

Watch On The Rain

The atmosphere's acid toll

by Bruce Henry

Canada has mobilized a considerable corps of scientists to develop data on the causes, consequences, and correction of acidic precipitation. Science Dimension presents a review of some of the scientific activity underway to stop this "scourge from the skies."

Acid rain — more accurately, the wet and dry deposition of sulphur and nitrogen compounds from the atmosphere — is blamed for severe damage to aquatic and terrestrial ecosystems. It is primarily the result of by-products from the burning of high-sulphur coal, which may take place hundreds or even thousands of kilometres away from problem sites. Reduced or, in some cases, eliminated fish populations present unambiguous evidence of acid rain damage in Canada, the United States, and other countries. And now it is not just fishermen and cottagers who are concerned: there is growing suspicion that acid rain may stress forest and agricultural lands as well.

The Distant Early Warning — aquatic ecosystems

In the mid-1960's University of Toronto zoologists Dr. Harold Harvey and Richard Beamish wondered why fish in two lakes in Ontario's Killarney district were growing at dramatically different rates. In addition, there were missing age classes in some fish — that is, certain age groups in the population were significantly depleted. These were effects whose cause was unknown, and the scientists began to look for the reason why.

"The Swedish soil scientist Svante Odén was really the first to blow the whistle on what was happening," says Dr. Harvey. In 1968, Odén published data indicating that some lakes and rivers in Sweden were becoming more and more acid. He also published maps of the pH of precipitation and drew

attention to the spread of very acid precipitation in northern Europe during the 1950's and 1960's. (The degree of acidity of a liquid is measured on what scientists call a 'pH' scale, which reflects the concentration of hydrogen ion present. pH 7 is neutral. As the pH moves below 7, acidity increases; as it moves above 7 alkalinity increases.)

About the same time, Americans were discovering similar problems in lakes in the northeastern U.S. "For example, fish populations might not be reproducing," explains Harvey, "or larval fish would be observed to die and create a blank year class. In certain other cases, older fish have been affected, leaving populations of young animals."