

The Not So Gentle Rain

Nature has wrapped the earth in a thin layer of oxygen, nitrogen and a few rare gases.

All people, animals and plants live in that layer. The people and animals breathe in oxygen and breathe out carbon dioxide. The trees and other plants reverse the process.

This neatly balanced atmosphere is now being altered. Industrial smoke and automobile exhausts are injecting sulphur dioxide and nitrogen oxides (as well as a large number of other foreign substances) into the wind-swept air. They may travel hundreds or thousands of miles from their sources, be transformed chemically into acids, and come down to earth in the form of acid rain (or snow, sleet or even fog), as gases or as dry particles that can combine with the morning dew.

The effect on lakes in eastern Canada and the northeastern United States has been pronounced. In hundreds of them animal and plant life has been virtually destroyed—some 180 of the Adirondack region's 2,800 lakes are without fish, and 140 fishless lakes have been documented in the province of

Ontario. Effects once found mostly in the east have now been reported over a much broader area. The evidence suggests that if acidity levels continue to rise, life in thousands of other lakes may disappear within a decade or two. In less obvious ways, the rain may also have deleterious effects on the health of people, forests and farms.

The problem is international and political—the pollutants often rise in one country and come down in another. Canada and the United States are making a joint effort to clean up the air of North America. They have in the past worked together on other issues with conspicuous success, but this time progress has been slow and time is running out.

Technology exists to greatly reduce the acid rain problem now, before much greater damage is done. To do so will require prompt action by both countries. In this issue of CANADA TODAY/D'AUJOURD'HUI we survey some of the damage done, consider that likely to come and suggest solutions.

What We Know

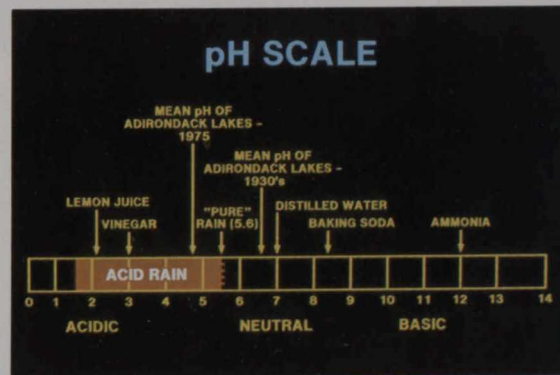
Q: *What is acid rain?*

A: Acidity is measured by the pH scale of zero to fourteen. For example, a body of water with a pH reading of seven is neutral, those with higher readings are alkaline and those with lower ones acidic. Clean normal rain over continental areas is slightly acidic with pH readings of around 5.6. (The carbon dioxide naturally present in the air sometimes combines with moisture to form weak carbonic acid.) When the pH drops one point, the acidity rises tenfold. A pH of four is one hundred times more acidic than one of six. The rain that now falls in the Adirondacks averages levels around 4.2. The lowest recorded level for a single storm, a pH of 1.5, was measured recently in Wheeling, West Virginia. That rain was as acidic as lemon juice.

Q: *Where does acid rain come from?*

A: Acid rain occurs when sulphur dioxide and nitrogen oxides oxidize and then combine with cloud moisture to form mild solutions of sulphuric and nitric acids. The sulphur dioxide comes from the smokestacks of utility plants or smelters, the

nitrogen oxides primarily from smokestacks and automobile and truck exhausts. Sulphur oxides are currently the main cause of acid rain. Utility and industrial plants in the United States produce about thirty million tons annually. Canada's smelters and plants contribute another five and one-half million tons.



The acidity of substances is measured on the pH scale—each whole number represents a ten-fold increase.

Cover Photo: The Jack Pine was painted by Tom Thomson, one of Canada's famed Group of Seven, in the days when the rain was pure and the fish were abundant. The lakes of Ontario are still beautiful, but many are dead.