

scarcity of annuals in the prairie flora, as well as of weeds, except in disturbed areas. Under present climatic conditions, grassland and parkland appear to be in a state of balanced tension, their dividing line advancing or retreating in conformity with climatic cycles of varying duration. Groves of aspen stretch throughout the prairies along the margins of rivers and streams, and Bird (1961—*Ecology of the Aspen Parkland of Western Canada*) expresses the opinion that, where there is sufficient moisture and fires are not too frequent, the parkland is slowly replacing the prairie in the south and is itself being replaced by spruce along its northern front. It is interesting to note the occurrence of a relict spruce community in the Spruce Woods Forest Reserve south of Brandon, where isolated thickets and clumps of white spruce (*Picea glauca*), associated with creeping juniper (*Juniperus horizontalis*), are scattered throughout an area of typical prairie vegetation.

There appears to be no consistent correlation between local prairie communities and local soil types, except to the extent that the plants themselves have contributed to soil differentiation. Where both forest and prairie vegetation have developed on the original glacial till, the soil under the latter is more fertile by reason of the influence of the prairie vegetation itself and of the more arid climate to which the prairie species are adapted. In the forest, humus accumulates and mostly decays on the soil surface, whereas the numerous roots and rootstocks of prairie species add humus more generally throughout the soil profile, with consequent improvement in water-retaining properties, soil aeration, soil temperature, content of nitrogen-fixing bacteria and fungi, and ease of root penetration.

The arid nature of the upland prairie habitat finds expression in various xerophytic adaptations of the plants. The almost complete occupation of the various soil levels by the root systems of different species has already been noted. This points to a fine adjustment between species, so that considerable changes in their relative abundance are unlikely. Species such as june-grass (*Koeleria cristata*), with a shallow, widespreading root system, are able to use the moisture of the many light showers whose water does not soak in deeply, while deep-rooted species, such as ground-plum (*Astragalus caryocarpus*) and Indian turnip (*Psoralea esculenta*), can reach the more reliable water supply of greater depths. The enlarged root of the latter also serves as an organ of water storage, as does the stem of the purple cactus (*Mamillaria vivipara*) of the sand-dune habitat. Low stature, with attendant decrease of exposure to drying winds, is characteristic, few upland species exceeding a height of one or two feet. Species having small or narrow leaves are common, the lower leaves often being shed during periods of drought.

It may be noted here that the only western tree species that reaches the Prairie Provinces is the lodgepole pine (*Pinus contorta* var. *latifolia*), which occurs, as an outlier from its main area, on the Cypress Hills of southwestern Saskatchewan.

A typical prairie flora (representative, also, of the typical ground covering of the aspen parklands) commonly includes such species as the following, many of which belong to the Grass (*Gramineae*), Sedge (*Cyperaceae*), Rose (*Rosaceae*), Pulse (*Leguminosae*) and Composite (*Compositae*) Families: feathergrasses (*Stipa*), oat-grass (*Helictotrichon hookeri*), grama-grasses (*Bouteloua*), cord-grass (*Spartina gracilis*), wild rye (*Elymus macounii*), meadow-grasses (*Poa*), june-grass (*Koeleria cristata*), sedges (*Carex*), wild onions (*Allium*), stargrass (*Hypoxis hirsuta*), pasque-flower (*Pulsatilla ludoviciana*), prairie-buttercup (*Ranunculus rhomboideus*), thimbleweed (*Anemone cylindrica*), cut-leaved anemone (*A. multifida*), bladder-pods (*Lesquerella*), stinking-clover (*Cleome serrulata*), alumroot (*Heuchera richardsonii*), cinquefoils (*Potentilla*), torch avens (*Geum triflorum*), chamaerhodos (*Chamaerhodos nuttallii*), milk-vetches (*Astragalus*), loco-weeds (*Oxytropis*), wild licorice (*Glycyrrhiza lepidota*), hedysarum (*Hedysarum alpinum*), prairie-trefoil (*Lotus americanus*), prairie-clovers (*Petalostemum*), Indian bread-root (*Psoralea esculenta*), golden bean (*Thermopsis rhombifolia*), leadplant (*Amorpha canescens*), fragrant false indigo (*A. nana*), wild flaxes (*Linum*), larkspur violet (*Viola pedatifida*), silverberry (*Elaeagnus commutata*), evening primroses (*Oenothera nuttallii* and *serrulata*), prairie-parsleys (*Lomatium*), golden alexanders (*Zizia aurea*), milkweeds (*Asclepias ovalifolia*, *speciosa*, and *viridiflora*), marble-seeds (*Onosmodium*), puccoons (*Lithospermum*), blue giant hyssop (*Agastache foeniculum*),