GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

NOTES

The Parsnip River sheet extends across almost all of the Cordilleran Orogen and includes a small part of Interior Platform in the northeast, embracing an area of about 235,000 square kilometres, or 91,000 square miles. Within the Cordilleran Orogen are parts of the Coast Plutonic Complex, the Intermontane Belt with several subordinant tectonic divisions, the Omineca Crystalline Belt, and the Rocky Mountains Thrust Belt. The Coast Mountains in the southwest are high and rugged with numerous icefields. The Interior Plateau is generally a low region with little relief. It includes the higher Skeena Mountains in the north and extends eastward as a broad lowland bordering the valley of the Fraser River and separating Omineca and Columbia Mountains. Two en echelon, linear valleys form Rocky Mountain Trench. To the northeast, the Rocky Mountains are relatively narrow and low, with the heavily forested ridges of the Foothills merging into the plateaus and lowlands of the Interior Plains.

Coast plutonic Complex is dominantly quartz diorite and granodiorite with foliated plutonic rocks, gneiss and schist forming northwesterly trending, steeply dipping pendants and screens between the plutons. Along the eastern margin, northerly and northeasterly trending, mainly normal faults occur. Within the axial part faults are few, possibly masked by the younger plutons. The Late Paleozoic pendants are strongly metamorphosed and, in places, older northeast trending structures are preserved. The highly metamorphosed, mainly volcanic, Mesozoic rocks in the south rest unconformably on older parts of the complex and are intruded by quartz monzonite. Late Tertiary and Quaternary volcanics in the east reflect the extension of erosion surfaces from Intermontane Belt.

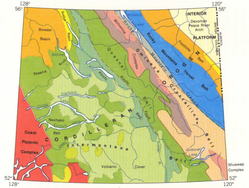
Intermontane Belt is divisible into the Hazelton, Pinchi and Quesnel Belts. The Hazelton Belt includes Lower and Middle Jurassic basaltic to rhyolitic volcanics, granitic intrusions and gneisses. A few scattered outcrops suggest that Triassic and Late Paleozoic rocks underlie the Jurassic. The belt is bisected by the northeasterly trending Skeena Arch which separates the Middle and Upper Jurassic marine sediments of Bowser Successor Basin in the north from the less extensive, late Middle Jurassic, marine Nechako Basin to the south. The older rocks are unconformably overlain by Tertiary basaltic to rhyolitic cover in the south, by the non-marine sediments of Sustut Successor Basin in the north, and by the mainly marine Lower Cretaceous Skeena volcanics and sediments in the southwest. Early Jurassic acidic plutons and Late Cretaceous to Tertiary felsitic to porphyritic plugs are scattered throughout the belt and extend into adjoining belts. The dominant structural style is block faulting of Cretaceous and Tertiary age. Pinchi Belt embraces the Upper Paleozoic strata between the Pinchi and Vital Faults. Pinchi Fault is probably a long-lived feature: it contains slices of blueschist and eclogite of Late Triassic age and may have been active as a strike-slip fault in the latest Mesozoic. The Vital fault system, active in the Late Jurassic and Early Cretaceous, is a series of imbricate eastdipping thrust and reverse faults on which more metamorphosed rocks of the Pinchi Belt are displaced over the less metamorphosed, younger rocks of Hazelton Belt. Rocks of Pinchi Belt consist of radiolarian chert, argillite, and massive pod-like, shallow water carbonates that contain mid-Pennsylvanian to Late Permian fossils and Triassic conodonts at one locality. Intercalated are basic volcanics, gabbro and alpine-type ultramafic rocks. Most rocks are at sub-greenschist to upper greenschist grade, or in blueschist facies locally associated with eclogite. The higher grade rocks exhibit two or, locally, three episodes of deformation. The earlier, associated with blueschist metamorphism, is probably Late Triassic and the later, associated with the Vital fault system, is Late Jurassic to Early Cretaceous. Cross-cutting granitic plutons are Jurassic and possibly Cretaceous in age.

In Quesnel Belt, Early Paleozoic and Precambrian rocks are exposed beneath widespread Upper Triassic, alkaline, augite porphyry basalts which interfinger easterly with black phyllite. This arc-type volcanism persisted into the Early Jurassic in the south. Coeval granitic plutons are spatially related and include porphyry copper deposits. The Lower Jurassic is the last marine sequence as uplift coincident with the rise of the Omineca Crystalline Belt excluded the sea from the area. Mid-Cretaceous acidic plutons occur along the eastern side of the belt and extend into Omineca Crystalline Belt. Block faulting with northwesterly and northeasterly trends and minor folding is characteristic. Several transcurrent faults may occur but, because of extensive cover, are speculative.

The central part of Omineca Crystalline Belt is a structural and metamorphic depression lying between penetratively deformed metasedimentary rocks in upper amphibolite facies that form the infrastructure in the culminations underlain by the Shuswap and Wolverine Metamorphic Complexes. Within the depression, the supratructure is composed of low grade and contemetamorphosed rocks ranging from Hadrynian to Triassic in age, concentrically folded and cut by vertical faults. Similar structural and metamorphic transitions, produced during the Jura-Cretaceous Columbian Orogeny, occur between Omineca Crystalline Belt and Quesnel Belt to the west and Rocky Mountains Belt to the east.

In the Rocky Mountains Thrust Belt thick, layered, platformal successions of carbonate and shale of Hadrynian and Paleozoic age form relatively north-easterly transported thrust sheets. The more easterly thrusts and folds, mainly in the Foothills Belt, also involve thick Mesozoic sequences, the upper part of which constitutes the westerly derived foredeep clastics produced and deformed during the Jura-Cretaceous Columbian and Late Cretaceous-Paleocene Laramide Orogenies. These clastics extend northeastward, undeformed, to underlie Interior Platform.

GEOLOGICAL PROVINCES


INTERIOR PLATEAU
COLUMBIA
OMINECA
INTERMONTANE
COAST
PINCHI
QUESNEL
ROCKY MOUNTAINS
Grand Forks
Greenwood
Nelson
Trail
Cranbrook
Fernie
Creston
Kimberley
Golden
Revelstoke
Vernon
Kamloops
Penticton
Merritt
Princeton
Hope
Chilliwack
Vancouver
Squamish
Pemberton
Lillooet
Clinton
Ashcroft
Cache Creek
Kelowna
Salmon Arm
Lytton
Lillooet
Williams Lake
Quesnel
Prince George
Vanderhoof
Fort St. John
Dawson Creek
Mackenzie
Fort St. James
Burns Lake
Smithers
Terrace
Prince Rupert
Queen Charlotte Islands
Port Hardy
Port Alberni
Nanaimo
Victoria
Sidney
Duncan
Courtenay
Campbell River
Alert Bay
Tofino
Ucluelet
Port Alberni
Sooke
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Tofino
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