# Why trout are disappearing in La Cloche lakes

By RICHARD J. BEAMISH
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ECOCIDE IS the destruction of an ecosystem. Destruction of aquatic ecosystems is occurring now in the La Cloche Mountains of Ontario, one of the more beautiful areas of Canada. The lakes nestled within these quartzite hills are a source of recreation for campers, canoeists and anglers. Angling, however, is a fast-dying sport in this area. During the past few years, lake trout and other fish have disappeared suddenly from several lakes such as Lumsden and O.S.A. Extinction of these fish is a result of the deterioration in the quality of the water in the La Cloche lakes. This is taking place in an area which has had considerable effect in Canadian history and culture.

Early French explorers named this 50-mile range of mountains along the north shore of Georgian Bay, La Cloche Mountains. The origin of the name La Cloche, meaning bell, is uncertain; it may have been applied to the bell-shaped hills, but legend also has it that the name referred to a group of large boulders on the eastern end of La Cloche Island. These rocks, when struck with a stone, gave off a ringing sound which could be heard a long way off. According to legend these rocks were used by the resident Indians to sound a warning.

During the time since the La Cloche Mountains were formed, these white and grey hills have been smoothed by weathering and repeated glaciations. When the central Great Lakes area was covered by the waters of the Algonquin Great Lakes, the tops of the La Cloche Mountains formed a series of islands. For a long time Indians came to these islands to quarry the quartzite. This stone when it breaks leaves a sharp edge and thus was ideal for making tools and weapons. As the water level fell, the islands became continuous with the mainland to the north and water trapped in the valleys formed the more than a hundred lakes now found within the La Cloche Mountains.

About 1790, the Northwest Fur Trading Co. built a fort and trading post on the La Cloche Peninsula and this post held a commanding position on the western trade route. In 1820, the rival Hudson's Bay Co. built Fort La Cloche at the foot of the mountains, beside the stream draining La Cloche Lake. The following year the rival companies merged and the fort on the La Cloche Peninsula was abandoned.

Four members of the Group of Seven explored the area from the nineteen twenties on. Frank Carmichael took a sketching and camping trip through the western La Cloche about 1926. Thereafter he was a frequent visitor, and he built his cabin on Cranberry Lake in 1935. He travelled the area with J. Gauthier or A. Y. Jackson, and produced here many of his famous paintings such as Hilltop. The Whitefish Hills, Grace Lake and Mirror Lake. Then A. Y. Jackson travelled extensively through these mountains alone or in the company of a mining-engineer friend.

Here too, Jackson painted Grace Lake, Gem Lake, Nellie Lake, and many more. Arthur Lismer sketched and painted along the Blue Ridge of the mountains, especially on MacGregor Bay. More recently, A. J. Casson painted in the western and central La Cloche Mountains, including the offshore islands of Georgian Bay. Some of Casson's many paintings from this area are Storm in the La Cloche Hills, La Cloche Channel, and Morning, La Cloche Channel.

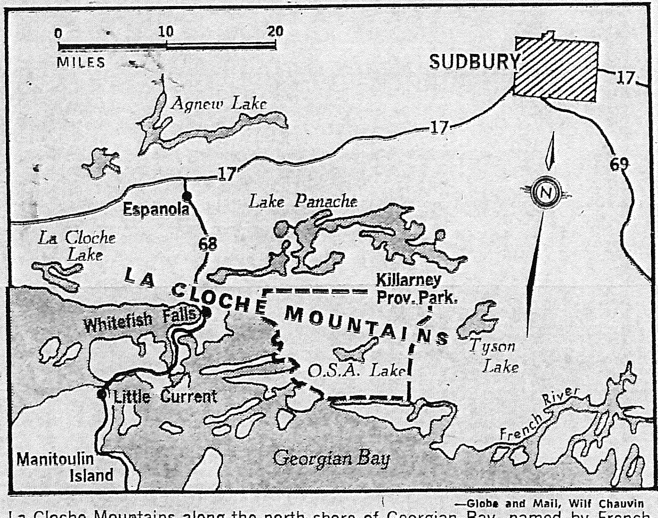
O.S.A. Lake, the acronym for Ontario Society of Artists, was so named in honor of the artists who have come to paint in these mountains. Today O.S.A. Lake could be ranked as one of the most seriously polluted lakes in the country. The waters are so acid as to be lethal to most species of fishes. Concurrent with the loss of fish. there has been a great increase in the amount of acid in the eastern La Cloche lakes tested over the past decade. Thus Fox, Bell and David lakes have shown a five-fold increase, Tyson, O.S.A. and Grey lakes a 10-fold increase, and George and Sunfish lakes a 100-fold increase in the amount of acid present in the water.

Analysis of rain and snow indicates this acid results from air-borne pollution and not from natural processes. Acid present in rain and snow appears to be a direct result of the large amount of sulphur dioxide emitted by the metal smelters in the Sudbury region. Once in the atmosphere some of the molecules of the sulphur dioxide combine with water vapor and fall to earth as a form of sulphuric acid.

In winter this fallout is particularly serious, with snow containing up to 100 times the concentration of acid found in typical trout lakes. In spring this acid enters the lakes and soon mixes from top to bottom. In this way the acid content of the lakes increases year after year. Eventually the concentration of acid exceeds that which some of the organisms in the lake can tolerate, and the ecosystem is destroyed.

The La Cloche Mountain lakes, because the quartzite rocks are so insoluble, were among the purest in North America. The tragedy of such pure lakes is that there is very little hardness in the water which can react with the polluting acid. Industry commonly gets rid of its wastes by building high emission stacks which spread the fallout over a greater area. Unfortunately, this tactic has served to carry acid pollution into an area where the lakes are not capable chemically of neutralizing the pollutant.

To date, only some of the lakes in the eastern half of the mountains have lost the bulk of their fish. But in many more lakes in the La Cloche Mountains the concentrations of acid are rapidly approaching the level at which the fish in these will also become extinct.




—Globe and Mail, Wilf Chauvin
La Cloche Mountains along the north shore of Georgian Bay, named by French.

—McMichael Conservation Collection
Group of Seven spent much time in La Cloche Mountains. Above Frank Carmichael's La Cloche Silhouette.

# How one company is trying to combat the problems of pollution

By R. R. SADDINGTON

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TODAY, WE ARE keenly aware of the need to conserve our resources and prevent pollution of our air, water and soil. . . . My purpose here is to discuss briefly various types of poollution confronting us, the considerations brought into play while searching for solutions, and what one company, International Nickel, is doing to meet the challenge.

## Tallest chimney

One obvious example is the tallest chimney in the world . . . at our Copper Cliff complex. Building this huge stack, which will be operational toward the end of next year, is a case of making full use of a proven method of dispersing sulphur dioxide-bearing smelter gas so that it will be rendered harmless. The new stack is not the final answer, but it is today's answer. It is the best solution that we, or anyone else, can find within the limits of today's technology. And it will be effective. At the same time, we are continuing a program of intensive research to develop a method of processing our ores that will not involve the generation of sulphur dioxide . . .

The new stack is part of an overall air pollution control program costing more than $40-million . . .

The tall stack has been the object of considerable criticism. Fears have been expressed that it will simply spread pollution over a wider area and put more poisonous sulphur dioxide in the atmosphere. In fact, it will do neither. There is widespread misunderstanding of the nature of sulphur dioxide. On a worldwide basis, a full 80 per cent of the sulphur dioxide in the atmosphere comes from organic decay. About 14 per cent can be attributed to the burning of fossil fuels, and about 6 per cent to smelting operations.

Sulphur dioxide survives only about four days in the troposphere, or lower atmosphere. It does not accumulate in the air as a poisonous layer in the earth's atmosphere. Therefore, the problem is not so much the volume disseminated from a stack, but rather the ground level concentrations.

We can minimize such concentrations and keep them within harmless limits by keeping waste gas aloft as long as possible and diluting it by effective vertical and horizontal diffusion . . .

Another part of our air pollution control program involves recovery of sulphur dioxide before it can be emitted as waste . . . Incidentally, dust abatement will also be improved because dust must be removed as a prerequisite to sulphuric acid production.

The question of where the markets will come from for this large increase in acid production or what will be done with it presents somewhat of a problem in itself. One only has to look at the enormous quantities of sulphur accumulating in Western Canada to see what can happen. This is one example of solving one problem only to create another . . .

## Marine studies

At Shebandowan west of Thunder Bay, where International Nickel is developing a 2,500 ton per day mine-mill operation, we have engaged a consulting firm to help us preserve the quality of the environment. The firm's environmental science division sent its marine biologists and ecologists to the area to conduct studies before the installation goes into operation. The knowledge they acquire and pass along to us will be invaluable in the development of a program to control industrial effluents . . .

Water quality control in an operation such as ours requires a combination of technical know-how and sound management. Our Sudbury operations require enormous amounts of water. . . . Our main areas of concern are the oxidation of sulphides in contact with ground water resulting in acidic water containing dissolved metals, and human error or mechanical breakdown resulting in accidental spills or overflows.

In the Sudbury area, we re-use more than 100-million gallons of water each day in processing the ore, by cycling it through a holding and recirculation system. We require about 30 million gallons of fresh water daily, and this figure has remained fairly constant despite a large increase in production in recent years.

Studies and changes are continually being made with an aim of achieving maximum circulation of both mine and process water. The new Clarabelle mill —a 35,000 ton per day operation—will not require any additional fresh water for processing. And, as a matter of interest, even the effluent from the town of Copper Cliff's sewage treatment plant is used as process water in our mills. . . .

Some of our systems designed to ensure that water we return to natural watercourses is acceptable are unique —the brainchildren of our own engineers. For example, they conceived, designed and installed a huge clarification unit 2,200 feet below surface at our Copper Cliff North mine. A tank 40 feet in diameter collects mine waste water. Solids settle to the bottom and are fed to a vacuum belt filter below. Water taken from that "sludge" is recirculated through the clarification tank. Meanwhile, the continuous clear water runoff from the top of the tank is channeled to clear water storage ponds underground before it is pumped back to the surface. . . .

## Water use

To give an idea of the magnitude of water quality management in an operation as complex as ours, here are some examples of procedures in effect or under study:

(1) Milling operations are continually revised to maximize the use of recirculated water. The Shebandowan mill for example, has been designed to operate in closed circuit with the tailings area.

(2) A dual retention basin is in operation on the effluent discharge of the Copper Cliff smelter. Lime is added to the effluents prior to entry.

(3) Schemes are being studied, both by Inco and the staff of consultants, to determine the best method of treatment of the effluents from Coniston smelter and the refineries at Copper Cliff and Port Colborne.

(4) Three retention basins are in use at the Iron Ore Recovery Plant, which have eliminated spills to the natural watercourse from this source.

(5) Studies are being conducted by our Process Technology Department to reduce the ammonia content of effluent pumped to the Copper Cliff tailings area.

(6) We monitor all waste water prior to discharge and the receiving watercourse both "up" and "down" stream from the point of discharge.

Tailings can give rise to another type of pollution, that of the land. We have tackled this problem successfully. Coarser solid tailings are no longer deposited in the tailings areas, but are treated and returned to the mines as sandfill.

Abandoned tailings areas may become barren waste lands, subject to dust storms during periods of high wind in the summer. Through the efforts of International Nickel's agricultural department . . . we are now growing grass on what was basically sterile, waste rock. Six-hundred acres are under cultivation. There has even been certain amount of volunteer growth, and wildlife is also making use of the reclaimed area.