The Climate of the Atlantic Provinces

By C. C. Boughner

THE climate of any region is determined in broad outline by its latitude and by its geographical position in relation to the continents and oceans. Owing to the control of the sun it is to be expected that the equatorial regions will have a high mean temperature and the polar regions a low mean temperature; but particularly in middle latitudes the arrangement of land and water masses modifies to a large extent this expected fall of temperature from equator to pole. Proximity to oceans also governs largely the distribution of precipitation.

It is our purpose to discuss the climate of the Atlantic provinces of Canada, a region situated on the eastern side of the great land mass of North America. Although bordering the Atlantic, these provinces have a temperature régime which is a complex of marine and continental influences. The prevailing eastward drift of airmasses from the interior of the continent diminishes the influence of the Atlantic ocean and renders the climate on the whole continental. Such airmasses are not infrequently displaced by inflows of moist Atlantic air which produce mild spells in winter and periods of cool weather during the summer.

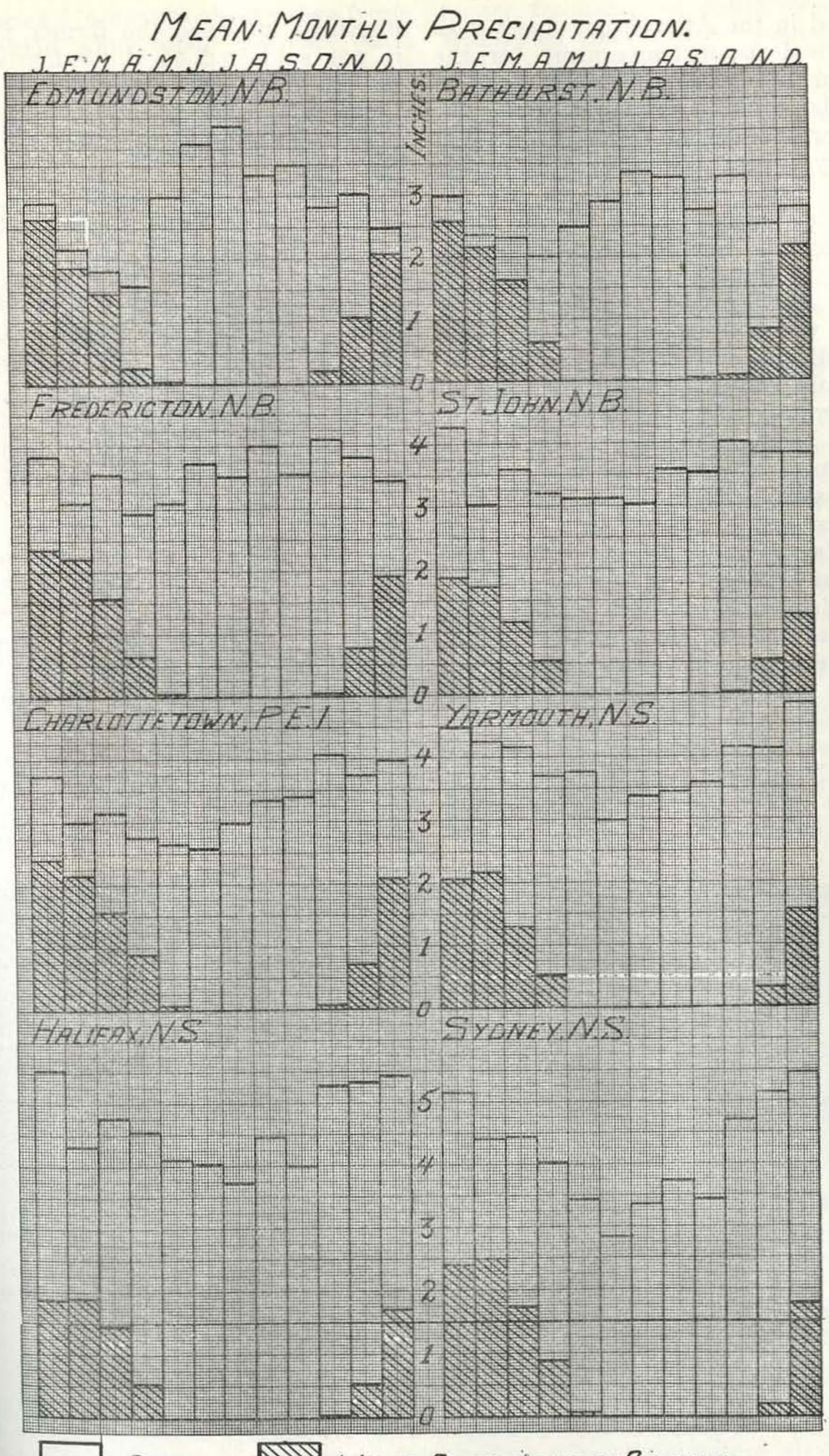
Except for the narrow ridge bordering the bay of Fundy east of St. John, the southeastern half of the province of New Brunswick is in general undulating and of low relief with the ground elevation generally not exceeding 500 feet above sea-level. In northwestern sections of the province the ground elevation is in general from 500 to 1000 feet above sea-level and reaches its greatest elevation of nearly 2700 feet in Northumberland county northeast of Grand Falls. The effect of elevation and continental influences are clearly reflected in winter temperatures. Along the north shore of the bay of Fundy January and February normal mean temperatures range from 16 to 20° F. but towards the interior of the province lower temperatures prevail. At Fredericton January temperatures average 13° F. with those for February nearly two degrees milder while at Grand Falls January and February mean temperatures are 8 and 10° F. respectively. Since 1875 extreme minimum temperatures of 35 degrees below zero Fahrenheit have been officially recorded at Fredericton, 21 degrees below zero at St. John and 46 degrees below zero at Grand Falls.

Summer temperatures are not as high in New Brunswick as in the same latitudes of the interior of the North American continent. July mean temperatures average 61° F. at St. John and 66° F. at Fredericton and Grand Falls. Extreme maximum temperatures have exceeded 100° F. at Fredericton, 95° F. at Grand Falls and 90° F. at St. John. On the other hand over the Great Plains of western Canada extreme temperatures of 110° F. and over are not unusual during July and August and 115° F. has been reached.

The advent of spring is somewhat more delayed in New Brunswick than for example in southern Ontario, while autumn temperatures are very much the same. At Toronto, Ont., the October mean temperature is 48° F. while that of Fredericton is 46° F.

The ridge of almost mountainous country running through the centre of the mainland of Nova Scotia divides it roughly into two slopes. The Atlantic slope is generally rough and rocky and is exposed to the full sweep of the Atlantic storms. The northern slope, facing the bay of Fundy and Northumberland strait, consists for the most part of tilled plains and river valleys. Southwestern Nova Scotia and the Annapolis valley enjoy the mildest winters ex-

EDITOR'S NOTE: C. C. Boughner, M.A., is a member of the Meteorological Division of Air Services, Department of Transport in Toronto.



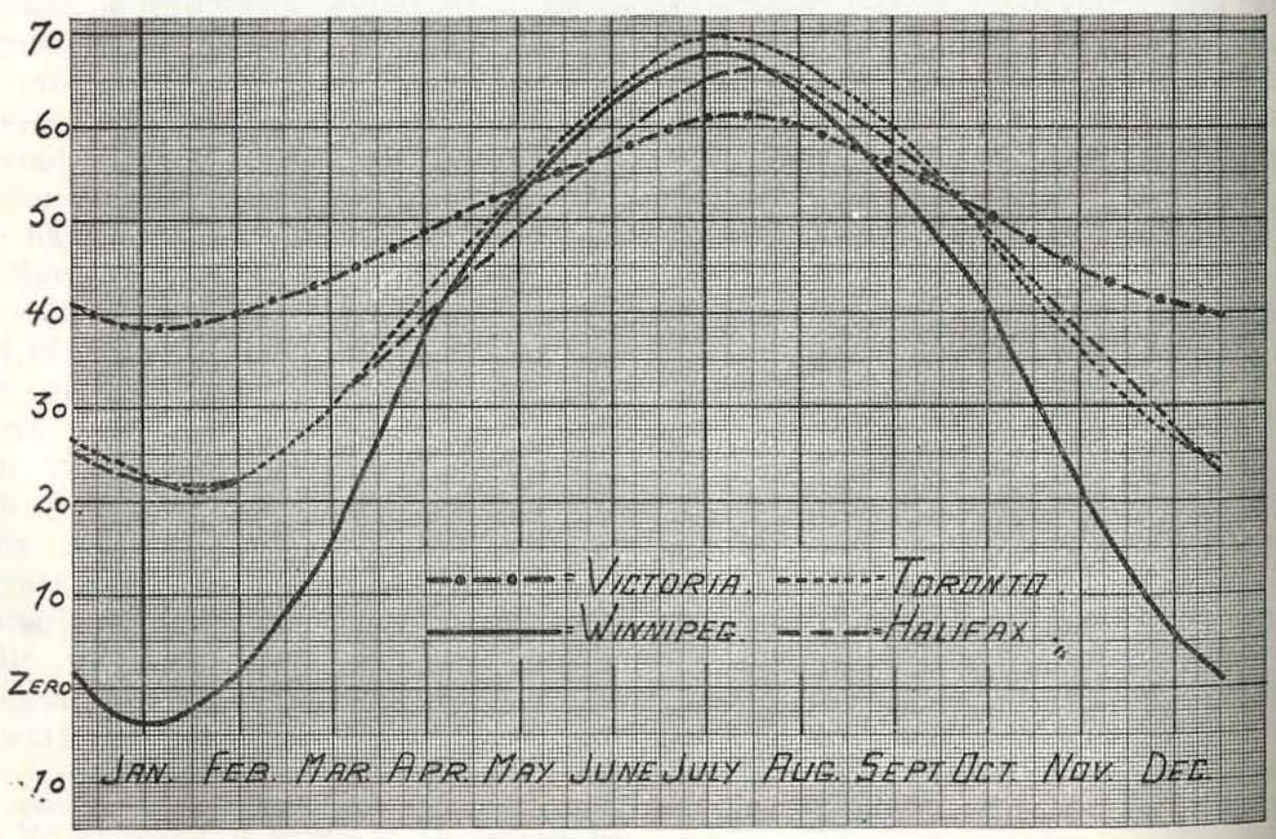
In the above diagram total precipitation, in inches, is shown as the sum of the rain, (unshaded area), and the water equivalent of the snowfall, (shaded area). Ten inches of freshly fallen snow is calculated as equivalent to one inch of precipitation.

perienced in the Atlantic provinces with the normal mean temperature for the coldest month ranging from 23 to 26° F. Along the Atlantic coast winter temperatures are somewhat lower; at Halifax February is the coldest winter month with a mean temperature of 22° F. Along the shores of the Minas Basin and Chignecto bay winter temperatures are two to five degrees colder than at Halifax. Besides enjoying more moderate average winter temperatures the Annapolis valley is not subject to such extreme cold waves as are other parts of the province. At Annapolis Royal 13 degrees below zero F. is the lowest temperature experienced since 1915 while in the same period extreme minima of 21 degrees below zero F. have occurred at Halifax and 35 degrees below zero at Mount Uniacke. At Sydney on Cape Breton Island the coldest month, February, has a mean temperature of 20° F. while the extremely lowest temperature officially recorded since 1870 is 25 degrees below zero F.

Summer temperatures are not quite as high in Nova Scotia as in New Brunswick due to the greater influence of the Atlantic ocean. On account of this maritime influence the former province is not subjected to the extensive heat waves which are experienced in New Brunswick. Spring and autumn temperatures are much the same in the two provinces.

Although Prince Edward Island lies to the north of Nova Scotia the tempering by the Gulf of St. Lawrence and its completely insular situation keep its winter temperatures only slightly colder than Nova Scotia but milder than most of New Brunswick. Its summer temperatures are about the same as those of the middle St. John river valley.

Of extreme importance to agriculture is the length of the frost-free season and there are wide variations in this respect throughout the Atlantic provinces. Along the immediate shore line and on the islands of the bay of Fundy we find 165 days frost-free, but a short distance north of the north shore of Fundy as well as along the southern slope of the Miramichi highlands the average frost-free period is less than 100 days. In the lower, middle and upper St. John river valley the average frost-free periods are 125, 111 and 106 days respectively. In the southwestern lake region of New



The Annual March of Mean Temperature.

Brunswick 114 days is the average frost-free period while along the east coast and along the bay of Chaleur the growing season is extended about 15 days. In Nova Scotia an average frost-free period of 145 days is enjoyed at Yarmouth, which is about five days longer than that of the outer coast region. A growing season free from frost for 114 days is experienced in the Annapolis valley but in the eastern highlands of the Nova Scotian mainland a comparatively short frost-free period of 90 days is found. On Cape Breton Island there is a frostless growing season of about four months and in Prince Edward Island agriculture is favoured by a frost-free period which averages 146 days in the agricultural region around Charlottetown at least.

The total average annual precipitation in New Brunswick ranges from 35 to 45 inches, with the heaviest fall occurring along the lower St. John river valley and along the north shore of Passamaquoddy bay. The average precipitation does not vary much from one month to another during the year although there is a tendency to a maximum in January as well as in October and November on the north shore of the bay of Fundy and along the lower St. John river. In the northwestern sections of the province there is a tendency towards the summer maximum which is a characteristic of our continental climates. On the mainland of Nova Scotia average annual precipitation ranges from 40 to 45 inches everywhere except along the Atlantic coast where it is about 10 inches heavier. Not only is the precipitation heavier along the Atlantic coast but there is also a greater frequency of days with precipitation; for here measurable precipitation falls on 140 to 160 days per year. Cape Breton Island has an average total fall of precipitation of about 50 inches which is about 10 inches more than the fall on Prince Edward Island.

Because a not inconsiderable part of the summer rainfall occurs during thunderstorms, it should be pointed out that on the average 5 to 12 thunderstorms per year are experienced in the Atlantic provinces. There is a slightly higher frequency in southwestern New Brunswick than in other sections of the region under consideration.

The annual snowfall varies widely from one winter to another throughout the Atlantic provinces. Coupled with this condition is the fact that winter precipitation is usually partly rain, which may thaw a considerable amount of previous snow cover. The depth of snow lying on the ground therefore is a very variable quantity especially in the southern regions.

On the average, total snowfall in Nova Scotia ranges from 45 to 85 inches, with the heaviest fall occurring in the region about Grand Pré and in the northeastern portion of the Annapolis valley. Not only is the snowfall heaviest in this region but here also are the greatest number of days with snow, on the average more than 45 days. Elsewhere in Nova Scotia snow falls on 20 to 35 days each winter.

In southern New Brunswick the annual snowfall averages about 75 inches but in northern sections of the province the fall slightly exceeds 100 inches. On the higher elevations in northwestern New Brunswick snow falls on more than 40 days of the year but in southern sections of the province measurable amounts of snow occur only on 20 to 35 days. In general January is the snowiest month throughout the Atlantic provinces. The heavy snowfall in the lumbering districts is of considerable economic importance as the deep snow affords excellent sleigh roads for logging operations.

The stormy character of the winters in eastern Canada is caused by the concentration of cyclonic disturbances or storm centres along a comparatively narrow zone on the southern margin of the cold Labrador region. The warm moist air of southern origin or of strongly modified continental air coming in contact with and being lifted up by contrastingly cold dry air of recent polar origin often results in violent gales and rains changing to snow. During the winter months northwest winds are predominant over the Atlantic provinces.

The approach of a low pressure system or storm centre is marked by northeast or east winds which will change to south or southwest after the arrival of the warmer air. There is a sudden shift to northwest with the arrival of the "cold front". Since the next storm centre will generally approach again from a southwesterly direction, these northwest winds with cold weather will prevail most of the time that is not actually stormy or unsettled.

In summer there is a concentration of low pressure centres over the St. Lawrence river valley and this leaves the Atlantic provinces under the predominating influence of winds blowing from the south, southwest or west.

The frequency of gales and high winds is of great importance to shipping and fishing interests of the Atlantic provinces. At Halifax on the Atlantic coast there are about 25 gales per year on the average, 20 of which occur between the period Nov. 1st and April 30th. At St. John 35 gales occur annually with December and January reporting the greatest monthly frequency. The decrease in the number of winds of gale strength in the interior of New Brunswick as compared with the shore of the bay of Fundy is quite noticeable. At Fredericton in the St. John river valley only five gales per year are reported.

The greatest number of gales occur in winter months in which cold fronts with their accompanying large temperature drops move from the interior of the continent towards the coastal waters. On the other hand the greatest number of fogs occur during summer months with the movement of warm airmasses towards the colder sea and colder air surrounding Newfoundland and the Labrador coast. Fogs are most prevalent along the Atlantic coast of Nova Scotia where on the average more than 50 are reported annually and at Halifax this number approaches 100. Another foggy region is the bay of Fundy where 30 to 65 days with fogs are reported. The decrease in fog-frequency is quite rapid with increased distance from the sea so that in the interior of New Brunswick less than 10 fogs are reported annually.

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Creative Education

A Review of Dr. M. M. Coady's "Masters of Their Own Destinies"

By Kenneth Leslie

Substituting Dynamics for Statistics

THIS is the story of the "Antigonish Movement" by the man whose dynamic personality has infused and informed it during the critical years of its birth and early development.

Further, it is a story of the failure of "laissez-faire" economy to meet the needs of the people and of the efforts of the people to institute in their own interests a democratically controlled economy.

But first, and even more importantly, it is a story of popular or "adult" education.

The word which occurs to this reviewer as setting apart the St. F-X brand of adult education from the usual type of adult education is the word "creative". That is, it is education which proceeds by an integration of the whole personality of the student with the object of study.

EDITOR'S NOTE: Kenneth Leslie, a native of Nova Scotia living in New York, well known as poet and author, is editor of the *Protestant Digest*.