

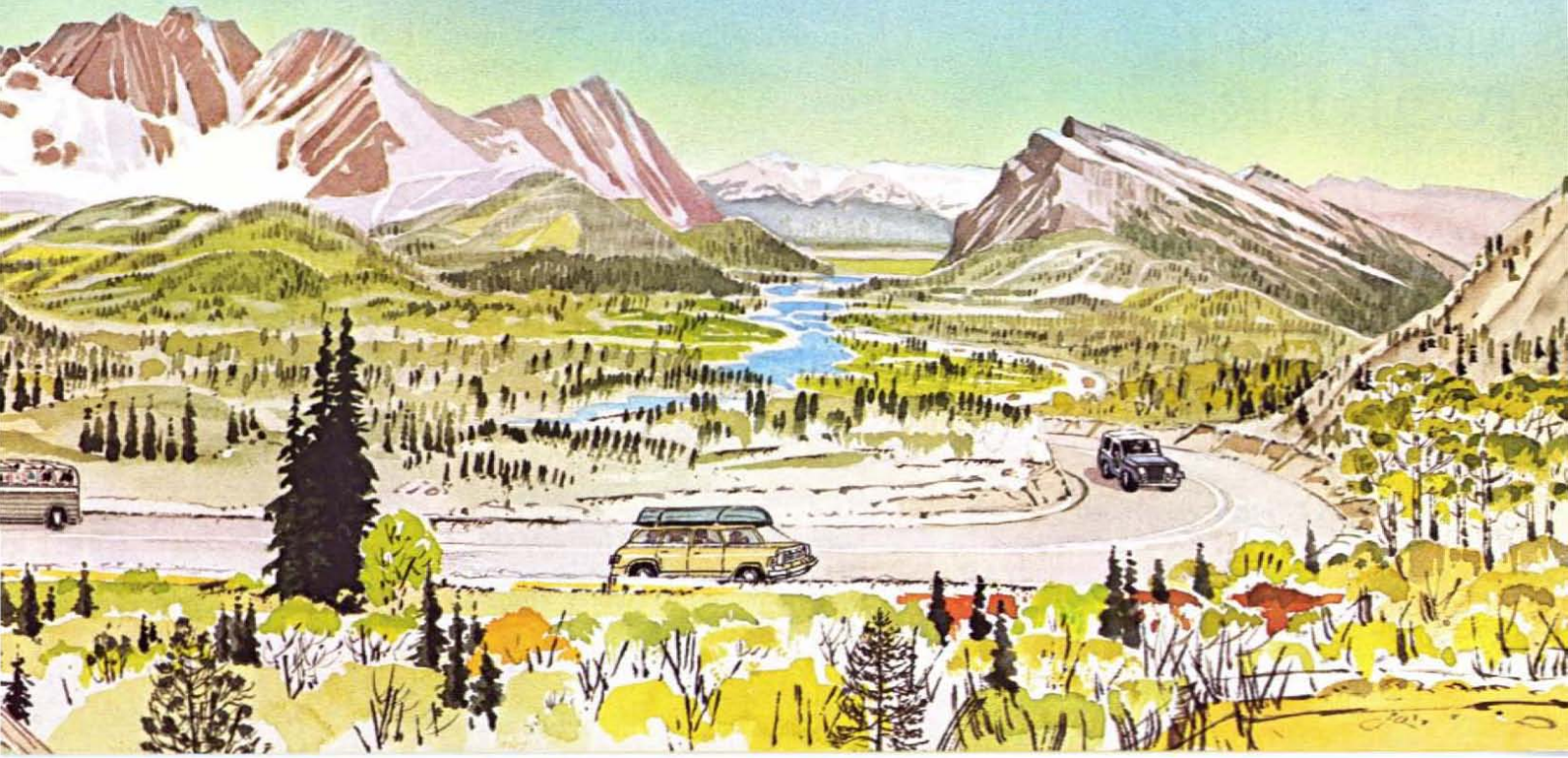


# ECOTOUR<sup>®</sup>

of the Trans-Canada Highway

## CALGARY-GOLDEN

Alberta British Columbia



# INTRODUCTION

This Ecotour is presented by the Canadian Forestry Service to stimulate an interest in landscape ecology. Information is provided on the natural and human history that has shaped the appearance of the countryside along the Trans-Canada Highway. The Rocky Mountain Route described in this publication extends from near the western limits of the Great Plains and adjacent Foothills Region of Alberta across the majestic Rocky Mountains into eastern British Columbia.

## ABOUT THIS ECOTOUR

This publication encompasses the 170-mile (270-km) portion of the Trans-Canada Highway between Calgary, Alberta and Golden, British Columbia. The highway traverses six major ecological zones (ecozones): Grasslands, Foothills, Montane East, Subalpine East, Subalpine West and Montane West. Recognition of these ecozones is based on the nature of forest, wildlife, geology, altitude, weather and human activity.

Along the Calgary-Golden route differences in altitude and aspect determine vegetation types which in turn support specific forms of animal life, e.g. gophers and elk inhabit the grassland areas while mountain goats and mountain sheep prefer the mountains.

Within each ecozone, averaging 25-35 miles (40-56 km) in length, more detailed information is presented on specific sites along the way to illustrate points of ecological or historical interest. Maps and sketches are used to portray certain ecological features, e.g. the inter-relationships of plants and animals with their environment.

Interesting side trips from the Trans-Canada Highway and other major routes are shown should you desire to leave the Ecotour route. In the text and particularly on the flash maps describing each ecozone your attention is drawn to additional points of interest. For more detailed background information a short list of suggested readings is given on the back cover.

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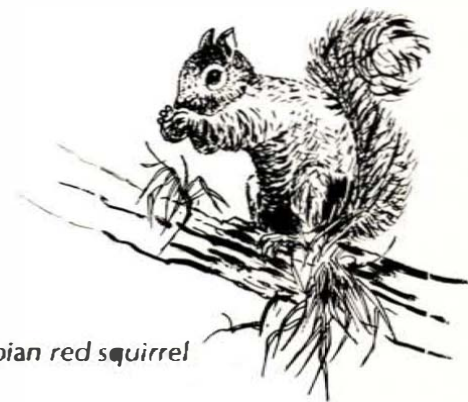
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*Columbian red squirrel*

# GRASSLANDS

The prairie landscape portion of the Ecotour extends approximately 20 miles (32 km) west from Calgary, 3,439 feet (1048 km) above sea level (a.s.l.), to the Cochrane-Bragg Creek overpass near the junction of Highway #22. Natural vegetation en route is primarily grasses, although scattered willows and aspen clumps may be found on coulee banks and along streams.

The native grasses of the prairie, although not readily identifiable from an automobile, consist of rough fescue, blue grama and little bluestem. Grasses grow better than trees in this area because of the dry conditions due to low rainfall and strong winds. Most of this native prairie is now planted to cereal crops, principally feed grains (oats and barley) or

winter feed crops for livestock, such as alfalfa and brome grass mixtures.

Before agriculture in the late 19th century, wide-swept prairie fires greatly curtailed the establishment of trees and shrubs but enhanced the growth of grasses.

Trees that escaped the fires provided Indians and early settlers with shelter as well as a source of fuel for winter warmth. Animals such as mule deer, elk, bison, wolves and prairie chicken favoured these sparsely treed habitats, though the bison and elk ranged far out into the grasslands for food.

Over 100 years ago great numbers of these animals roamed throughout the grasslands. Today, however, the bison are gone and populations of other species have been depleted, with one notable exception, the

Richardson's ground squirrel or gopher which is the buff-coloured rodent that frolics about the highway during the summer.

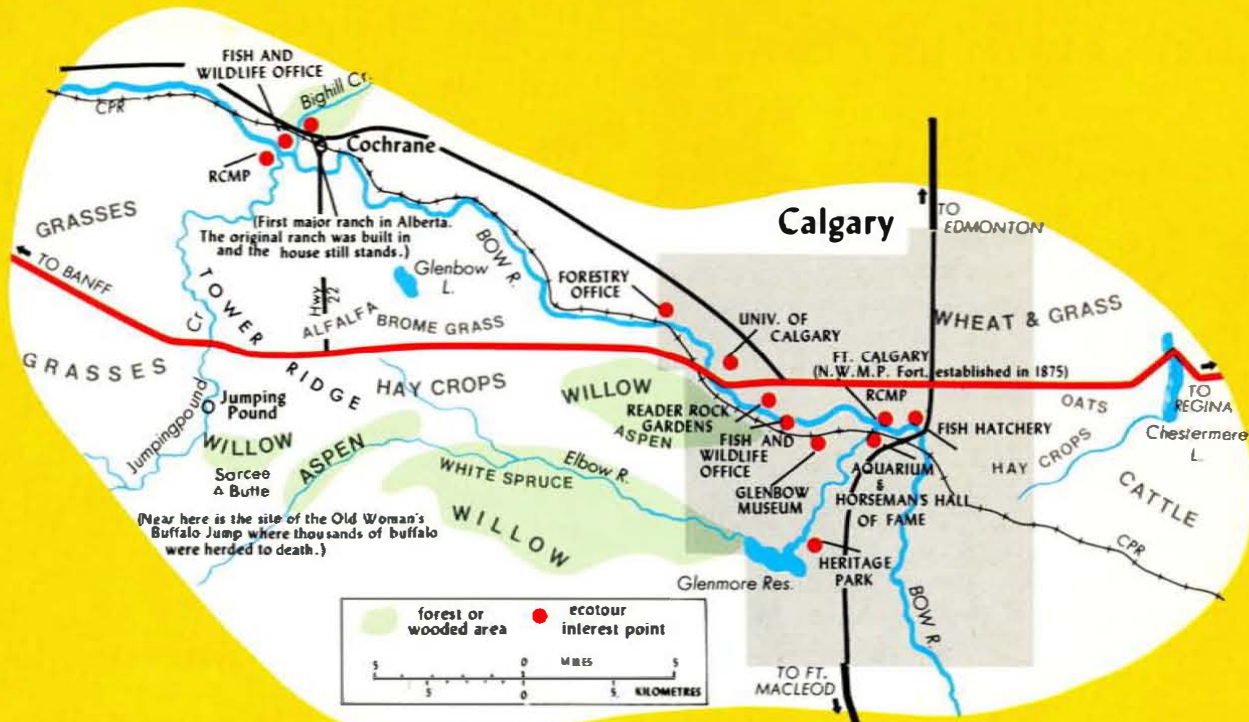
During the pre-settlement period, blackbilled magpies and bison were closely associated. When the bison disappeared, magpies also declined, only to increase dramatically when cattle were introduced to these ranges. These medium-sized, black and white birds with long black tails are predators on other birds and regularly scavenge small animals killed on roads.

Trembling aspen is the major tree species in this prairie ecozone, found abundantly on hillsides, immediately west of Calgary. These fast-growing, short-lived trees, belonging to the poplar family, occur in dense patches (bluffs) and are occasionally associated with



willows. Frequently poplar bluffs are windlashed, often clinging to slough banks, hillsides and stream courses. Many aspen trees visible from this portion of the highway exhibit a stunted, rounded appearance that is typical of most trees growing under exposed conditions.

The best known Alberta wind, the Chinook, has great impact on the land, particularly in the southwestern portion of the province. Primarily a winter phenomenon, it brings moderating temperatures. The Chinook arch, the typical cloud pattern in the western sky, heralds the arrival of the warm Chinook. It results in a dramatic rise in temperature, sometimes from  $-35^{\circ}\text{C}$  to  $0^{\circ}\text{C}$  within a 12-hour period. These warm and dry winds rapidly melt snow from the grasslands, providing winter grazing for wild game and since the 1880's for domestic livestock. The Chinook enables cattlemen to free-range their livestock on the open range for 9 out of 10 years.



Magpie

DRIVE SAFELY!

Blue Grama Rough Fescue Little Bluestem

Barley

Oats

Alfalfa

# FOOTHILLS

This ecozone, the aspen grove region, is a transition from grassland in the drier area at lower elevations to forest in the cool and moist higher elevations. Subtle changes appear as prairie grasses give way to shrubs and trees: note individual white spruce growing amidst clumps of dwarf trembling aspen, shrubby cinquefoil bushes and willow. White spruce also occur along streams and rivers.

The most common tree in the foothills is trembling aspen, recognized by its white bark and light green leaves. The name trembling aspen originates from the gentle fluttering action of the leaves in even the slightest breeze. In autumn, this tree bedecks the countryside with bright striking colors ranging from ochre reds to flaming yellows. In some Indian languages the name is translated to mean woman's tongue or noisy leaf. On good sites this tree may exceed 60 feet (18 m) in height. Well-established stands of aspen occupy the banks of the Jumpingpound Creek.

This is named from the former Indian hunting practice of driving bison over the steep river banks to their death below.

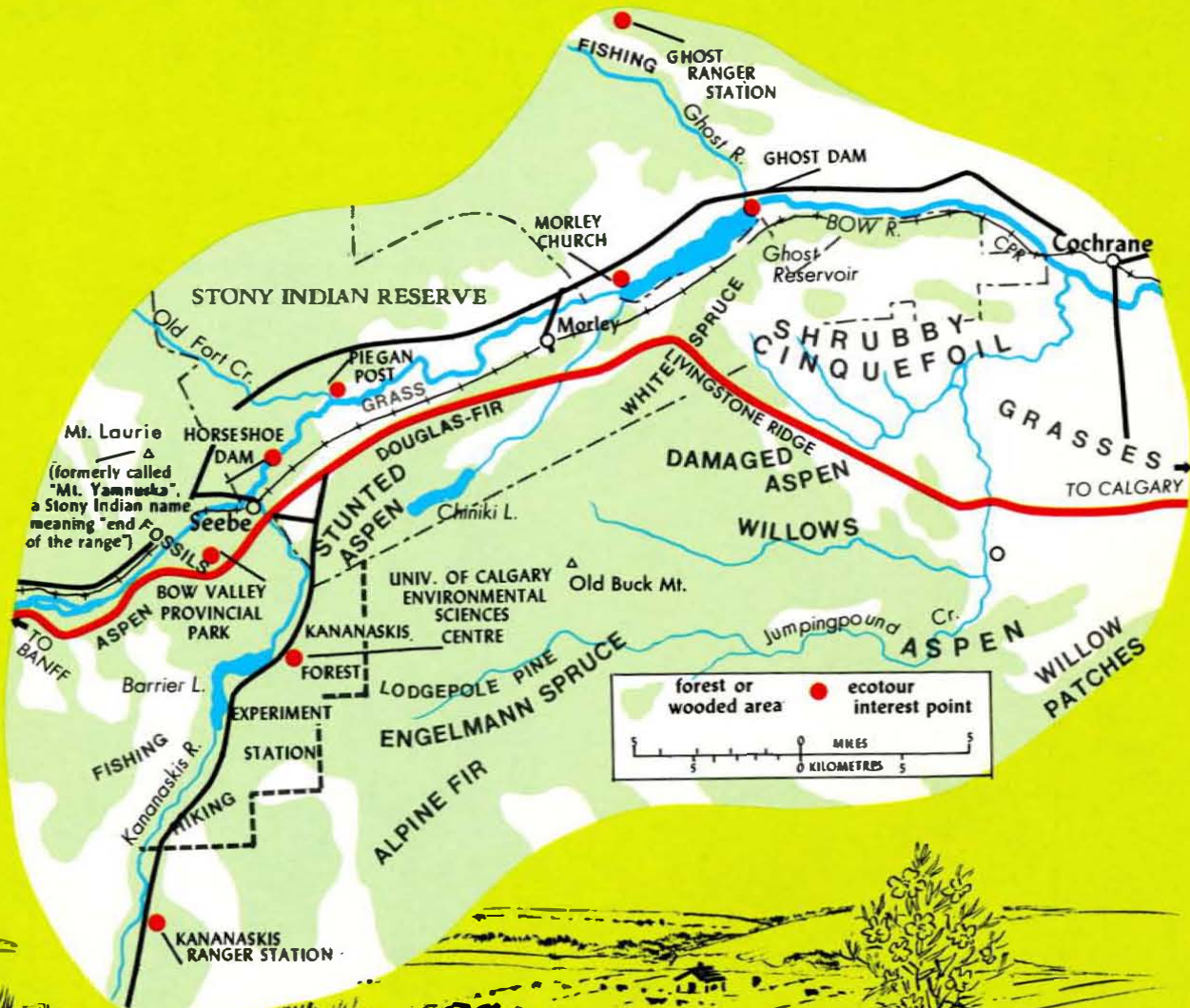
Note as you travel west that the ridges running at almost right angles to the road become more and more pronounced. These ridges, the upturned edges of more resistant rock layers, culminate in a large timbered ridge (Livingstone Ridge) approximately 30 miles (48 km) west of Calgary. A service station on the north side of the highway is located at the hill crest. This is the eastern boundary of the Stony Indian Reservation. To the east of Livingstone Ridge, the rolling foothills and grasslands stretch to the distant horizons.

The forest on this ridge top is composed of white spruce, trembling aspen and some limber pine. The west-facing slopes are covered primarily with white spruce and an occasional Douglas-fir. Note the uniform coneshaped crown of white spruce. This tree, one of Canada's major commercial species, is used extensively for lumber and pulpwood. In earlier times, explorers and Indians utilized white spruce roots for lacing the birch bark on their canoes.

Westward from the crest of the Ridge is the sweeping descent into the wide, flat Bow Valley, with a splendid unfolding panorama of the majestic Front Range of the Rocky Mountains. High, rounded foothills nestle at the foot of these sharply uplifted and folded rock formations. This front range and its escarpments were uplifted 69 million years ago. The Stony Indians have lived among these valleys, foothills and mountains for 200 years. Fur traders of the North West Company and the Hudson's Bay Company passed through this area during the early 19th century and in 1873 John McDougall established a Methodist mission at Morley, where the 1875 church still stands. Today, cattle ranching constitutes a major component of Alberta's agriculture.



Kananaskis Forest Experiment Station, established 40 years ago as a research and demonstration area for the Canadian Forestry Service is located 5 miles (8 km) south on the Kananaskis Road (Highway 40). The station served as a relief camp during the Depression of the 1930's and a site for the National Forestry Program of the late 1930's. During World War II, the Kananaskis Station became an internment camp for civilian aliens and later, a camp for German prisoners of war. Now the Canadian Forestry Service maintains the station for basic and applied forest research related to the east slopes of the Rockies. A Public Awareness Program is open to visitors during the summer months. Also located at this station is the University of Calgary's Environmental Sciences Centre.



Indian Reserve

Shrubby Cinquefoil

# MONTANE EAST

This Montane ecozone stretches from Seebe to Banff. Douglas-fir and lodgepole pine are the prominent trees in this area.

Millions of years ago horizontal sediments were lifted up, folded and pushed over to form the Rocky Mountains. Note the steep eastern sides and more gradual western slopes, e.g. Mt. Rundle. Starting about 1 to 3 million years ago and ending about 10,000 years ago, massive glaciation has modified the rivercut valleys and slopes. Immense valley glaciers in the past gouged or carved river valleys to the characteristic U-shaped cross sections. The Bow River flows in such a trough.

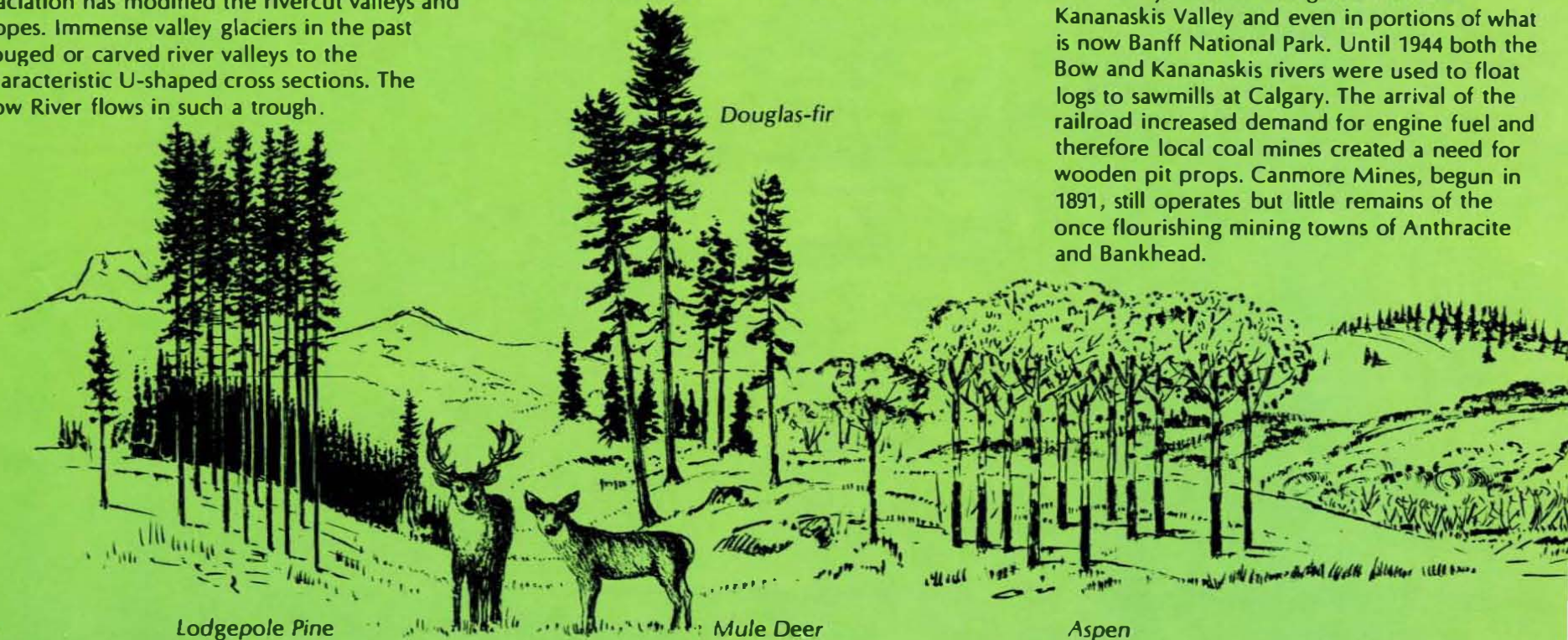
Along the broad avenue of lofty peaks east of Banff, the landscape is dominated by the evergreen forests of lodgepole pine, white spruce and some Douglas-fir. In the vicinity of the east gate of Banff National Park, the forest is typically Montane with these evergreen trees and trembling aspen generally prevalent between 4,000 and 5,000 feet (1200-1500 m) elevation.

Also near the east gate of the Park the trembling aspen have many old gray-black scars on the lower trunks. These marks are the

result of browsing by elk in severe winters when food was scarce.

Lodgepole pine is a pioneer species, one of the first to establish itself after fire. Heat is necessary to liberate seeds lodged in its insulated cones. After 70-100 years other trees such as spruce replace the pine. Indians boiled the inner bark of lodgepole pine for food and also made teepee poles from this tree, hence the name "lodge" pole.

Since 1883, loggers have harvested almost all of the readily accessible large trees in the Kananaskis Valley and even in portions of what is now Banff National Park. Until 1944 both the Bow and Kananaskis rivers were used to float logs to sawmills at Calgary. The arrival of the railroad increased demand for engine fuel and therefore local coal mines created a need for wooden pit props. Canmore Mines, begun in 1891, still operates but little remains of the once flourishing mining towns of Anthracite and Bankhead.





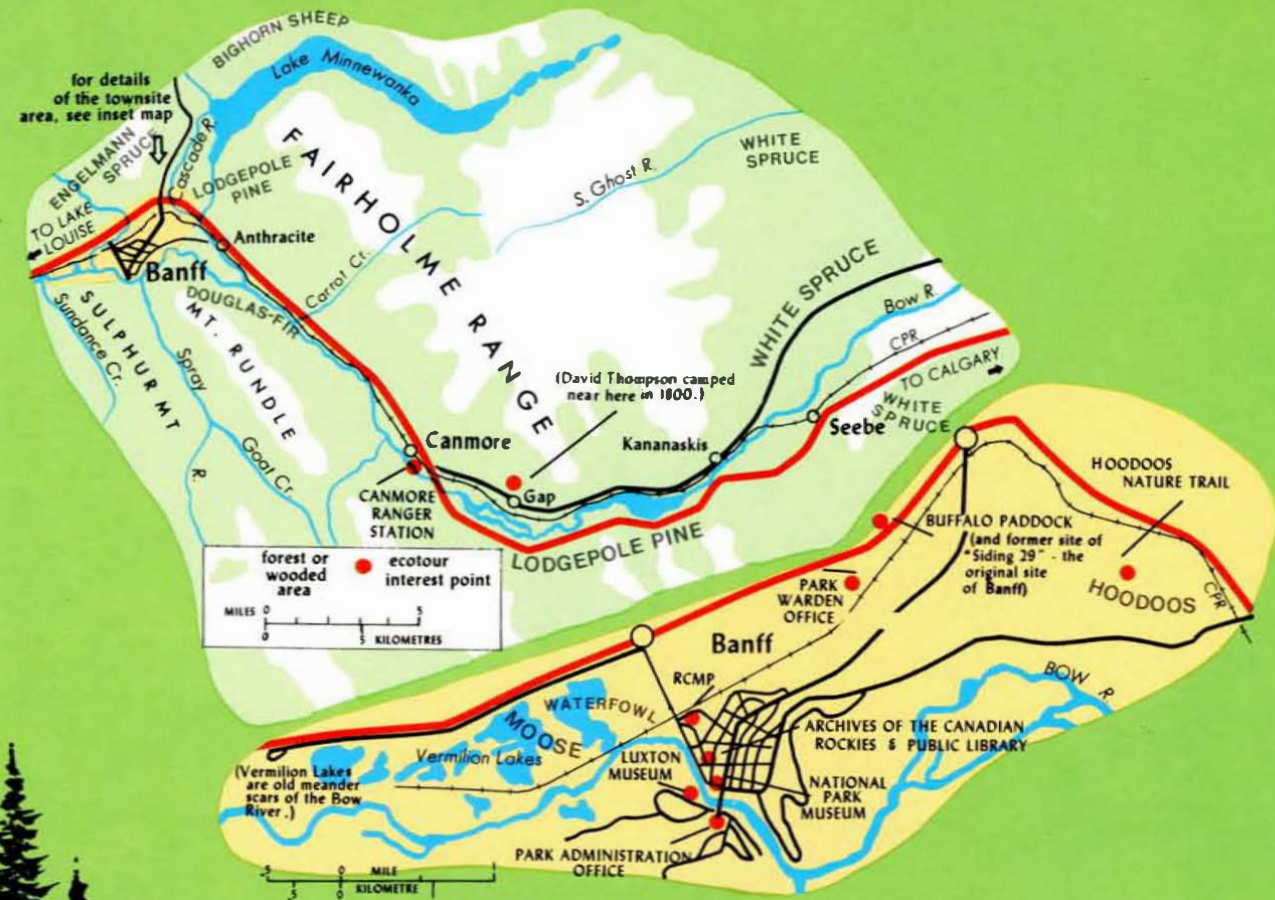


Hoodoos

West of Banff National Park's east gate are large clay "toadstool" structures, the Hoodoos. Soil and rock underlying this area vary in their resistance to erosion by wind and water. Harder upper layers resist erosion while softer lower layers wear away and leave a hard protective cap to form a hoodoo. Banff National Park lies immediately west of Canmore where the Bow Valley cuts through massive mountain terrain, composed chiefly of limestones, dolomites and quartzites. In 1883, two railway men discovered mineral hot springs on Sulphur Mountain near Banff. Later in 1885 the government placed a reserve on these springs and an adjacent 10 square miles



Willow and Spruce



(26 km<sup>2</sup>). In 1887 this park reserve was expanded to 260 square miles (673 km<sup>2</sup>) and called Rocky Mountains National Park, Canada's first national park. Additional acreage was added in 1930 and the name changed to Banff National Park. This park now encompasses 2,546 square miles (6641 km<sup>2</sup>), about one-quarter the size of Holland.
















Edmonton

Calgary

WEBER

**LEGEND**

-  Trans-Canada Highway
-  other major roads
-  CPR. mainline
-  Field
-  Mt. Lougheed (10,194')
-  mountain peak (with elevation in feet)
-  VERMILION PASS
-  pass
-  Alberta-British Columbia boundary
-  National Park boundary
-  indian reserve

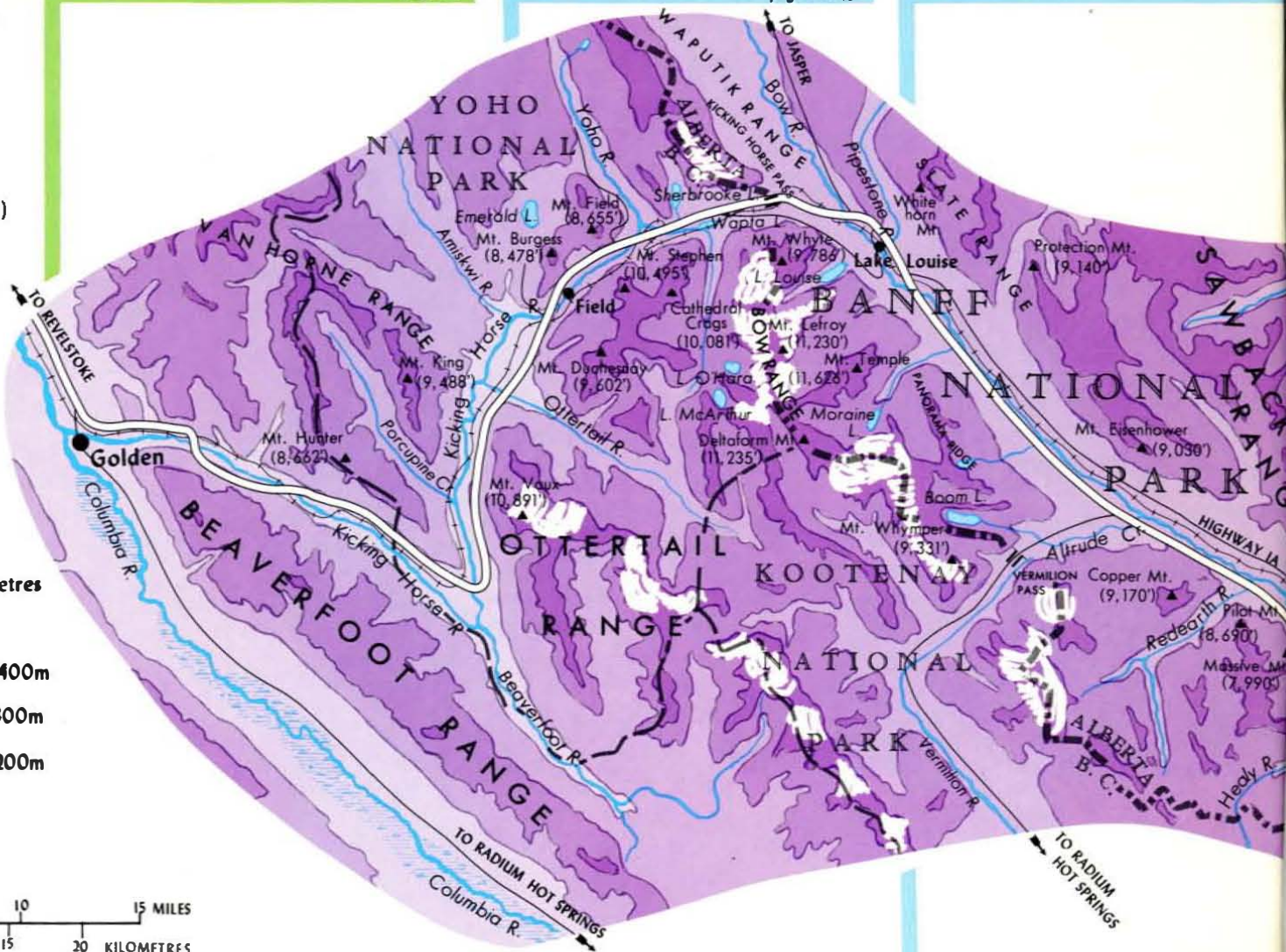
**MONTANE WEST**

page 16

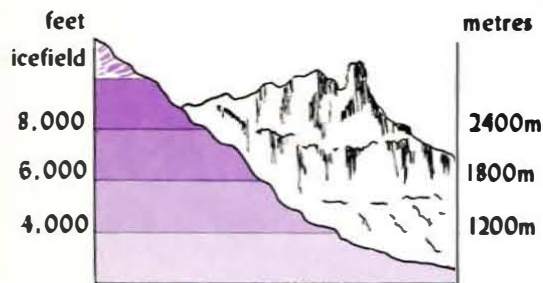
**SUBALPINE WEST**

pages 14-15

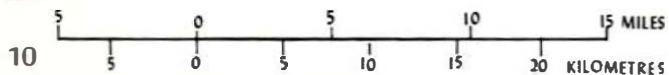
**SUBALPINE EAST**



**ALTITUDE TINTS**



**SCALE**

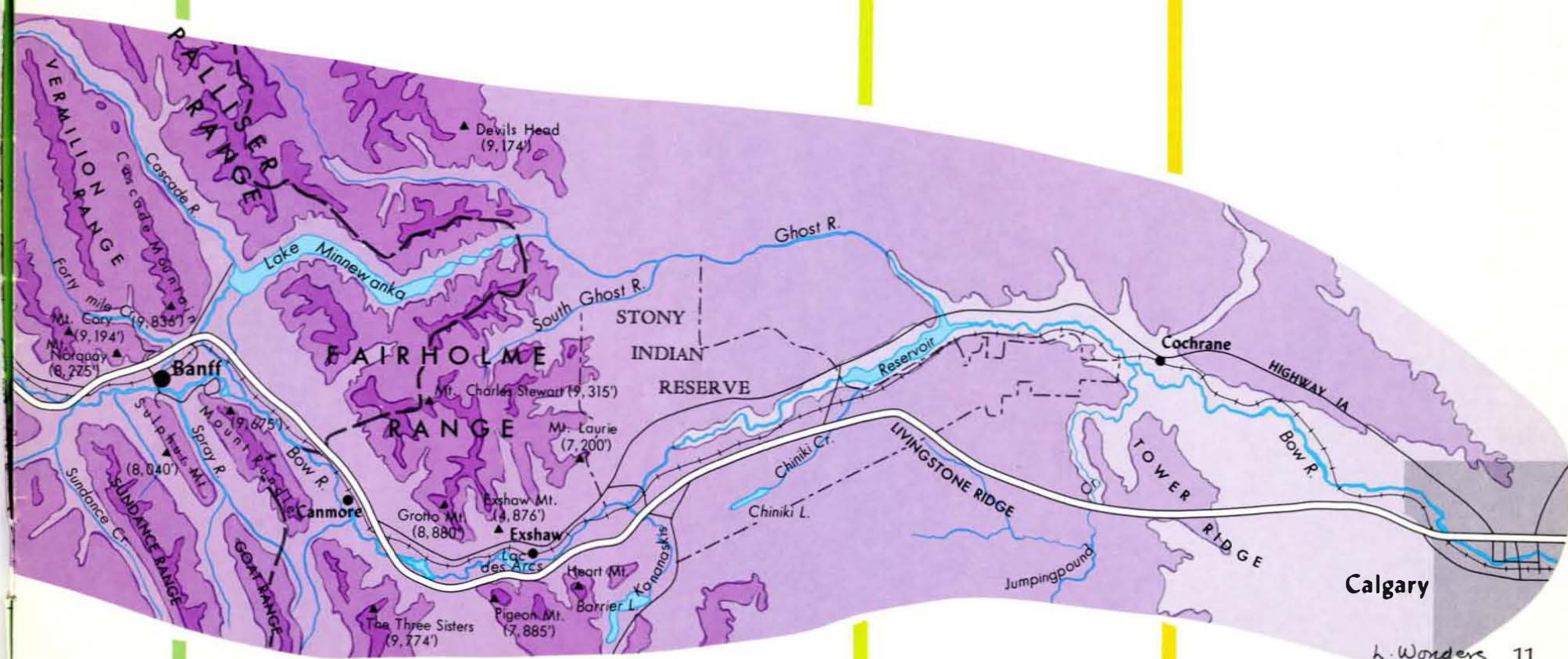


# MONTANE EAST

# FOOTHILLS

# GRASSLANDS

for more information about each ecozone turn the pages to the corresponding colour

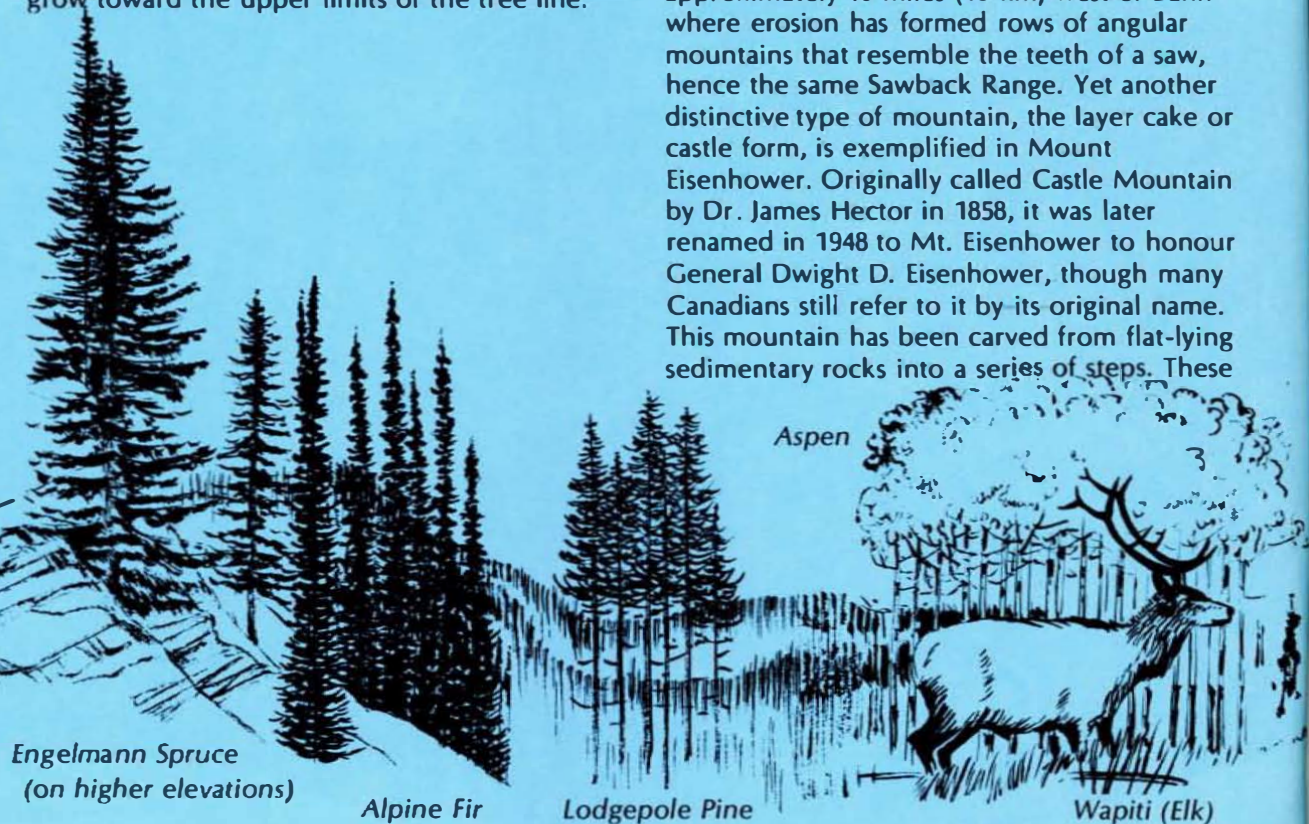


# SUBALPINE EAST

The subalpine east ecozone extends from Banff (elevation 4,583 feet (1397 m) a.s.l.) up the Bow Valley to Lake Louise (elevation 5,100 feet (1554 m) a.s.l.). This portion of the highway passes through subalpine forests, mountains and valleys typical of the Rocky Mountains. Mountain sheep are stocky yet agile animals that roam the steep terrain and rugged canyons of the Rockies. They possess keen eyesight, detecting small objects at distances up to 2 miles (3 km) or more. Mature rams stand about 40 inches (102 cm) high and may weigh 300 pounds (136 kg). Ewes weigh about 150 pounds (68 kg). Horns of mature rams form a curl which may measure up to 48 inches (122 cm) in length and 17 inches (43 cm) in circumference at the base. Lambs are born from early May to mid-June. Lambs and ewes remain together while older rams tend to congregate in "bachelor bands" except at mating time in the late autumn. Forests throughout the Bow Valley contain a natural hybrid between Engelmann and white spruce. The Engelmann spruce occurs at higher

elevations (above 5,500 feet or 1680 m) and white spruce at lower levels. Lodgepole pine also is a major component of these forests and is generally more prevalent along the highway than spruce forests. Intermingled with the forests of pine and spruce are stands of trembling aspen. Although not easily recognizable from a moving automobile, alpine fir, alpine larch and some limber pine grow toward the upper limits of the tree line.

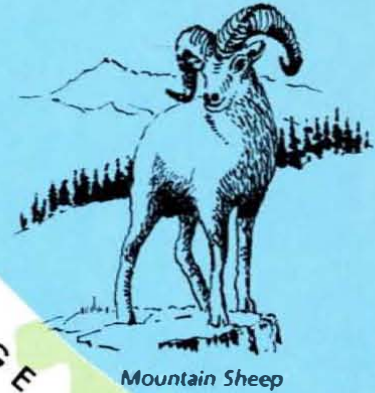
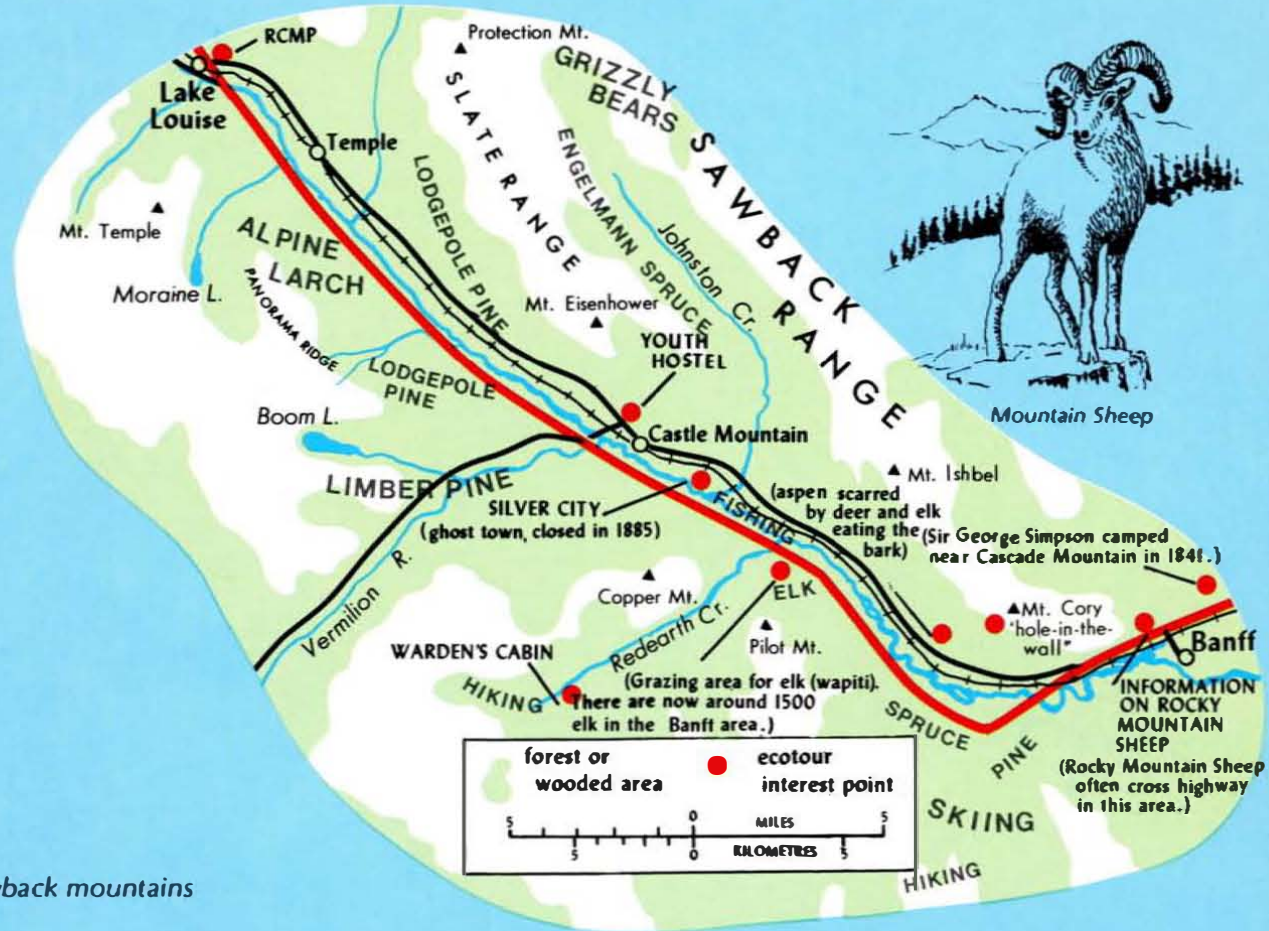
Three distinct forms of mountains occur between Banff and Lake Louise. Many mountains have a characteristic shape determined by their geologic formation, type of rock and the influence of erosion over the years. Early travellers were quick to recognize these differences. Mt. Rundle, at Banff, is a tilted mountain of grey limestone. An example of the sawback type of mountain may be seen approximately 10 miles (16 km) west of Banff where erosion has formed rows of angular mountains that resemble the teeth of a saw, hence the same Sawback Range. Yet another distinctive type of mountain, the layer cake or castle form, is exemplified in Mount Eisenhower. Originally called Castle Mountain by Dr. James Hector in 1858, it was later renamed in 1948 to Mt. Eisenhower to honour General Dwight D. Eisenhower, though many Canadians still refer to it by its original name. This mountain has been carved from flat-lying sedimentary rocks into a series of steps. These



layer cake or castle-like mountains of tall hard-rock cliffs, alternating with softer-rock slopes or terraces, are also found near Lake Louise and Moraine Lake. On the east side of the Bow River just south of Mt. Eisenhower, Silver City, a mining boom town of 2,000 people developed, flourished, and died between 1883 and 1885.

The Bow River, which parallels the highway, contains a variety of trout and the Rocky Mountain whitefish. Fly fishing with streamers, bucktails and other wet flies provides good sport, while use of a dry fly may prove rewarding towards evening.

These mountains and associated forests serve as a valuable watershed for western Canada. Trees hold snow in winter and retard rapid melting in the spring, thereby regulating streamflow and water volumes.



Castle form or layer cake mountains

Sawback mountains

Tilted mountains



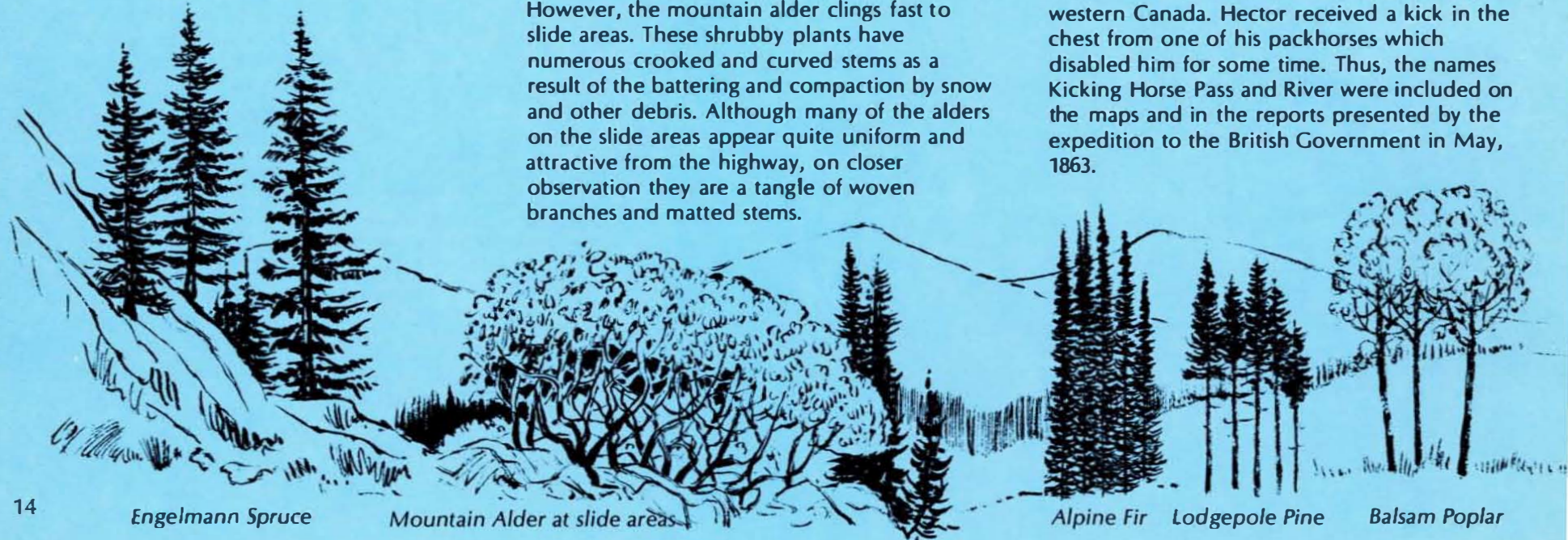
# SUBALPINE WEST

This ecozone, extending from Lake Louise to Field, is characterized by forests composed of Engelmann spruce, alpine fir, lodgepole pine and occasional balsam poplar. These forests are changing through previous disturbances by fire, pests, avalanches and man. Engelmann spruce, alpine fir, limber pine and alpine larch occur towards the timberline. Alpine larch, which can be easily identified in autumn when its needles turn yellow, is the only conifer (needle-leaved tree) in this area which sheds its foliage each year.

Lake Louise was first visited in 1882 by Tom Wilson, a guide and employee of the Canadian Pacific Railway, who was led to this "Lake of Little Fishes" by a Stony Indian, Edwin the Gold Seeker. Lake Louise was named in 1884 in honour of Princess Louise, a prominent member of the British Royal Family. Avalanches occur frequently during the winter and early spring. Despite snowsheds on the railroad and highway, plus other protective devices, the avalanche still poses a problem. Slide areas can be seen on many mountain slopes with sparse tree cover. Many slopes are subjected to repeated avalanches which tend to prevent or suppress forest development. However, the mountain alder clings fast to slide areas. These shrubby plants have numerous crooked and curved stems as a result of the battering and compaction by snow and other debris. Although many of the alders on the slide areas appear quite uniform and attractive from the highway, on closer observation they are a tangle of woven branches and matted stems.

The ecozone crosses the continental divide (the backbone of the North American continent) at an elevation of 5,329 feet (1624 m) a.s.l. From this summit, waters flow east to enter the Atlantic Ocean via Hudson Bay or west to eventually enter the Pacific Ocean. This divide also marks the boundary between Banff and Yoho national parks.

The historic Kicking Horse Pass is the route followed by the Trans-Canada Highway and transcontinental line of the Canadian Pacific Railway. In 1858 this pass was discovered by Dr. James Hector, the geologist of the famous Palliser expedition commissioned by the British Government to explore and map portions of western Canada. Hector received a kick in the chest from one of his packhorses which disabled him for some time. Thus, the names Kicking Horse Pass and River were included on the maps and in the reports presented by the expedition to the British Government in May, 1863.



Engelmann Spruce

Mountain Alder at slide areas

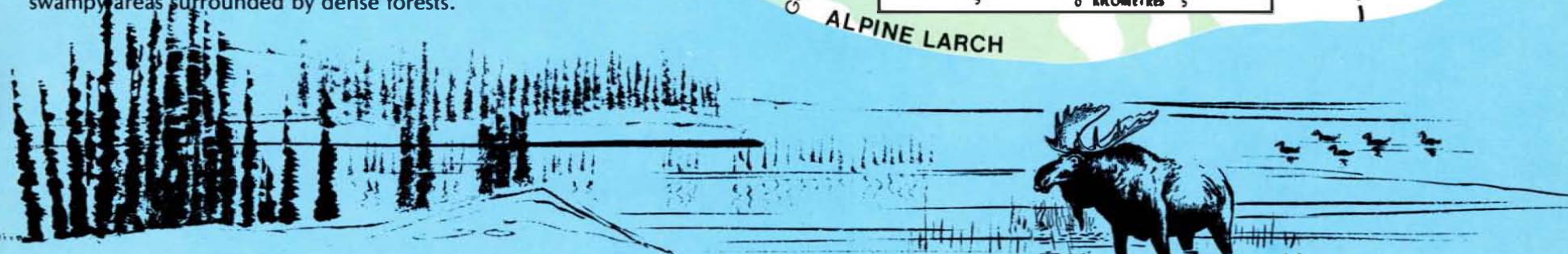
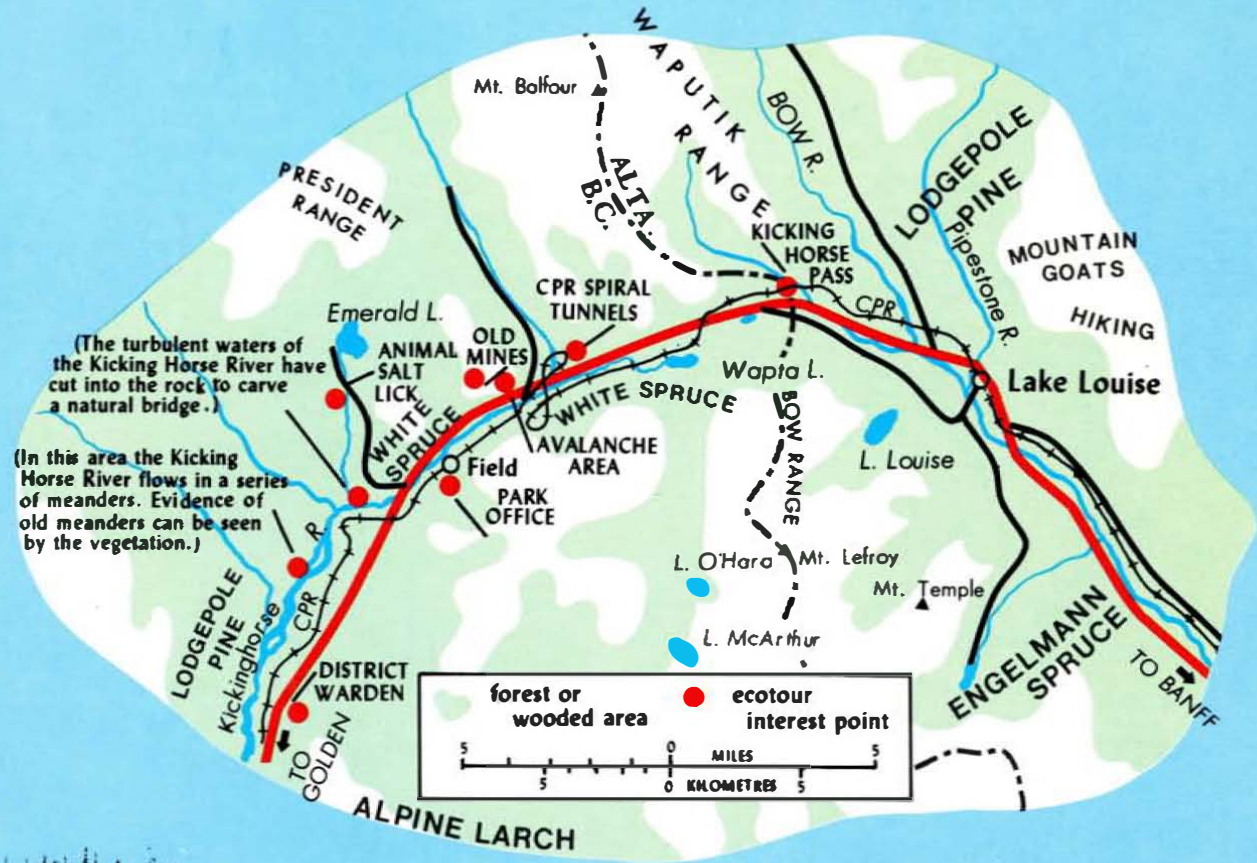
Alpine Fir

Lodgepole Pine

Balsam Poplar



By the terms of the union of the Crown Colony of British Columbia with Canada in 1871, the Federal Government undertook to build a railway to connect coastal British Columbia with the eastern Atlantic provinces. In 1880 a decision was made in favour of the Kicking Horse Pass as the shortest route from the prairies to the Pacific Ocean. Despite difficult topography and heavy snow, the line was completed, the last spike driven, and the first through train from Montreal arrived at Port Moody on the Pacific in November, 1885. Within the Kicking Horse Pass the Canadian Pacific Railway has two spiral tunnels, one 3,200 feet (975 m) long and the other 2,800 feet (850 m), cut through the slopes of Mts. Cathedral and Ogden with a maximum grade of slightly more than 2 per cent. These enable the trains to climb the steep valley sides without "switchbacks" (a series of zig-zag tracks). The moose is the largest animal in this area. Bull moose are identified by their flat and palm-like antlers, and at maturity may weigh up to 1,500 pounds (680 kg). Moose prefer swampy areas surrounded by dense forests.



Kicking Horse River Flats, near Field

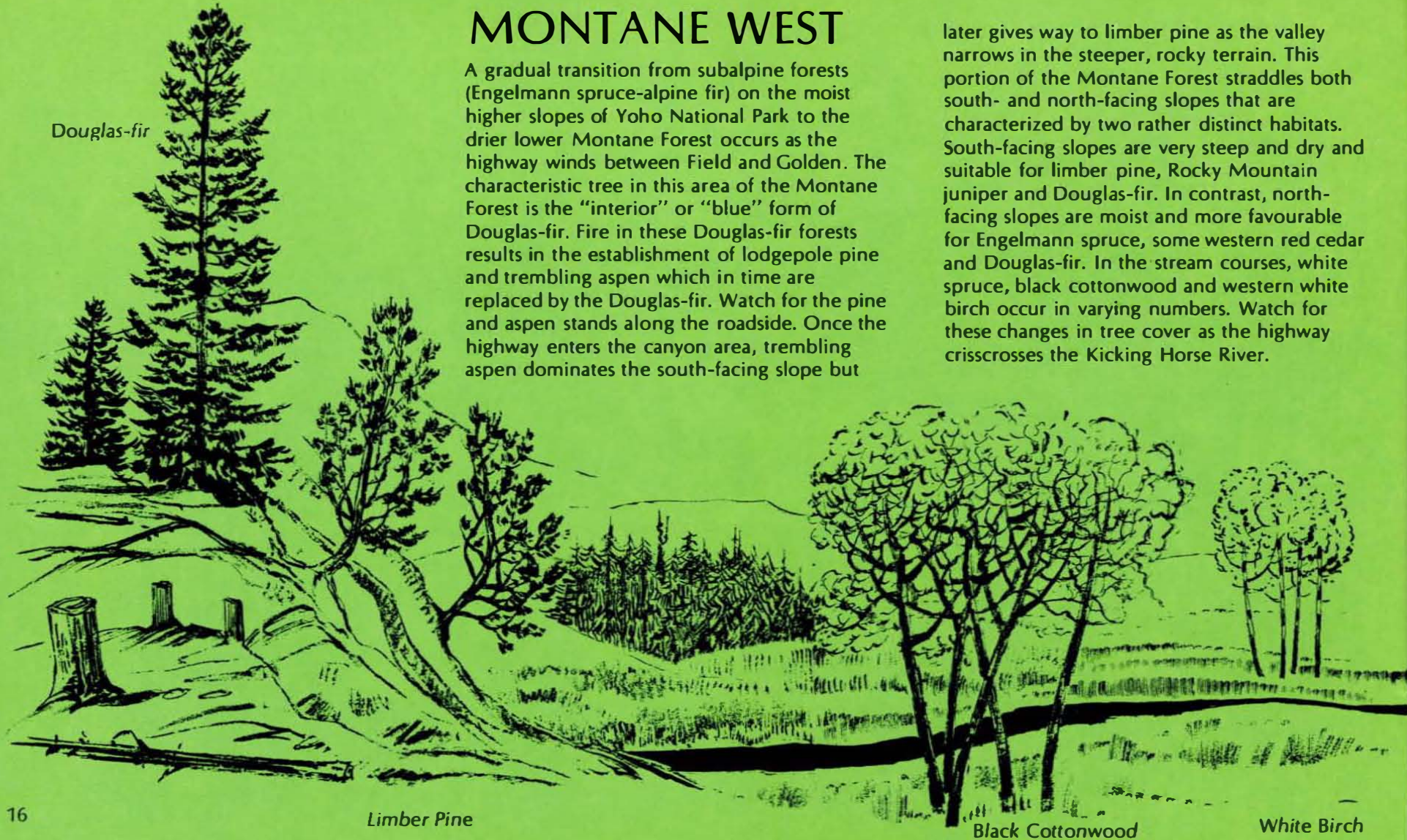
Moose

# MONTANE WEST

A gradual transition from subalpine forests (Engelmann spruce-alpine fir) on the moist higher slopes of Yoho National Park to the drier lower Montane Forest occurs as the highway winds between Field and Golden. The characteristic tree in this area of the Montane Forest is the "interior" or "blue" form of Douglas-fir. Fire in these Douglas-fir forests results in the establishment of lodgepole pine and trembling aspen which in time are replaced by the Douglas-fir. Watch for the pine and aspen stands along the roadside. Once the highway enters the canyon area, trembling aspen dominates the south-facing slope but

later gives way to limber pine as the valley narrows in the steeper, rocky terrain. This portion of the Montane Forest straddles both south- and north-facing slopes that are characterized by two rather distinct habitats. South-facing slopes are very steep and dry and suitable for limber pine, Rocky Mountain juniper and Douglas-fir. In contrast, north-facing slopes are moist and more favourable for Engelmann spruce, some western red cedar and Douglas-fir. In the stream courses, white spruce, black cottonwood and western white birch occur in varying numbers. Watch for these changes in tree cover as the highway crisscrosses the Kicking Horse River.

Douglas-fir



Limber Pine

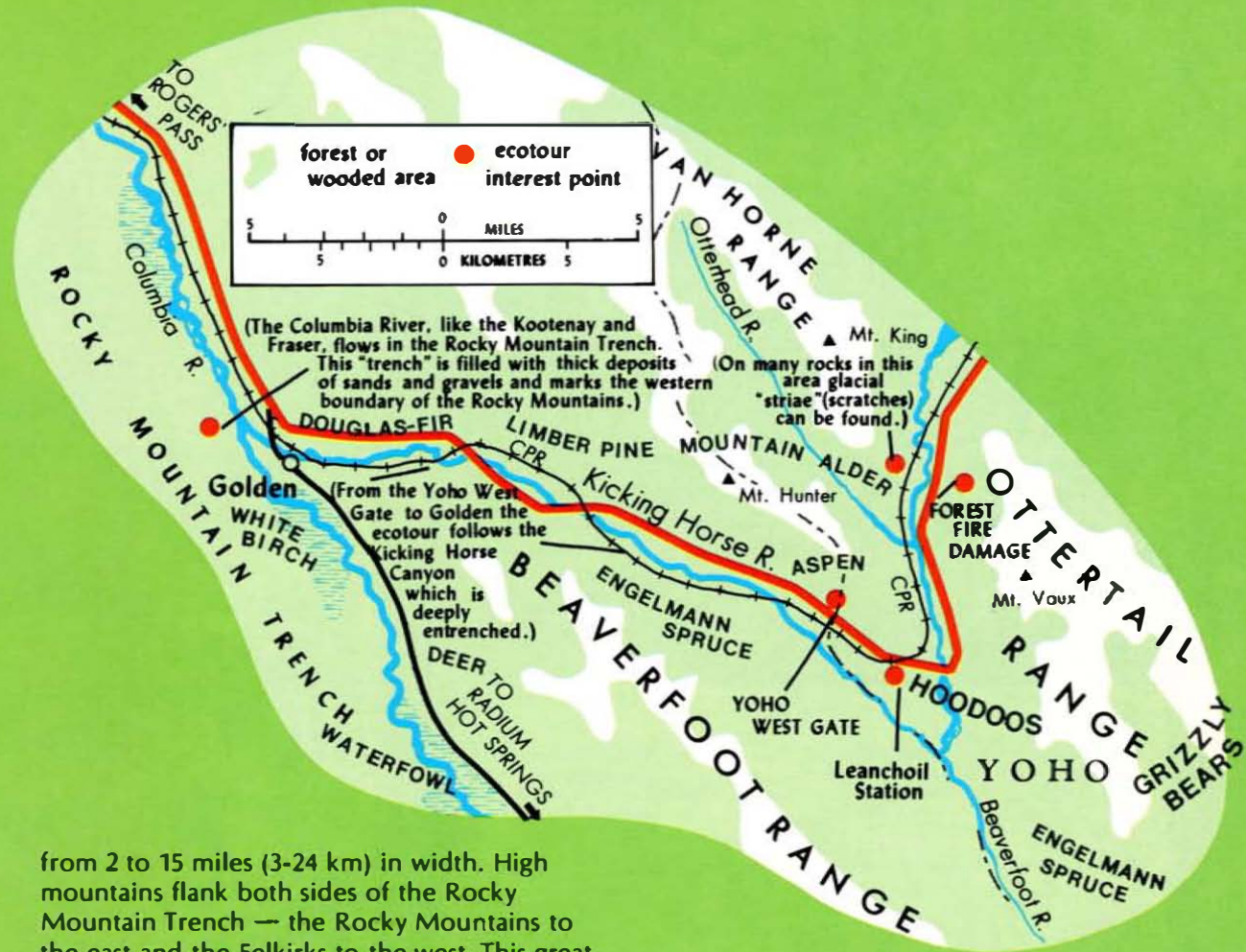
Black Cottonwood

White Birch

Early travellers had difficult times negotiating this valley. The Canadian Pacific Railway mastered the Kicking Horse Canyon in 1885, but even today heavy equipment is required to clear snow and rock from these hazardous though scenic stretches of the railroad and highway.

At Golden, the Columbia River provided early fur trade brigades of the North West Company and Hudson's Bay Company with a ready access to the Pacific Ocean. In this headwater country of the Columbia, boats and rafts used by early travellers were made from the western red cedar and Douglas-fir to transport men and supplies westwards to Fort Vancouver at the mouth of the Columbia. Furs, the eastbound cargo, were destined for Montreal in eastern Canada. Boat Encampment, some 80 miles (130 km) to the northwest, was named at that time. The Columbia River had a huge salmon run to spawning grounds in the smaller headwater tributaries before construction of large hydro-electric dams farther downstream.

Golden is situated about midway along in the Rocky Mountain Trench, a major structural feature extending 900 miles (1450 km) in a northwest-southeast direction and varying



from 2 to 15 miles (3-24 km) in width. High mountains flank both sides of the Rocky Mountain Trench — the Rocky Mountains to the east and the Selkirks to the west. This great trough or gash in the earth's surface was created by faulting, e.g. parallel cracks in the earth's crust, and erosion by rivers.

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