Larger ponds and lakes are nearly all too cold to support vascular aquatic plants but possess a rich microscopic algal flora. In smaller ponds may be found pondweeds (*Potamogetom*), aquatic buttercups (*Ranunculus hyperboreus; R. aquatilis*) and mare's-tail (*Hippuris vulgaris*). Most brooks and streams are too cold or turbulent for vascular plants but protected stream margins and floodplains may support various grasses and sedges.

The Plant Environment

For tables and maps dealing with the climate of Canada, reference may be made to the *Climatological Atlas of Canada* (Thomas, 1953). More recent maps of various climatic zones (as well as of forest regions, vegetation zones, typical plant ranges and ranges of the principal commercial trees) are to be found in the *Atlas of Canada* (1957). The present paper is concerned with certain less obvious ways in which variously interacting factors may affect the climate and plant distribution of a region, matters of the utmost importance in interpreting the various distributional patterns of Canadian plants.

Temperature.—A factor of prime importance in its general effect on the Canadian climate is the distribution of heat by ocean currents, opposite extremes of which operate along the Pacific and Atlantic Coasts. The warm waters of the Japanese current exert a profoundly ameliorating effect in their northerly flow against the northern part of the Pacific Coast. This, combined with the huge volumes of relatively warm water discharged by the Mackenzie River system into its extensive delta bordering the Arctic Ocean, results in mean annual temperatures in southern Yukon of approximately the same magnitude as those in the Gulf of St. Lawrence region of the Atlantic Coast. fully ten degrees of latitude farther south. Here, the cold waters of the Greenland and Labrador currents flow southward along the Atlantic Coast, markedly lowering temperatures and producing weeks of cold rain and fog.

The opposite effects of the Atlantic and Pacific currents explain the fact that maps of temperature isotherms indicate an increasingly steep northwesterly trend from east to west, due allowance being made for the depressing effect of the cold waters of Hudson Bay. It is immediately apparent that the southern boundary of the botanical Arctic Region by no means corresponds with the geographic Arctic Circle except to some degree in the extreme northwest. As is well known, temperature is one of the most important factors in the distribution of plant life, provided such other factors as precipitation, wind velocity, length of daylight, altitude, soil composition, and competition do not exert a 'limiting' effect. The southern boundary of the botanical Arctic, as pointed out previously, is generally regarded as approximately the average of the northern limits of white spruce (*Picea glauca*) and black spruce (*P. mariana*). These lines reflect the northwesterly trend of temperature isotherms in the same latitudes, coinciding roughly with the 50° F. isotherm of mean monthly temperatures. As pointed out by Porsild (1951a), however, "... large parts of the 'barren grounds' are treeless not because of an insufficient summer temperature but more likely because of insufficient precipitation during summer, coupled with high frequency of winds and extreme dryness of the air during winter". A precise correspondence between temperature isotherms and boundaries of biotic regions is not to be expected.

There is also strong evidence that secular or cyclic changes of temperature are still occurring following the Pleistocene epoch and that floristic boundaries have not yet reached a state of equilibrium. Griggs (1934) presents strong evidence that the forest in Alaska is pushing northward into the tundra. He concludes from pollen studies that the advance is a secular one in the nature of recovery from the last era of glaciation during a period of gradual improvement in climate. rather than a cyclic one with the "... unstable forest border slowly swinging back and forth like a pendulum now favored for a few hundred years, now driven back again by adverse conditions ...".

The accompanying map places most of the interior of the Gaspe Peninsula of Quebec in the coniferous Boreal Forest Region, whereas large coastal strips are placed in the Great Lakes–St. Lawrence Forest Region, characterized by such northern hardwoods as