

Canadian Parliament buildings in Ottawa, have also deteriorated.

The rain falling on forests and other non-farmlands could, in time, cause extensive changes in the soil chemistry. There is not enough information yet to make it possible to say exactly what the results might be, but there is no reason to think the changes will be beneficial. Laboratory evidence suggests strongly that a continued acid rainfall would measurably reduce forest productivity within fifty years. The polluting of the air with tiny sulphate particles can have a markedly adverse effect on persons with bronchial disorders and respiratory diseases. Acidic precipitation also leaches heavy metals such as mercury from rocks, and these can get into water systems supplying drinking water.

Q: *What can be done?*

A: A great deal. There is broad agreement in the scientific community that acid rain throughout much of the northern hemisphere is caused primarily by man-made emissions of sulphur dioxide and, to a lesser extent, oxides of nitrogen. Currently available technologies can do much to control these. Chemical "scrubbing" of the gases in utility stacks can, for example, remove over ninety per cent of the sulphur. There are also techniques which remove the sulphur from ores used in smelters. Nitrogen released from smoke-

stacks cannot yet be effectively controlled, but several promising technologies are being tested. Devices exist which remove nitrogen emissions from autos. The problem may become less acute if energy conservation programs prove significantly effective or if non-polluting energy sources are developed on a wide scale. In the meantime, however, the need for controls is urgent.

Q: *Don't the Canadian and American governments have air pollution control requirements already in force?*

A: Both countries have clean air acts, but as they stand now, the laws cannot do the complete job. The Canadian Federal Government issues guidelines dealing with specific industries for provincial agencies. The province of Ontario has flexible laws and it has developed an extensive acid rain program for ore smelters and the publicly-owned hydro plants. The United States' federal law, the Clean Air Act of 1970, as amended in 1977, is designed mainly to control air pollution on a local or statewide basis. It requires the installation of scrubbers on new plants, but older plants are permitted to continue without controls as long as the ambient air in the vicinity of the plant is at an acceptable level of purity. To control emissions from older plants, the present law would have to be amended.

The First Signs Were Faint

In the 1950s, scientists began to notice a rise in the acidity of lakes. Some assumed that the changes in particular lakes were caused by beaver dams or storm-felled trees. In Scandinavia sportsmen found fewer fish in some waters.

In 1959 a Norwegian Fisheries Inspector named A. Dannevig connected the increased acidity with the decline of fish.

In 1965 researchers in Ontario found fish dying in lakes around Sudbury, the site of the largest nickel smelter in the world. Tests conducted between 1963 and 1969 at the Hubbard Brook Experimental Station in New Hampshire showed the water there had an average pH of 4.1.

In 1969 Swedish scientist Svante Oden traced the acidity in Scandinavian lakes to airborne pollutants from Great Britain, Germany and France. In 1970 Gene Likens of Cornell and F. Herbert Bormann of Yale reported increased acidity in the rain falling in northeast North America. The Canada Centre for Inland Waters in Burlington, Ontario, the country's largest water research centre, was monitoring the rainfall with a specially-designed bucket that opened automatically when it rained.

In 1975 the National Academy of Sciences in Washington, D.C., reported on the use of fossil

fuel in power generators and its consequences. The report gave scientists concerned with plant emissions new basic data. In Canada the Department of the Environment concluded that the increasing acidity of rains and the susceptibility of tens of thousands of lakes on the Laurentian Shield constituted a major problem, and it set up a network of rain monitoring stations. The United States has a similar network and the United



A special bucket to catch the rain.