

A factor which plays an important role in determining the character of western winters is the intensity of the anticyclones and the latitude in which they first appear. The weather chart of the northern hemisphere between longitude 40° E. and 180° W., now prepared daily, includes data both from Alaska and from the sub-arctic portions of the north Atlantic, and there is a growing conviction that the pressure distribution in northwestern America in winter depends largely on the position and the intensity of the normal area of low pressure over the north Pacific, which is the resultant of the persistent development of deep cyclonic areas.

In some seasons these cyclonic areas enter the continent very far north, and appear actually to prevent the formation of the anticyclones, which are so intimately associated with great cold waves, and in such seasons comparatively mild or even very mild winters prevail in the western provinces, the general flow of air being from the south and west. In other seasons, the Pacific cyclonic areas develop farther south, and enter the continent over British Columbia, and then great anticyclones, accompanied by intense cold, develop in the Mackenzie River valley and Yukon and sweep southeastward towards the Great Lakes and eastern Canada. One of the problems then to be solved has relation to the factors governing cyclonic development in the higher latitudes over the ocean, and one wonders whether a varying solar radiation may not cause changes in the barometric distribution in the tropics, which will affect the strength of the trade winds and which will in turn lead to variations in the great ocean currents, and then, according as the warm waters are abnormally far north or far south, the Pacific centre of action will also vary. The solution of such a problem may ultimately lead to the possibility of forecasting the character of coming winters.

Canadian territory stretches northward beyond the arctic circle, from lands in the western provinces where cereal crops are an assured success to the barren lands where only mosses and lichen grow. A question of moment, then, is how far north the lands of agricultural possibilities extend. Certainly, between the two limits, there is a wide zone, in the southern portion of which crops will in most years mature, and in the northern portion of which they will only very occasionally ripen. Throughout all this vast doubtful area, the factor of long summer sunlight plays an important role and lengthens the period of growth, but another factor, acting adversely, is the liability of early and late summer frosts, and the husbandman who sees his crops rapidly maturing is not unlikely to see them destroyed in August before ready for harvest. Graphs showing summer temperature curves at various stations show how in August the downward trend of the curve is very rapid at the more northern stations.

The southern portions of Ontario enjoy a particularly favourable climate, partly owing to their being farther south than other portions of the Dominion. The most southerly point in Ontario is in the same latitude as Rome, and Toronto is in the same latitude as Florence. The Great Lakes also exert an important influence in tempering the cold of winter and moderating the heat of summer, and undoubtedly have some influence in equalizing the precipitation, periods of drought there being less frequent than in corresponding latitudes to the west.

The enormous territory included in northern Ontario and Quebec, north of a line passing through Quebec city, enjoys a fairly warm summer, and it is only as autumn advances that a marked difference of temperature is registered between these districts and those farther south. It is not latitude alone which leads to the shorter growing season and more severe winters in these northern parts, but rather the fact that the mean path of cyclonic depression lies in the valley of the St. Lawrence to the south.