes but instead using coal-fired power plants to supply the fuel.

Diesel fuel, in America, is horribly horribly dirty fuel. A truck burning American diesel emits the same amount of particulates as 150 cars, causing cancer in 125,000+ people here alone each year (*Miller/Spoolman 487*). Diesel here is so dirty that European diesel engines won't even burn it.

I'm sure you've heard about the hole in the ozone layer, so why would extra ozone be a problem? Well, the ozone in the stratosphere, the layer of atmosphere above our troposphere, is like sunscreen. It keeps out a lot of harmful UV radiation, and without it, like the people of Australia find out every winter, we get more sunburns, eye cataracts, and skin cancers (*Miller/Spoolman 523-524*). But when it's produced down here at ground level, it's a major health concern, causing/aggravating lung and heart diseases and so on.

Outdoor air pollution is more of a problem in developing countries, where laws and regulations are not in place on huge coal-burning smoke stacks that provide much of their

energy. Take China for example. They burn more coal than any other country, and they have 16 out of the 20 dirtiest cities in the world, with about 981 air-pollution related deaths a day (*Miller/Spoolman 476*). Some of the pollution comes from burning e-waste, old computers and phones and things, that we (illegally) ship over there to get rid of it instead of recycling it properly. So we can't blame it all on China. But air pollution is hardly just a problem in developing countries. Indoor air pollution, the pollution of developed countries, kills 73% of those who die from the effects of air pollution (*Miller/Spoolman 487*).

2. Indoor Air Pollution

Developed countries have made great progress in limiting outdoor air pollution, but indoor air pollution is still affecting billions. The WHO says that it is the world's most serious problem for poor people, and air pollution is worse indoors than out, from *two to one hundred times* (*Miller/Spoolman 483-484*). It's one of the top twenty risks for cancer, because it can't disperse like it can outdoors, and most people in developed countries spend 70-98% of their time either in a building or in a vehicle (*Miller/Spoolman 484*). This pollution comes from many sources, both natural and human-induced. Pesticides, lead particles, dust mites and other vermin, mold spores, formaldehyde, radioactive radon-222, and my personal terrorist; tobacco smoke.

I can not stand tobacco smoke. I am extremely sensitive to it and I hate what cigarettes do to people. They are terrifyingly addictive, shockingly unhealthy, and annoyingly unconfined. At least with other addictive substances, the only person directly harmed is the user, but not so with cigarettes. The CDC estimates that about 50,000 people died of lung cancer and heart disease from second-hand smoke in 2006 (*Miller/Spoolman 463*). Cigarettes kill one person every six seconds worldwide, and one a minute in the US (*Miller/Spoolman 462*). This is the world's most preventable major cause of premature death and suffering. It killed 100 million last century and

is going to kill 1 billion this century if we can't control it (*Miller/Spoolman 462*). Smoking cigarettes causes your lungs to shrivel up and turn black. It tells you *on the package* that it's a major health risk. Why do people start?

So. Outdoor air pollution is a bigger environmental hazard, but indoor air pollution poses a bigger immediate threat to health. What can we do about these issues?