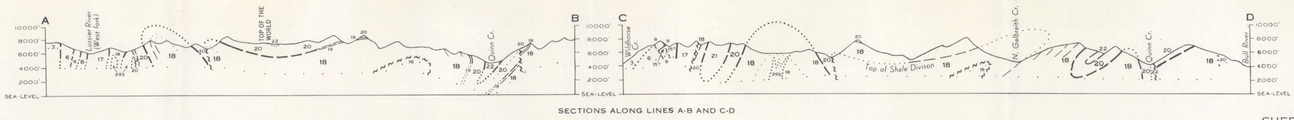
PRELIMINARY SERIES

SHEETS 82 G/NW AND 82 G/SW



SECTIONS ALONG LINES A-B AND C-D

LEGEND

CENOZOIC

QUATERNARY
PLEISTOCENE AND RECENT

30 — Till, gravel, sand, silt, alluvium

MESOZOIC

CRETACEOUS (?) AND (?) TERTIARY

29 — 29a, quartz monzonite, (White Creek batholith); 29b, monzonite, quartz monzonite, granodiorite

TRIASSIC

28 — SPRAY RIVER FORMATION: dark siltstone and silty shale

PALAEOZOIC

PENNSYLVANIAN AND (?) PERMIAN

27 — ROCKY MOUNTAIN FORMATION: dolomitic or limy sandstone, quartzite; sandy dolomite and limestone; siltstone, chert

MISSISSIPPIAN

26 — 26. Undifferentiated Exshaw and Banff formations and Rundle group; 26a. EXSHAW FORMATION: black shale; black limestone; BANFF FORMATION: dark cherty limestone and laminated silty limestone, grey limestone, limy siltstone, fetid in part; 26b. RUNDLE GROUP: grey crystalline limestone, crinoidal in part, dark fine-grained limestone, cherty in part, all commonly fetid

DEVONIAN
UPPER DEVONIAN

25 — PALLISER FORMATION: Lower (main) Member: massive mottled grey limestone; nodular limestone. Upper Member: thin-bedded nodular shaly limestone

24 — Basal beds; buff-and orange-weathering dolomite, sandy dolomite, sandstone (may be older); FAIRHOLME GROUP: Lower Part: fine-grained black and grey limestone, stromatolitic and coralline in part; dolomite. Upper Part: shale and limestone; ALEXO FORMATION: sandstone and sandy limestone; argillaceous limestone

MIDDLE (?) AND UPPER DEVONIAN

23 — Limestone, shale; siltstone, dolomite; gypsum (?)

MIDDLE DEVONIAN AND (?) EARLIER

22 — Basal unit; buff-and orange-weathering dolomite, sandy dolomite, dolomitic sandstone and shale; white quartzite; conglomerate; BURNAIS FORMATION: gypsum, dolomite, limestone; HARROGATE FORMATION: fine-grained black limestone; shaly limestone; shale

SILURIAN AND/OR DEVONIAN

21 — Shale, limestone; conglomerate, tuff, volcanic breccia, lava, greenstone

ORDOVICIAN AND SILURIAN
UPPER ORDOVICIAN AND LOWER AND (?) MIDDLE SILURIAN

20 — BEAVERFOOT-BRISCO FORMATION: dolomite, limestone; conglomerate locally at base, thin graptolitic shale near top

ORDOVICIAN

19 — GLENOGLE FORMATION: graptolitic shale and fine-grained siltstone, generally limy; shaly limestone; WONAH FORMATION: quartzite, sandstone

CAMBRIAN AND ORDOVICIAN
UPPER CAMBRIAN AND LOWER ORDOVICIAN

18 — Mc KAY GROUP: limestone, shale, intraformational limestone conglomerate

CAMBRIAN
MIDDLE AND/OR UPPER CAMBRIAN

17 — JUBILEE AND ELKO FORMATIONS: dolomite

MIDDLE CAMBRIAN

16 — BURTON FORMATION: shale, limestone; sandstone, conglomerate at base

LOWER AND (?) MIDDLE CAMBRIAN

15 — CRANBROOK FORMATION: quartzite, grit, conglomerate; sandstone; EAGER FORMATION: shale, limestone, siltstone, sandstone

WINDERMERE OR LATER

14 — Conglomerate

WINDERMERE

13 — TOBY FORMATION: conglomerate, argillite, sandstone

PRECAMBRIAN

PURCELL

12 — MOUNT NELSON FORMATION: argillite, dolomite, quartzite

10 — ROOSVILLE FORMATION: laminated green argillite and siltstone, dolomitic in part; laminated black and grey argillite; grey quartzite; orange-weathering grey dolomite and grey-weathering limestone, both commonly stromatolitic and oolitic

9 — PHILLIPS FORMATION: red quartzite, siltstone, and argillite

8 — GATEWAY FORMATION: grey and green argillite and siltstone, partly dolomitic, grey quartzite; buff and orange weathering dolomite, commonly stromatolitic and in part oolitic; conglomerate; 8a, lower contact may be above base of rest of Gateway formation

11 — DUTCH CREEK FORMATION: equivalent to units 8, 9, and 10

5 — 5a, green, grey, and purple siltstone, argillite, and quartzite; 5b, chiefly andesitic lava, breccia, and tuff except in Purcell Mountains south of latitude 49°30' where accompanied by green and grey argillite and siltstone, dolomitic in part, and quartzite

6 7 — 6. Comprises units 4 and 5 undivided
7. SIYEH FORMATION: red-weathering grey dolomite and argillaceous dolomite; grey dolomitic argillite and siltstone; quartzite, green argillite, grey-weathering grey limestone. Equivalent to 5a and part (most ?) of 4

4 — KITCHENER FORMATION: grey and green argillite and dolomitic argillite, grey dolomite, sandy in part (dolomitic rocks weather buff to brown); quartzite; grey limestone

3 — CRESTON FORMATION: grey and green argillite and siltstone, grey, green, white, and purple quartzite

2 — ALDRIDGE FORMATION: grey quartzite and siltstone, commonly massive, interbeds, partings, and bed-tops of dark argillite; thinly laminated platy dark argillites and siltstones dominant in upper part, mostly rusty weathering; 2a, dark grey to black laminated argillite grey siltstone and quartzite, rusty weathering. May be equivalent to only upper part of 2

1 — FORT STEELE FORMATION: white siliceous quartzite, grey argillaceous quartzite, dark argillite, grey and black dolomitic and calcareous argillite; dolomite. May be equivalent to lower part of 2

Note A - Purcell undivided

Note B - Purcell and Cambrian undivided

Note C - Palaeozoic undivided

Rock outcrop . . . . . ×

Geological boundary (defined, approximate, assumed) . . . . . ~ · · · ~

Limit of geological mapping . . . . . + + + +

Bedding (horizontal, inclined, vertical, overturned) . . . . . ⊥ ⊥ ⊥

Bedding (dip known, top unknown) . . . . . /

Fault (defined, approximate, assumed) . . . . . ~ ~ ~

Anticline (defined, approximate; showing direction of plunge of axis) . . . . . ⟝ + ⟞

Anticline, overturned (showing dip of limbs, trace of crest plane, and approximate direction of plunge of crest line) . . . . . ⟝ ⟞

Syncline (defined, approximate; showing direction of plunge of axis) . . . . . ⟞ + ⟝

Syncline, overturned (showing dip of limbs, trace of trough plane, and approximate direction of plunge of trough line) . . . . . ⟞ ⟝

Sink hole . . . . . SH

Mineral property . . . . . × Pb

MINERAL SYMBOLS

Cadmium	Cd	Silver	Ag
Gold	Au	Tin	Sn
Lead	Pb	Zinc	Zn
Placer Gold	Placer Au		

Geology by G.B. Leech, 1956; G.B. Leech and R.L. Langenheim, 1957, G.B. Leech, 1959; H.M.A. Rice, 1935

Compilation by G.B. Leech

Main highways . . . . . (3)

Selected other roads . . . . . ═══

Trail . . . . . - - - -

Cabin . . . . . •

Indian Reserve boundary . . . . . - - - -

Intermittent lake and stream . . . . . ~ ~ ~

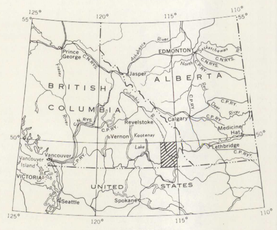
Marsh . . . . . ~ ~ ~

Contours (interval 1,000 feet) 5000

Height in feet above mean sea-level . . . . . +6775

Cartography by the Geological Survey of Canada, 1960

Approximate magnetic declination, 21° 30' East



INDEX MAP

DESCRIPTIVE NOTES

These notes deal chiefly with the south half of the map-area. The Rocky Mountains part north of Elko, 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 Siyeh formation is here limited to the Rocky Mountains. The stratigraphic equivalent of the base of the Siyeh (Rockies) has not yet been recognized in the Purcell Mountains. The succession formerly called Siyeh in the Purcells includes on the one hand the equivalent of merely the upper part of the true Siyeh (?), 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 Purcells 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 Purcells 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 Siyeh) 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 quartzites 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 5,000 feet thick. In the Galton Range, on the other hand, the single lava zone overlies about 150 feet of greenish argillite beneath which is a 1,000-foot section characterized by red- and brown-weathering dark dolomites of varying degrees of purity with interbeds of quartzite. This is underlain in turn by about 700 feet of less-dolomitic strata, chiefly dolomitic argillites and dolomitic siltstones. The formation is underlain by 700 feet of an essentially non-dolomitic sequence of green argillites 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 Purcells, shown here for the first time, provides a valuable new correlation across the Rocky Mountain Trench. The recognition of Phillips formation at Skookumchuck Creek permits a closer comparison of the Dutch Creek strata (11) of the northwest with the equivalent Gateway, Phillips, and Roosville 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 local, sudden, and erratic change to green, especially in zones of structural disturbance.

The Roosville 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; those in the Kitchener and Siyeh formations occur in more continuously 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 northeastward, 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 monoclinal and dips are moderate, but farther south a series of folds appears and dips are locally steeper. Thus near the International boundary the beds on the east side of the main structure steepen suddenly eastward and pass into the first syncline, which plunges gently south. The succeeding anticline, which plunges north, is likewise asymmetrical, with a sharp crest leading into a steep, 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 existence is indicated only by abnormally great apparent thicknesses of formations. A major fault or a close-set 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 either longitudinal or cross-faults, especially near Plumbob and Teepee creeks.

On the east side of the Rocky Mountain Trench at Roosville, the westernmost outcrops are Upper Devonian and Mississippian strata. These are faulted against Gateway strata which adjoin them on the east and which in turn are faulted against the Siyeh formation. The Siyeh there forms 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.

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. 565, 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 2 1 0 2 4 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 photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa

PUBLISHED, 1960
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