

Effect of Topography on Climate.—The topography of a country, however, exercises an important influence on weather conditions, and there are many parts of Ontario, to say nothing for the moment of British Columbia, where, owing to topographical features, considerable rain or snow may fall with westerly winds, when the barometer is rising behind a retreating low area. Immediately to the east of lake Huron and Georgian bay the land rises rather abruptly over 1,000 feet; westerly winds off the lake are deflected upwards by the increasing height of the land, and the air, expanding as it rises, is cooled below the dew point, with resulting precipitation. Hence it is that the snowfall in Grey, Bruce and neighbouring counties is greater than in the counties to the south and east, where the land falls away in elevation. This topographical effect is more general and more pronounced in British Columbia, where in winter the mean temperature of the sea is warmer than the land. The air coming eastward from the Pacific rises up the western slopes of the mountain ranges, and the cooling effect of expansion leads to very heavy rains on the outer coastline, with lighter but still heavy rains on the lower mainland.

Climatic Features of the Canadian Provinces.—There are very interesting climatic features peculiar to each of the Canadian provinces. Beginning in the far west, the most striking feature is the mildness of the climate near the Pacific coast, where the controlling influence is the prevailing westerly winds which bring the warm moist air from the Pacific. In addition to this, when winds are northerly and easterly, the air is being drawn from higher to lower levels, and is thus gradually warmed as the atmospheric pressure increases towards sea level. It is also due to this latter cause that the cold spells near the coast are never severe. Another feature is the seasonal character of the rainfalls. During the colder months of the year it is heavy, while in summer it is very light. In the cold months, Pacific air, on reaching the continent, is cooled both by passing over a relatively cold land, and also a land with rapidly increasing elevation. In summer, on the contrary, the sea air is colder than the land, and it is only occasionally, even at high levels, that it is cooled below the dew point, hence the deficiency of rain during June, July and August. Another factor which plays an important role in British Columbia is the anticyclone moving southward from the Yukon. It is at such times that the severe east and northeast snowstorms occur in the mountains.

A problem which is receiving much attention is that of the precipitation of the western provinces. It has not yet been definitely decided whence comes the moisture which falls in summer rains, but from recent investigation it would appear that the greater part is from the gulf of Mexico, though a certain proportion comes across the mountains south of Canada from the Pacific. The variation from season to season is certainly closely connected with the distribution of atmospheric pressure over other parts of the continent. It is surmised that a cold spring, following a cold winter with an abnormal accumulation of snow and ice in northeastern Canada, including Hudson bay, is usually there followed by a rather persistent abnormally high barometer, which in turn leads to a prevalence of east and northeast winds over the northern portion of the Great Lakes, and thence westward to the Canadian prairies, while over the northwestern portions of the continent the pressure is relatively low. The stream lines of the warm lower atmosphere in the Mississippi valley will then be from the southeast, converging towards colder east and northeast winds, and gradually rising above them. With such conditions, copious rains are likely to occur in the western Canadian provinces. When, in other seasons, a series of lows pass eastward across the Great Lakes, the resultant stream lines in western Canada will be southwest and west and the rainfall west of the Great Lakes will be light.