



These notes deal chiefly with the south half of the map-area. The Rocky Mountains part north of Elk, is described in GSC Paper 58-10. New data on the anomalous sequence of volcanic and sedimentary rocks (21) in the Rockies east of Wild Horse River indicate their age to be in the range of mid-Silurian to mid-Devonian, rather than Devonian or younger.

Use of the term Siph formation is here limited to the Purcell Mountains. The stratigraphic equivalent of the base of the Siph (Rockies) has not yet been recognized in the Purcell Mountains. The succession formerly called Siph in the Purcell includes on the one hand the equivalent of merely the upper part of the true Siph (7), and on the other, in some localities, the probable equivalent of the base of the Gateway formation (8) of the Rockies. The inclusion of the latter arises from differences in the occurrence of the Precambrian lavas whose top has been taken to mark the base of the Gateway. In the Purcell south of latitude 49°30' the lavas occur through a greater stratigraphic range and the highest flows are separated from the lower, main, lavas by considerable thicknesses of sediments. The lavas of the Galton Range correspond to the lower, main, lava zone in the Purcell near the International Boundary.

In the Purcell Mountains near latitude 49° the sediments between the top of the dolomitic Kitchener formation (4) and the topmost lava (the interval formerly called Siph) comprise two main divisions. The lower division (5a), between the Kitchener and the lower lavas, consists of non-dolomitic, thin-bedded, green, or less commonly, purple quartzite and argillites; whereas the upper division (5b), is characterized by dolomitic argillites and quartzites as well. West of Bloom Creek the lower division is about 2,500 feet thick and the whole sequence, from Kitchener to topmost lava, is some 5,500 feet thick. In the Galton Range, on the other hand, the single lava zone overlies about 1,000 feet of varying degrees of purity with interbeds of quartzite. This is underlain in turn by about 700 feet of essentially non-dolomitic strata, chiefly dolomitic argillites and dolomitic siltstones. The formation is underlain by 700 feet of an essentially non-dolomitic sequence of green quartzite and quartzites with interbeds of white or brown-spotted siliceous quartzites, exposed at only one locality and not differentiated on this map.

A feature diagnostic of the Gateway formation is an abundance of well-formed salt casts; the relatively few occurrences of salt casts in other formations of the area comprise only sparse ill-formed individuals.

The red, mica-flecked Phillips formation (9) is distinctive. Its occurrence in the Purcell, shown here for the first time, provides a valuable new correlation across the Rocky Mountain Trench. The recognition of Phillips formation at Shookmuck Creek permits a closer comparison of the Dutch Creek strata (11) of the northwest with the equivalent Gateway, Phillips, and Kootenay sequence of the south and east. It is, however, impractical at the present scale of mapping, and perhaps impossible at any scale, to subdivide the Dutch Creek elsewhere in this manner. In all regions the characteristic red colour of the Phillips is subject to sudden, and erratic change to green, especially in zones of structural disturbance.

The Kootenay formation (10), whose upper boundary is erosional, is more argillaceous than the Gateway, and much of it consists of thinly laminated green argillite containing numerous thin layers of prominent porous breccia. Thinly laminated black-and-grey argillites of this formation are, however, indistinguishable in isolated outcrops from certain argillites of the Gateway and Kitchener formations. Stromatolites are conspicuous in beds of dolomite and limestone, especially in the upper part of the formation. The stromatolites in the Gateway formation, on the other hand, are relatively more abundant near the base of the formation; those in the Kitchener and Siph formations occur in more continuous dolomitic surroundings and appear predominantly in different form.

The Mount Nelson formation (12) is absent in the Rockies.

The Moyie fault, the largest in the southwest part of the map-area, is a reverse fault that dips steeply northwest. It is believed to be chiefly an oblique thrust whose hanging-wall moved relatively upward and northward, but its history may date from Precambrian time and involve varied movements. Another major fault west of the Moyie fault also strikes northeasterly and dips steeply northwest. Intense shearing and crumpling along it indicate compressive stresses for most of its history.

The region south of the Moyie fault is the northeast part of a major domal structure. North of latitude 49°15' its east side is monoclinical and dips are moderate, but farther south a series of folds appears and dips are locally steeper. Thus near the International Boundary the basic trend of the main structure steepens suddenly eastward and passes into the first syncline, which plunges gently south. The succeeding anticline, which plunges north, is likewise asymmetrical, with a sharp crest leading into a steeply and locally overturned, east limb.

A series of faults parallel with the Rocky Mountain Trench occur on its west edge and traverse the eastern part of the region discussed above, and in each case the west block is apparently structurally the lower. In the few instances where the dips of these faults are discernible they are steeply westward. The faults are undoubtedly more numerous than shown on the map, which is partly diagrammatic in this respect, but except in localities where good stratigraphic markers are well exposed, their occurrence is indicated only by abnormally great apparent thicknesses of formations. A major fault or a lower series of faults of this type lies along Gold and Joseph creeks and is believed to cut the Moyie fault. East-west faults may be more common than the map indicates, because some of the anomalous thicknesses of formations and displacements of contacts could result from other longitudinal or cross-faults, especially near Plumb and Tepee creeks.

On the east side of the Rocky Mountain Trench at Kootenay, the westernmost outcrops are Upper Devonian and Mississippian strata. These are faulted against the Gateway which adjoins them on the east and which in turn are faulted against the Siph formation. The Siph there forms the east wall of the Trench; these faults strike along the Trench and although concealed, their occurrence is strongly indicative of westward dips. These faults, together with those on the west side of the Trench, are believed to be west-dipping gravity faults; the stratigraphic displacement across the Trench at this latitude is believed to be the cumulative effect of numerous similar faults.

The steeply inclined rocks near Elk and the confluence of the Elk and Wild Horse rivers are of several flexures and asymmetrical folds whose axial planes dip chiefly west and which are believed to be much more recent than those related to eastward thrusting or incipient thrusting older than the gravity faults.

Leech, G. B. 1958: Fernie Map-area, West Half, British Columbia. Geol. Surv., Canada, Paper 58-10.

1959: The Southern Part of the Rocky Mountain Trench; Bull. Can. Inst. Min. Met., vol. 52, No. 365, pp. 327-333.

Rice, H. M. A., 1937: Cranbrook Map-area, British Columbia. Geol. Surv., Canada, Mem. 207.

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GEOLOGICAL SURVEY OF CANADA  
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

MAP 11-1960  
GEOLOGY  
FERNIE  
(WEST HALF)

KOOTENAY DISTRICT  
BRITISH COLUMBIA

Scale: One Inch to Two Miles = 1/126,720  
Miles 0 1 2 3 4 5 6

Geographical names subject to revision

In response to public demand for earlier publication, Preliminary Series maps are now being issued in this simplified form, thereby effecting a substantial saving in time. There is no loss of information, but the maps will be clearer to read if all or some of the map-units are hand-coloured.

Air photograph covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa

MAP 11-1960  
FERNIE  
WEST HALF  
BRITISH COLUMBIA

3401  
.05  
1956  
G4  
omvsc  
c.1