

PHYTOGEOGRAPHICAL REGIONS OF LABRADOR

By I. Hustich*

AS LONG ago as 1913 the great American botanist L. M. Fernald pointed out the necessity of dividing the Labrador peninsula into smaller phytogeographical districts. Except for Halliday's forest classification for the whole of Canada in 1937¹, and the climatic classification of the province of Quebec made by Villeneuve in 1948², no serious attempt has been made in this direction.

In northern Europe the phytogeographical provinces are in most cases administrative units only; their main purpose is to make the floristical statistics easier. In 1922 Linkola,³ however, attempted to divide Finland into regions according to the quality of the soil in these different regions and the same idea was expressed in the forest-economic classification by Cajander, (1925).⁴

Our knowledge of the phytogeographical and forest conditions of Labrador is very limited. We know, however, certain geological and morphological facts, we have scattered notes on the flora in different parts of the peninsula, and several travelers' general observations about flora and fauna. A very preliminary attempt to make a classification is thus possible.

The classification below partly follows Halliday's general forest classification. Some of his sub-regions are simplified and some changed altogether. His main line, the northern limit of the Great Lakes-St. Lawrence mixed hardwood-softwood region, is also used by the author as the southern limit of the boreal coniferous region.

The new phytogeographical classification for Labrador is shown on Fig. 3. The reasons for this classification are the following.

1. The occurrence of a wide belt of sedimentary rocks in the interior of Labrador has important influences on the distribution of plants and forest types.

2. The difference between the *taiga* proper and the *forest tundra* must be observed. (The forest tundra is the northernmost part of the boreal coniferous region where the forest occurs only along rivers, in sheltered valleys and in smaller patches.)

3. The biogeographical difference between the interior and the coastal belt must be recognized.

4. The southern mountain range in Labrador, partly coinciding with the water-divide of the St. Lawrence area, is of importance.

5. The sharp boundary between the Precambrian sedimentary rocks and the Archaean rocks along the east coast of Hudson Bay, as well as

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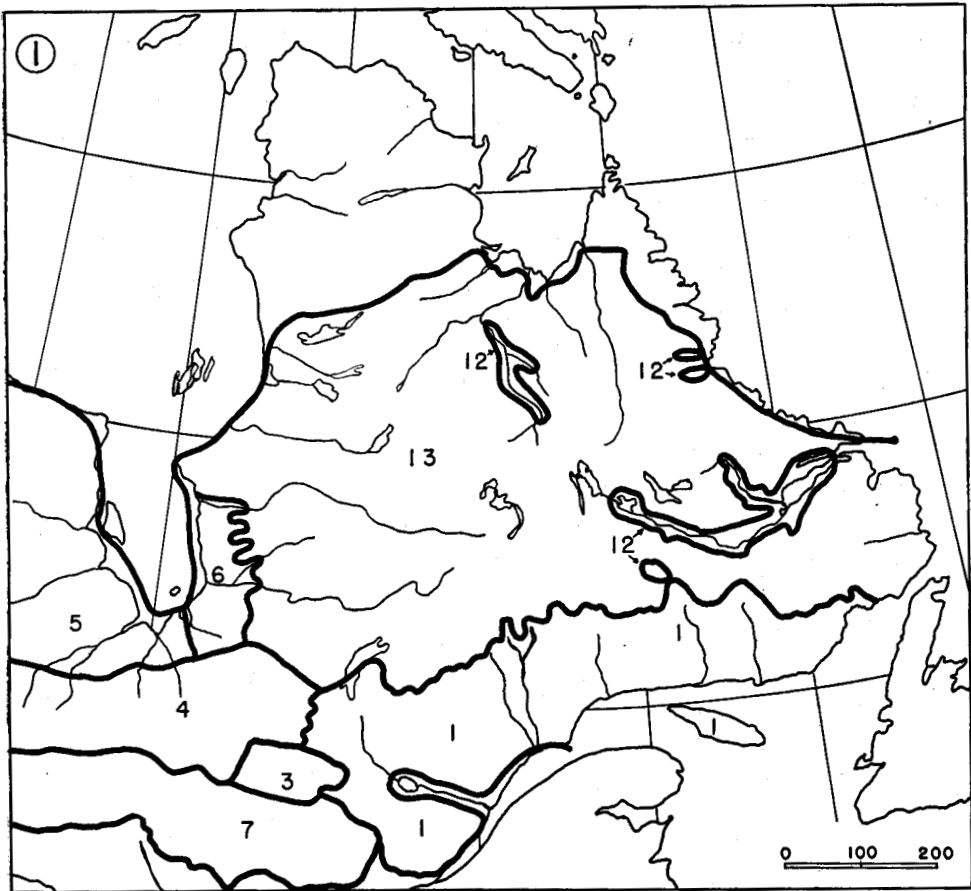


Fig. 1—Halliday's forest classification for eastern Canada (1937). 1= Northern Coniferous Section. 3=Central Laurentian Section. 4= Northern Clay Section. 5=Coastal Plain Section. 6=East James Bay Section. 7=Central Transition Section. 12=Hamilton-Ungava Valleys Section. 13=North-eastern Transition Section of the Boreal Forest Region.

the border line between the Canadian Shield and the Silurian-Devonian area west of Rupert River, is of phytogeographical importance. Furthermore, the Mingan-Anticosti area with its sedimentary rocks must be separated from the Canadian Shield regions.

6. The eastern limit of jack pine is a prominent forest-geographical feature in the interior of Labrador.

A New Classification

The author has based his classification on the features mentioned and divided the Labrador peninsula into 18 sections:

1. *The Transition Section.* The southern limit of this section has already been mentioned. The northern limit coincides with the northernmost localities for solitary white pines, red pines, yellow birches and black ash. Rich coniferous forest types are common but intermingled with poorer types of more northern origin, black spruce muskeg for instance.

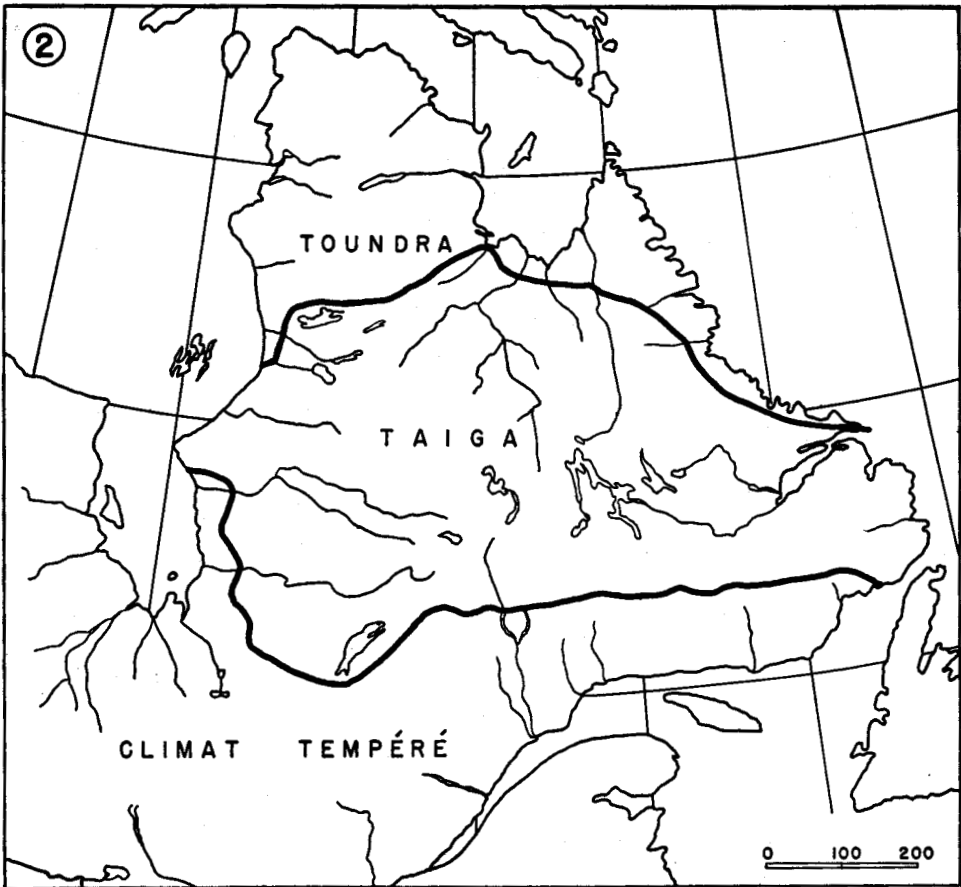


Fig. 2—Villeneuve's climatic classification of Quebec (1948).

2. *The Southern Laurentian Section.* This section coincides partly with Halliday's *Central Laurentian Section* and partly with the western part of his *Northeastern Coniferous Section* where cedar and jack pine still occur. The eastern and northeastern limits of this section coincide with the tree-line of cedar. This section is also a water-divide area, where granite and gneiss predominate. No white or red pine, sugar or red maple, yellow birch or black ash grow here, but rich coniferous forest types occur intermingled with black spruce muskeg, and spruce and jack pine lichen forests of northern type.

3. *The Clay Belt Section.* This agrees more or less with Halliday's *Northern Clay Section*. The difference between sections 2 and 3 is clearly seen in the general occurrence of balsam fir, balsam poplar and white spruce in this area, compared with their scarcity in Section 2. (See Halliday's description of his *Northern Clay Section*, 1937).

4. *The Mistassini Section.* This area of late proterozoic sedimentary rocks has a rich flora due to the strong limestone influence in the soil. Here is the northeasternmost locality for cedar and jack pine.

5. *The Peribonka Section.* Cedar is absent, but jack pine still

occurs, forming the eastern border of this section. Granite-gneiss rocks are dominant. The country is hilly in the southern part and rich coniferous forest types (*Aralia* and *Oxalis* types) are also common here. The northern limit of this section is the water-divide between the James Bay basin and the St. Lawrence.

6. *The North-Shore Section.* No cedar or jack pine is found here, but the coniferous forest types are still fairly rich because of the good drainage in the hilly country. The northern limit of this large section is the water-divide between Hamilton River basin and the St. Lawrence. The rock is of Archaean age, chiefly intrusive rocks.

7. *The Mingan-Anticosti Section.* This section is of no particular importance from a forest-geographical point of view, but extremely interesting botanically because of its rich flora, due to sedimentary rocks of Silurian-Ordovician age. Here many endemic plants occur and the locale has been considered as one of the supposed "nunatak" areas during the latest glaciation in Labrador.

8. *The Western James Bay Section.* The entire section has a sub-arctic appearance, but the sedimentary rocks of Silurian-Devonian, Ordovician and partly Lower Cretaceous age cause a rich flora in the river valleys where many southern plants occur. Of special interest here is the botanically well-known Moose River valley. Many western plants have their easternmost outposts here. While it is more or less avoided by jack pine, cedar has its northernmost localities in the area covered by this classification.

9. *The Eastern James Bay Section.* Here the bedrock is of Archaean age, granite and gneiss, but richly covered with glacio-fluvial material and often clayey sand and below the highest marine limit. This highest marine limit is important, too, for its distribution of forest types, the richest occurring below it (where also, for instance, balsam poplar is common). The eastern limit of this section coincides with the partly-unknown highest marine limit in this part of the Labrador peninsula. Sections 8 and 9 are partly the same as Halliday's corresponding divisions.

10. *The Western Interior Section.* Jack pine has its northernmost localities here, its northeastern limit coinciding with the eastern limit of the area. The country is low, rich in lakes and rivers. Black spruce muskeg and spruce lichen forests are very common, forming a real taiga forest. The northern limit of this section is very approximate; it coincides with the southern limit of the Forest Tundra where granite and gneiss are predominant.

11. *The Eastern Interior Section.* This section is similar to section 10, but jack pine does not grow here. The western limit of the section is the eastern limit of jack pine, and its eastern limit is the brushwood of the Atlantic coast. Granite and gneiss predominate here also and the

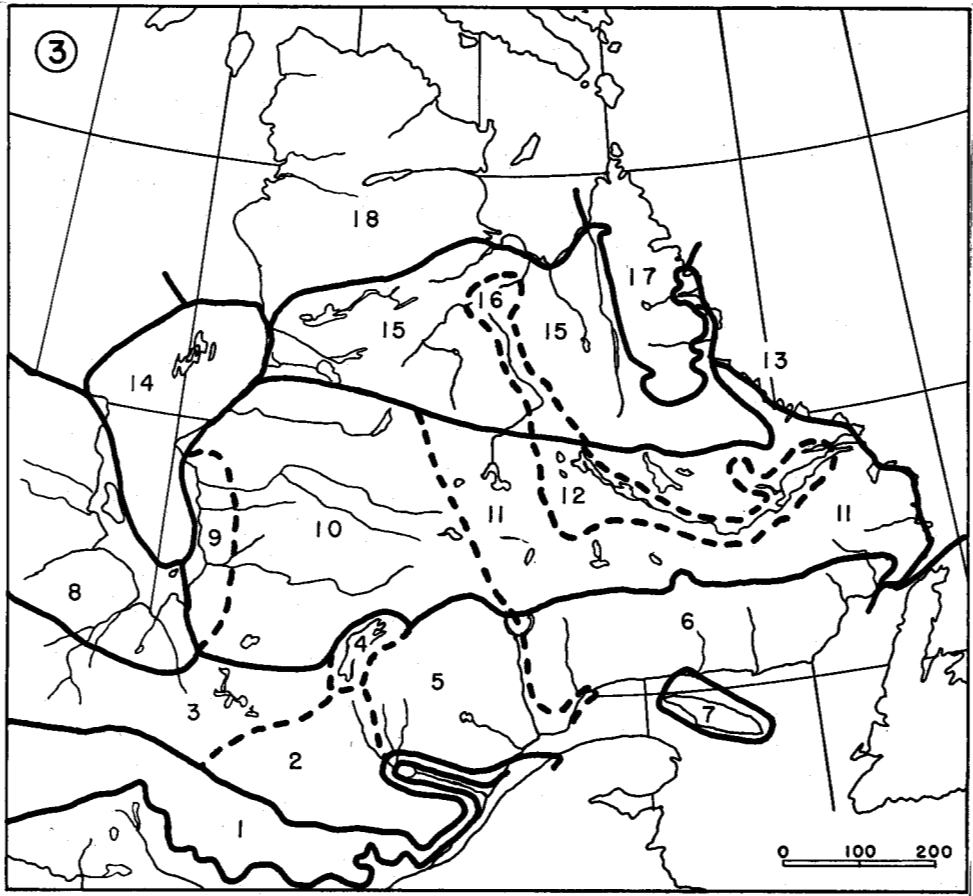


Fig. 3—The author's phytogeographical classification of the Labrador peninsula. The numbers on the map correspond with those used in the text.

section forms, together with 10 and 12, the taiga proper, where black spruce muskeg and spruce lichen forests are the dominant forest types.

12. *The Hamilton River Section.* This section is "isolated" from the surrounding eastern interior section because of its generally richer soil in timber forested valleys. The bedrock is often of sedimentary origin or shows intrusive rocks richer in calcium than the usual Archaean granite-gneiss rock in the interior of Labrador. In the river valleys there are good forest types with white spruce, balsam fir, white birch and balsam poplar; aspen has its northernmost localities here. Several bushes, namely *Brunus pennsylvanica* and *Cornus stolonifera* also have their northernmost localities here. This section is partly the same as Halliday's *Hamilton-Ungava Valleys Section*.

13. *The Atlantic Coastal Section.* The influence of the cold current is clear and arctic types of plants go farther south on this coast than on any other place around the north pole, except Kamchatka. The interior limit is formed by typical Labrador brushwood where no forest of commercial value grows, and most of it is treeless coastal areas and islands.

14. *The Hudson Bay Section.* This section is unimportant from a forest point of view. The eastern limit coincides with the timber-line of the western interior region, but the Precambrian sedimentary rock causes a peculiar flora along the coast as well as on the low Belcher Islands and other islands in Hudson Bay. The treeless Cape Jones area and also Cape Henrietta Maria belong to this section.

15. *The Ungava Forest-Tundra Section.* The author separates the forest-tundra from the taiga proper, as this is necessary at least from a biological point of view. In the forest-tundra the forest occurs only in patches and the whole area is dominated by barren-ground with characteristic plant and animal life. Also, he thinks that when in the future, a forest conservation program has to be worked out for Labrador, the southern limit of areas where no cutting can be allowed, will extend to the southern limit of his *Forest-Tundra Section*. In the Ungava forest-tundra there is no jack pine, no aspen and practically no balsam fir, white birch or balsam poplar; the bedrock is dominated by granite-gneiss, and the forest by poor northern types.

16. *The Koksoak Forest-Tundra Section.* This area is "isolated" from the surrounding and poorer Ungava forest-tundra for the same reason as the *Hamilton River Section* was isolated from the eastern interior. In the Koksoak area Precambrian sedimentary rocks dominate and the flora is rich in the Koksoak valley. Here also balsam fir, balsam poplar and white birch are fairly common and the forest is of richer types than in the surrounding country.

17. *The Torngat Section.* This is a true arctic treeless section which during the latest glaciation, according to some authors, was a "nunatak" area. It has high, rugged mountains with an arctic-alpine type of flora.

18. *The Arctic Ungava Section.* This section is also truly arctic with rolling barren-ground, but without the high mountain peaks which give the Torngat its characteristic features.

Of the 18 sections mentioned here, (*see Fig. 3*), numbers 7, 13, 14, 17 and 18 do not belong to "Forest-Labrador", numbers 15 and 16 form the Forest-Tundra, and numbers 9 through 12 the Labrador Taiga proper. Numbers 2 through 6 form the Southern Boreal Coniferous Zone, of which the transition into the Great Lakes-St. Lawrence mixed hardwood-softwood formation takes place in section 1. Section 8 belongs to the Central-Canadian Taiga, (*see Fig. 4*).

The difference between Halliday's classification of 1935 and this classification can be seen when comparing *Figs. 1* and *3*. The main difference is the separation of the coastal areas with different edaphic charac-

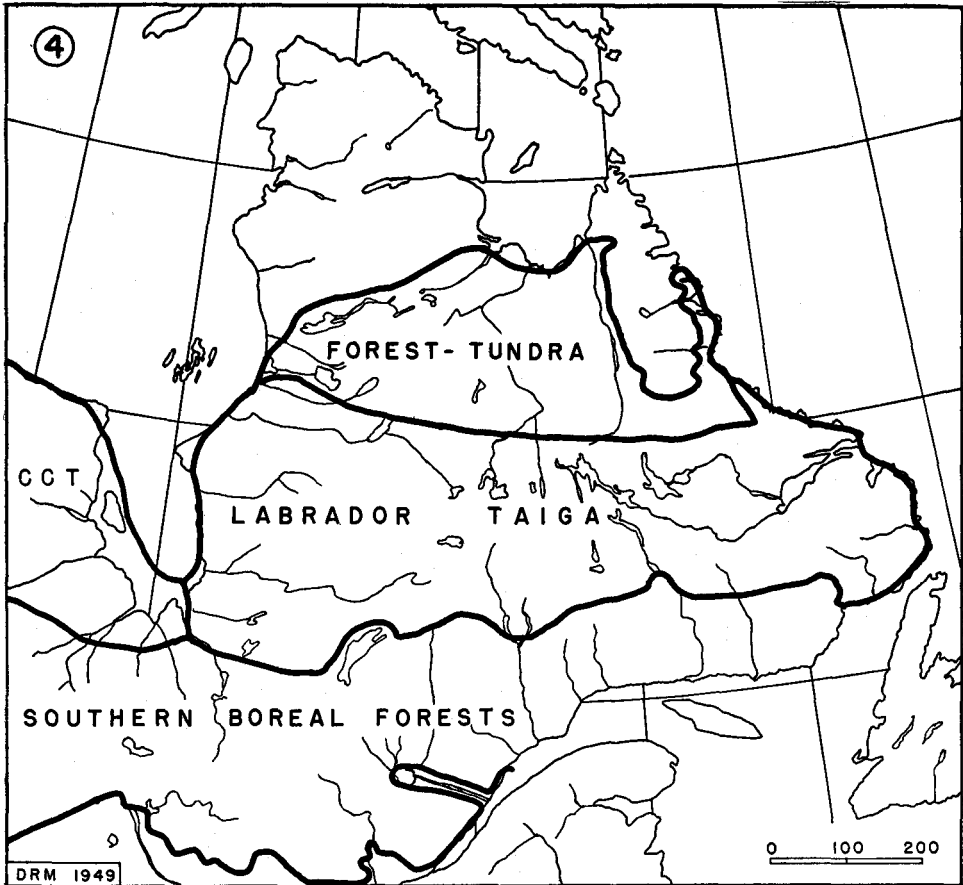


Fig. 4—The main forest regions in Labrador. (CCT=The Central Canadian Taiga.)

teristics and especially the consideration of the difference between the taiga proper and the forest-tundra.

In working out this classification, which the author hopes will be of some interest to all field biologists who have worked in the Labrador area, the literature available has been used, as has correspondence with some scientists. The author's own experience of the area is as follows: The Finland-Labrador expedition in 1937 along the Atlantic coast of Labrador with short trips inland; in 1946, excursions to the southwesternmost part of Labrador, including James Bay (Moose River); in 1947, the Canadian-Finnish Hudson Bay East Coast expedition; excursions in 1948 north of the St. John's area and into the interior of Labrador on the central water-divide near Knob Lake.

¹Halliday, W. E. D. A forest classification for Canada. *Forest Service Bull.*, Canadian Dept. of Mines and Resources. Ottawa, 1937, p. 89.

²Villeneuve, G. Oscar. Aperçu climatique du Quebec. *Bureau de Météorologie Bull.*, Quebec, 1948, p. 10.

³Linkola, K. Zur Kenntnis der Verteilung der landwirtschaftlichen Siedlungen auf die Böden verschiedener Waldtypen in Finnland. *Acta Forestalia Fennica*, Helsinki, 1922, p. 22.

⁴Cajander, E. K. Forstlich-geographische Übersicht Finnlands. *Acta Forestalia Fennica*, Helsinki, 1925, p. 25.