V  
Zonobiome of the Warm-Temperate Humid Climate

1. General

Zonobiome V cannot be sharply delineated since it is a transitional zone between the tropical-subtropical and the typical temperate regions, although too large to be considered an ecotone. Two subzonobiomes can be distinguished:

1. A very humid subzonobiome with rainfall at all times of year or with a minimum in the cool season. The principal vegetational period, which is invariably wet, is oppressive due to high temperatures. The regions involved lie on the eastern sides of the continents between latitudes 30° and 35° in both the Northern and Southern Hemisphere and are influenced by trade and monsoon winds. Temperatures drop quite severely in the cool season, and there may even be frost, but there is no cold season. Nevertheless, the vegetation spends the winter in a resting state.

2. A subzonobiome with rainfall occurring principally in winter and no summer-drought season. This region lies along the western seaboard of the continents, nearer to the poles than the first, adjoining the wet subzonobiome of ZB IV with winter rain.

In North America, the subzonobiome with winter rain stretches along the coastal regions from northern California to southern Canada. It is the zone of the Sequoia sempervirens forests, which can attain a height of 100 m. Farther north, this vegetation is succeeded by forests with Tsuga heterophylla, Thuja plicata, and Pseudotsuga menziesii (Fig. 102). Prunus laurocerasus, Rhododendron ponticum, and Araucaria excelsa flourish in gardens, thereby indicating mild winters. Still farther north, the temperature gradually drops, the climate becomes wetter, and diurnal and annual fluctuations in temperature are small. The maritime, frost-sensitive sitka spruce becomes predominant. The zone extends along a meridian up to the subarctic in Alaska, but regions corresponding to ZB VI or ZB VIII are barely recognizable. It is an extremely humid, maritime ecotone in which land cultivation is impracticable and the population is therefore sparse.

Studies based on the International Biological Program (IPB) have been carried out to examine these probably most productive coniferous forests in the world, especially the Douglas fir ecosystems (Pseudotsuga). A volume containing 11 contributions on the preliminary results obtained from studies in the years 1971–1978 has been published (Edmonds 1982), although the actual summary of these results has not yet appeared.
An analogous situation is found in southern Chile. The subzonobiome with winter rainfall but no summer drought corresponds to the luxuriant Valdivian evergreen rain forests previously mentioned (p. 172). The Magellan forest, which continues to the south with both evergreen and deciduous *Nothofagus* species and well-developed moors, constitutes the transitional zone to the subantarctic Fireland and the islands.

The tall, frost-sensitive coniferous species of the Pacific coast of North America are wholly lacking in western Europe, where they died out during the glacial periods of the Pleistocene. The nearest counterparts to this subzonobiome in Europe are the heath formations on the coasts of northern Spain and southwestern France (Landes). The humid transitional zone is as split up as the coasts of Western Europe. It comprises Wales, western Scotland, and the island groups, including subarctic Iceland and the wettest parts of the Norwegian west coast with the Lofoten Islands, and extends to the arctic. Heather moors with birch and willow are the predominant form of vegetation at the present time (p. 190).

The southwest tip of Australia with winter rains and no summer drought (Karri forest, p. 176) also belongs to this subzonobiome. An extremely perhumid zone, however, consisting solely of Tasmania (with small *Eucalyptus* species and moors) and the southwest portion of the South Island of New Zealand, with Stewart Island, constitutes the transition to the subantarctic islands.

A completely isolated region belonging to this subzonobiome is found in northern Anatolia with Colchic forests in which *Rhododendron ponticum* and *Prunus laurocerasus* are native. These are offshoots of the luxuriant forests of

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**Fig. 102.** Damp, oceanic coniferous forest with *Pseudotsuga menziesii*, *Tsuga heterophylla*, and *Thuja plicata* on the Hoh River (Olympic National Park). (Cf. climate diagram of Vancouver, Fig. 93). (Photo H. Walter)