

Getting the lead out

by Wayne Groszko

Lead enters the atmosphere from natural sources such as volcanic dust and from sources caused by human activities. Generally, industrial activities such as burning coal cause lead (among other things) to be added to the atmosphere.

These kinds of activities began to increase greatly in North America in the late 1800s with the industrial revolution. But around the 1940s, another human activity became the dominant source of lead to the atmosphere. At the time, the use of tetra-ethyl lead as a gasoline additive for cars increased rapidly and this caused substantial increases in the amount of lead entering the atmosphere. Since lead is a heavy metal, it does not stay in the atmosphere for long. The lead is attached to the surface of small particles which fall out in rain and get deposited on land surfaces and in water.

Since lead is also a toxic material, it's use in gasoline has been gradually

phased out since the 1970s. Leaded gasoline is no longer available in Canada, though it is still sold in some other countries. (Switzerland is one example.)

Did removing the lead from gasoline in North America result in a decrease in lead concentrations at the Earth's surface? The answer is yes, according to a study in which the lead concentrations in coral reefs were measured.

Annually banded coral reefs add a new layer of material each year, and measuring the lead in each layer provides an estimate of the lead concentration in the water at the time the layer was formed. The estimated concentrations over the past 150 years are shown in the graph. These quantities are from measurements made in a coral reef in Bermuda, near the middle of the Atlantic Ocean.

The amount of lead begins to climb early in the 1900s, then takes off, reaching a peak in 1971. Since then, the amount of lead has been decreasing. Of course, as of 1987 it

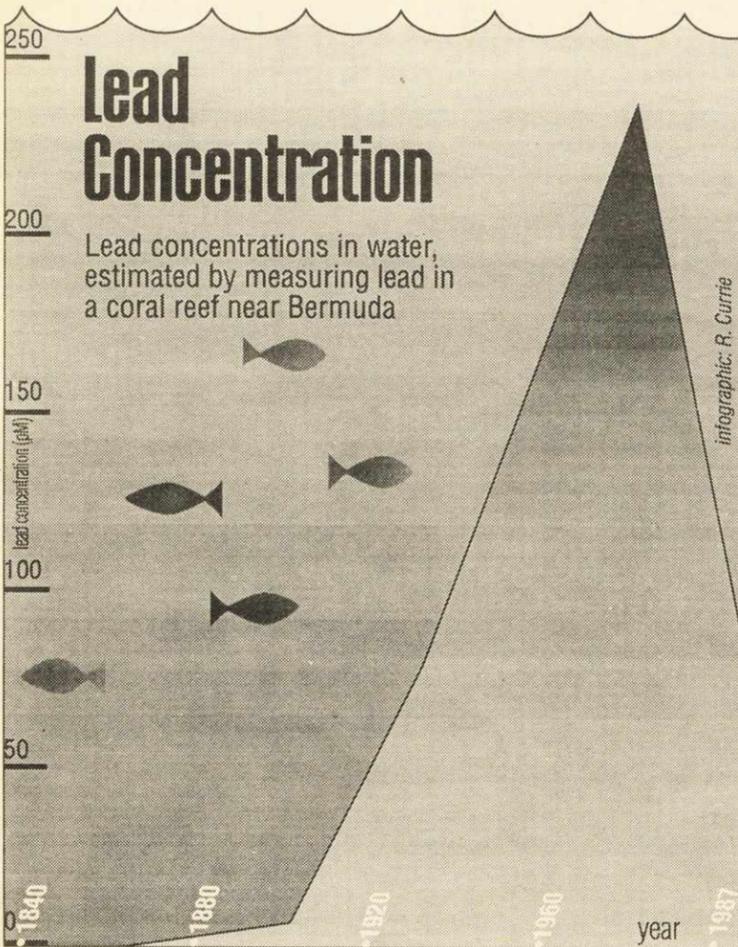
was still about four times higher than "normal" background levels before the industrial revolution, but at least it's moving in the right direction.

Over time, the lead concentration in the same coral reefs could go down to as low as it was in the 1920s. At that point, there will still be many industrial sources of lead. If there are changes in the industries which still emit lead, it may be possible one day to measure lead concentrations as they were in 1840. There will always be some background level of lead from sources other than human activity.

The reaction of lead concentrations in the Atlantic Ocean demonstrate that decisions we make often have a measurable impact on the environment. Though the lead is now out (in North America anyway), over-use of automobiles still results in smog, acid rain, carbon dioxide emissions, increased incidence of oil spills, and even going to war to protect oil supplies. When you choose better transportation, namely walking, bicycling or taking the bus, you are doing the planet a favour.

Want to help the environment on campus? Join Eco-Action, a Working Group of NSPIRG (phone 494-6662, e-mail nspirg@ac.dal.ca) or join the Dalhousie Science Society Environmental Committee (phone 494-6710). You could be writing articles for the Gazette Environment section, conducting "Learn-to-Compost" workshops, maintaining an environmental information network or doing all kinds of fascinating stuff!

Source of data: Glen T. Shen and Edward A. Boyle, Earth and Planetary Science Letters, Volume 82, pages 289-304, (1987)



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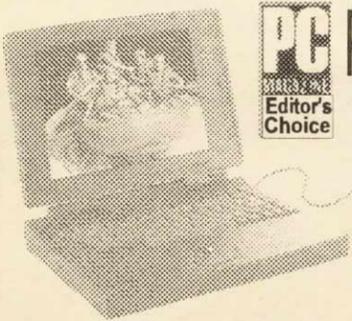
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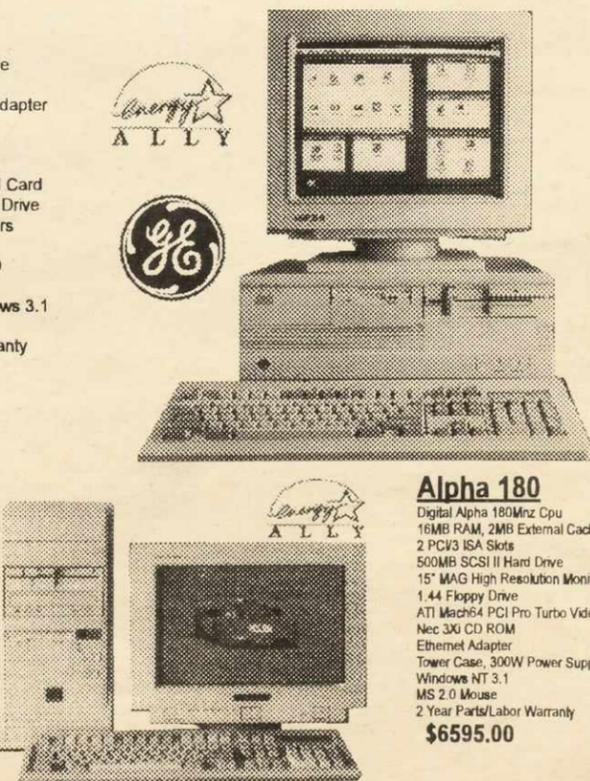
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