V. Types of Arctic Climates

As we move southwards through the Arctic the daily temperature fluctuations increase in amplitude (Figs. 117, 118), a fact that is of considerable biological importance, especially with respect to decomposition. In addition, just as in tropical and temperate climates, we can distinguish between two continuously connected extremes of climate: the dry arctic climate (continental arctic climate) on the one hand, and the wet arctic (oceanic arctic) on the other. What does this mean?

If large quantities of precipitation fall during the long arctic winter the snow cannot melt in the short cool arctic summer and a continual blanket of snow and ice results. Further, solar radiation is reflected instead of being absorbed by the soil, and thus a regulatory circuit with positive feedback is established, the mean temperature drops and a situation results in which active life is impossible. At the other extreme, where precipitation is entirely lacking, the biological end result is the same. In the absence of both snow and ice the dark ground can absorb heat throughout the summer and can become quite warm. Despite this, life in this theoretical type of climate is also impossible because there is no water. However, only the former of these two extremes has developed, and the latter exists only in a

![Daily temperature pattern at the end of June in Canada](image117.png)

Fig. 117. Daily temperature pattern at the end of June in Canada. The diurnal fluctuations become much larger towards the south.
Fig. 118. Annual temperature pattern recorded on Spitsbergen and in Alaska. In each case recordings were made at an arctic station near to and strongly influenced by land, and at another under strong oceanic influence. The marine station clearly has fewer low winter and fewer high summer values.

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mitigated form. Apparently the presence of a perpetual ice covering is often not so much a question of prevailing temperature as one of quantity of precipitation. If we consider a section passing through Norway, far south of the Arctic at approximately the latitude of Bergen (60°N), where the coastal regions receive large amounts of precipitation, we find very large glaciers at low altitudes, as well as the vast arctic-like region known as Hardangervidda. Further east there is less precipitation, snowline and treeline are much higher and the Dovre-Fjell gives a less arctic impression than the Hardangervidda. Climatologists are agreed that larger amounts of precipitation on Spitsbergen would result in complete glaciation. This would apply equally to the islands of the Canadian Archipelago and to Peary Land in the north of Greenland. Such dry regions are of course supplied with water from surrounding areas during the summer, and are never completely without water. Life can develop because they are relatively warm in summer. Similar regions form oases in the inland ice in the Antarctic as well.

The situation is represented schematically in Fig. 119. Dry arctic climates are characterized by severe winters and warm summers, whereas the wet arctic type of