



These notes deal chiefly with the south half of the map-area. The Rocky Mountains part north of E24a, is described in GSC Paper 58-10. New data on the anomalous sequence of volcanic and sedimentary rocks (13) 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 Sisyph formation is here limited to the Purcell Mountains. The stratigraphic equivalent of the base of the Sisyph (Rockies) has not yet been recognized in the Purcell Mountains. The succession formerly called Sisyph in the Purcell includes on the one hand the equivalent of merely the upper part of the true Sisyph (1), 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 Galton Range of the Rockies the lavas occur in a single zone with only small intercalations of sediments, whereas in the Purcell south of latitude 49°30' the lavas occur through a greater stratigraphic range and the higher 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 (6) and the topmost lava the interval formerly called Sisyph comprise two main divisions. The lower division (8a), between the Kitchener and the lower lavas, consists of non-dolomitic, thin-bedded, green, or less commonly, purple quartzites and argillites; whereas the upper division (8b), 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 5,000 feet thick. In the Galton Range, on the other hand, the lower lava zone overlies about 150 feet of greenish argillite beneath which is a 1,000-foot section made up of thin bedded brown-weathering dark dolomites of varying degrees of purity with interbeds of quartzite. This is underlain in turn by about 100 feet of less-dolomitic strata, chiefly dolomitic argillites and dolomitic siltstones. The formation is underlain by 100 feet of an essentially non-dolomitic sequence of green argillites and quartzites with interbeds of argillite and siltstone. The quartzites, exposed at only one locality and not differentiated on this map.

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

The red, mica-flecked Phillips formation (9) is distinctive. It is occurred 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 Shookmunchuk Creek permits a closer comparison of the Bulk Creek strata (11) of the west with the equivalent Gateway, Phillips, and Roosevelt sequence of the south and east. It is, however, impractical on the present scale of mapping, and perhaps impossible at any scale, to subdivide the Bulk Creek elsewhere in this manner. In all regions the characteristic red colour of the Phillips is subject to local, sudden, and drastic change to green, especially in zones of structural disturbance.

The Roosevelt 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 penecontemporaneous 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. The bulk of the Kitchener and Sisyph formations occur in more continuously dolomitic surroundings and appear predominantly as different form.

The Mount Nelson formation (12) is absent in the Rockies. The Moyie fault, the largest in the southern 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 northeastward, but its history may date from Precambrian time and involve varied movements. Another major fault west of the Moyie fault also strikes northwesterly and dips steeply northwest. Some 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' the east side is monoclinical and dips are moderate, but farther south a series of folds appears and dips are locally steeper. This near the International Boundary the beds on the east side of the main structure, excepting suddenly eastward and part into the first syncline, which plunges gently south, the succeeding anticline, which plunges south, is likewise asymmetrical, with a sharp crest leading into a steeply overturned, east limb. The steeply inclined rocks near the Rocky Mountain Trench occur on its west edge and traverse the eastern part of the region described in this map. 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 due to the limited scale in this respect, but except in localities where good stratigraphic markers are well exposed, their position is indicated only by anomalously great thicknesses of formations. A major fault or a 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 contact could result from either longitudinal or cross-faults, especially near Plumbob and Teepee creeks. On the east side the rocks are thickly bedded. The Gateway and Roosevelt, the westernmost outcrops are Upper Devonian and Mississippian strata. The Sisyph formation, the Sisyph beds, are strata which adjoin them on the east and which in turn are faulted against the Sisyph formation. The Sisyph beds form the east wall of the Trench. The faults strike along the Trench and although concealed, their courses are 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 Elko and the confluence of the Elk and Wigwam rivers are parts of several flexures and asymmetrical folds whose axial planes dip chiefly west and which are believed in the main to reflect a fold zone related to eastward thrusting or incipient thrusting older than the gravity faults.

Leach, 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. 385, pp. 327-333.
Rice, H. M. A. 1937: Cranbrook Map-area, British Columbia Geol. Surv., Canada, Mem. 207.



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

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 closer to read if all or some of the map-units are hand-coloured.

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

MAP 11-1960
FERNIE
WEST HALF
BRITISH COLUMBIA