



HOW THE ATLANTIC IS WARMING UP

Timber is Replacing Glaciers,
Icebergs are Melting, Codfish
Have Moved North & Tropical
Sharks are Off Canada

by J. E. Belliveau

Halifax

A PICTURE of languid Nova Scotians loafing on the sands of blue tropical waters and fearing to swim far from shore because of man-eating sharks is not one to be conjured up readily. In song and story they have been told of the green northern waters smashing against rugged cliffs. In summer they knew only of bathing beaches where sharks, tarpon and ray fish would never approach.

Yet today coastal folk with a knowledge of some of the strange things which have been happening along our Atlantic coast might consider the tropical theme less far-fetched than it once was. Not that palm trees will be waving and coconuts dropping soon, but tropical fish are there now.

Natives and travellers who spent summer weeks within sound of the Atlantic's wash in 1954 could be excused if they refused to countenance the idea of tropical life off Nova Scotia. It was an unusually cool and rainy summer on the coast. In spite of that, the ocean temperature remained at a level so much warmer than it used to be that fish from the south swam about daily. Fewer man-eating sharks were reported than in the previous summer, but the cod, which has been a staple of the Nova

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Scotia economy for generations, remained away in large numbers. And the reason the cod didn't come was because the ocean is getting warmer.

Plankton, the minute form of marine life which makes the water green and feeds the cod, doesn't thrive in warm water. The fish have gone north and have remained there.

Piscatorial wonders like the killer shark, which Nova Scotians called "the Fourchu rammer" after John Burns had been drowned in 1953 when his boat was rammed, made headlines when they first arrived from the tropics. With them also came the deadly ray and the tarpon, but last summer they had become commonplace enough to fail to excite the fishermen.

Scientists who have been studying our changing climate and the rising ocean temperature were not surprised when the fish first came from the balmy southern waters. They knew something more was happening than the chance arrival of killer sharks. They knew that tropical fish could be expected because from 1947 to 1953 the waters off Halifax had warmed an average of two degrees. If this doesn't seem much, it is only necessary to remember it is an average and that it is sufficient to send the multimillion-dollar codfish industry elsewhere. Another rise of two degrees could drive the fabulously rich fish food industry based on the cod and some of his relatives so far that the industry could disappear.

All those who have made an expert study of meteorological, biological, agricultural and marine changes are agreed our northern climate is getting warmer—and much more rapidly than most be-



lieve. Whether this is part of a relatively short cycle or the herald of a new dawn is a matter upon which the scientists are not agreed.

Indisputably, much of the northern hemisphere is warmer than in 1850, proving dad was right when he said "the winters aren't what they were when I was a boy." True as this is, it is not what has struck the long-handled underwear trade because the difference has been gradual and less felt than might be thought. People stopped wearing long-legged undies because the style changed and houses got warmer and people were not outdoors as much.

More important than this is evidence offered by people like Keith McLeod, superintendent of public weather services for Canada, who says categorically: "Canada is warming up. Timber is replacing glaciers in the north. Crops are being harvested where 70 years ago there was nothing but frozen muskeg." He says further that if the present warming trend continues future towns on Hudson Bay could have temperatures like those of the lakehead, 700 miles south. "The ice might melt in the northern straits and permit cities on the bay to carry on all-year trade across

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the Atlantic to Europe," he adds.

One of the closest students of the climatic alteration is Hurd C. Willett, the Massachusetts Institute of Technology's distinguished meteorologist. He believes the warming of North American weather, dating back at least 50 years, has now halted and probably reversed. He also forecasts a continued temperature decline, notably in the north and northeastern areas, reaching a low between 1960 and 1965.

In particular, he foresees cooler summers and few, if any, balmy winters. This part of his belief is held in east coast Canada at the moment, but climatic experts in Canada and Europe disagree sharply with Willett. These people don't argue the individual summers may be cooler; they think the northern ice cap is melting and that warmer climate is here and to continue.

Some hold it is a 1,000-year cycle, and that when Leif Ericson came to Hudson Bay the bay was ice-free in winter and warm in summer—as warm as Keith McLeod predicts it may again become. These people also think Newfoundland was Vineland, semi-tropical about the time Iceland began to be so chilly its people went exploring to find warmer lands. Likewise, Nova Scotia, New Brunswick and eastern Maine were delightfully warm spots about the year 1,000.

Six hundred years later, on Dochet's island, now in Maine, but once part of Nova Scotia, and now a few yards off the New Brunswick shore, the winters were so severe that members of Champlain's expedition in the winter of 1604 had a horrible time battling cold and scurvy.

If Willet is wrong and some others right, a new pattern of living,



especially in the east and north, could emerge. It might even be that the maritimes' economic problems would decrease with the longer summers and warmer winters. What it would mean for ore-rich Labrador and the people who must work there can readily be imagined.

Enough has already happened in this changing scheme of things to take one's breath. Greenland is warming up so fast and the ice cap retreating so rapidly that farming is being done to a depth of 16 miles from a coast that only a generation ago was constantly locked in ice and snow. Icebergs are disappearing from Canada's Atlantic coast; forests are growing in the sub-Arctic of the east and air bases have been established on Baffin Island.

As recently as 1936 only one convoy of ships was able to traverse the northern sea route out of Murmansk in Siberia, but now 100 or more convoys are able to negotiate the passage in the much lengthened open season each year. On Pearyland an icefield has gone back at the rate of 100 feet a year since 1947, and a Scandinavian fjord



open 95 days a year between 1907 and 1917 is now free for shipping 191 days a year.

What climatic and resultant ocean temperature changes can do is indicated by the effect on North America's fishing industry.

One of the most storied parts of the U. S., Cape Cod, was named for the fish which has brought centuries of wealth to Canadian, American, British, Portuguese, Norwegian and French fishermen and processors. Today, because of warming waters, the cod has deserted that famous Massachusetts fishing coast. Clyde C. Taylor of the North Atlantic Fishery investigation has said the cod now ranks fifth, behind haddock, redfish, sea herring and lobsters.

Lunenburg fishermen have sailed far from their Nova Scotia banks, even to the coasts of Greenland, in search of the cod. They will sail again, for they are among the world's most intrepid fishermen and they fish with the ancient handline methods which from time immemorial have been the most satisfactory means of harvesting this rich ocean crop.

Whatever is now in store for Canada's eastern fishermen, and whatever debate may exist about the 1,000-year climatic cycle theory, it seems likely that Iceland

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was once covered with ice, hence its name, and Greenland was green, to provide its name, and that their relative conditions changed with the climatic alteration. Greenland became an ice land and Iceland became, relatively speaking, green land.

When the ice age came to Greenland, where Canadian fishermen now cast nets, cooler air invaded the palmy lands on both sides of the Atlantic. They never got so cool as to drive the codfish away from this side after the 15th century. John Cabot discovered the tremendous potential off Newfoundland in 1497 and Europeans in great numbers flocked to the Grand Banks. Portuguese and French fishermen were off Canada's coasts even earlier, as were the Spanish. The Spanish Armada's defeat by Queen Elizabeth's fleet gave freedom to the English to exploit the western fishery.

But Greenland had lost the codfish, and only in the last half dozen years has it begun regaining them so steadily that fishermen are going to its coasts in increasing numbers.

University of Alberta scientists have found southern animal life in their formerly cold province. Southern Ontario is getting more and more to be a tobacco grower's paradise, and some Ontario farmers are thinking of raising cotton. In New Brunswick a species of cougar known locally as a panther has been reported frequently.

There are those who have blamed a shift in the Gulf Stream for changing the climate and bringing the tropical fish to Nova Scotia and driving the cod off, but J. R. Lingard, a defence research oceanographer at Dartmouth, said the stream was too far off the Canadian

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coast to do this. He did say that recent studies of the stream, which is a jet of water like that out of a hose into a sluggish ditch of water, show it to be only 30 to 40 miles wide. It meanders through the ocean like a land river in flat country.

A stream of warm water, piled up in the Florida strait by the big warm seas to the south, the Caribbean and the Gulf of Mexico, it is forced into the Atlantic under such tremendous pressure that it follows its own course for 1,000 miles or so. It remains warm, so warm that it gives England its moderate climate and, in absence, allows Labrador in the same latitude to be a cold, barren land. If tropical fish swim northward in the stream they don't go outside its boundaries unless the outside Atlantic waters have so warmed that they find very little difference.

If the cod should eventually go from Canada's Atlantic coast it would not necessarily mean the fishing industry would die or the thousands whose livelihood depends upon it would starve or leave. What has happened off Massachusetts could happen here. Other fish came along, but not food fish. A fish called the menhaden, of which (it is safe to wager) 99 per cent of Canadians had never heard, is now the richest catch off Cape Cod. In fact, menhaden and herring, pilchard and anchovies comprise 21 per cent, or the largest single portion, of the world's fish catch.

Cod seem to like a narrow range of water temperature, neither too warm nor too cold, and they are found where the waters mix, where the chilling temperatures of the ocean deeps meet the pleasanter

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coastal temperatures.

It was in these great fish fields that the effect of warming water on fish life was first noticed to have taken a sudden turn in 1947. Since then, with some ups and downs, the water warming has been more gradual. No one can say precisely why there should have been a sudden change in that year, but the answer likely lies in the fact that there was not. The water simply reached a point where the cod were no longer happy there and so departed.

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Notes of the Week

- Man's industrial activity is creating a greenhouse effect that is steadily increasing the temperature of the ground and lower atmosphere, Prof. Gilbert N. Plass, a Johns Hopkins University physicist, told the American Geophysical Union meeting in Washington. Carbon dioxide discharged from chimneys, he explained, acts like a glass roof over the world in that it admits short-wave energy from the sun but bounces back longer waves that reflect from the earth. In addition to getting about 1½ degrees hotter per century, the climate may be getting drier, Prof. Plass theorized.

Mother Earth: A Little Warmer

Oldtimers who insist winters were snappier in their day got some scientific backing, but not much. A Johns Hopkins U. physicist said the earth's average temperature is rising—but only 1½° every 100 years.

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