SECTIONS ALONG LINES A-B AND C-D SHEETS 82 G AND 82 G SW PRELIMINARY SERIES 116°00′ 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 21 Shale, limestone; conglomerate, tuff, volcanic breccia, lava, greenstone GLENOGLE FORMATION: graptolitic shale and fine-grained siltstone, KIMBERLEY 3 FAIIIT BURTON FORMATION: shale, limestone; sandstone, conglomerate  $\bigcirc$ 15 CRANBROOK FORMATION: quartzite, grit, conglomerate; sandstone; EAGER FORMATION: shale, limestone, siltstone, sandstone DUTCH CREEK FORMATION: equivalent to units 8,9, and 10 6 7 6. Comprises units 4 and 5 undivided . SIYEH FORMATION: red-weathering grey dolomite and argillaceous dolomite, FERNIE grey dolomitic argillite and siltstone; quartzite, green argillite, grey-weathering to 5a and part (most ?) of 4 CRESTON FORMATION: grey and green argillite and siltstone, grey, laminated platy dark argillites and siltstones dominant in upper part, 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 Rock outcrop.....x Limit of geological mapping. Bedding (horizontal, inclined, vertical, overturned)...... Bedding (dip known, top unknown)...... of crest line)..... plunge of axis)..... of trough line).... Selected other roads.....======== Trail...... Indian Reserve boundary..... Intermittent lake and stream..... Contours (interval 1,000 feet). 

LEGEND

28 SPRAY RIVER FORMATION: dark siltstone and silty shale

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

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

grained black and grey limestone, stromatolitic and coralline in

ATION: sandstone and sandy limestone; argillaceous limestone

Basal unit: buff-and orange-weathering dolomite, sandy dolomite,

BURNAIS FORMATION: gypsum, dolomite, limestone; HARROGATE FORMATION: fine-grained black limestone; shaly

dolomitic sandstone and shale; white quartzite; conglomerate;

UPPER ORDOVICIAN AND LOWER AND (?) MIDDLE SILURIAN

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

generally limy; shaly limestone; WONAH FORMATION: quartzite,

Mc KAY GROUP: limestone, shale, intraformational limestone

part; dolomite. Upper Part: shale and limestone; ALEXO FORM-

Basal beds: buff-and orange-weathering dolomite, sandy dolomite, sandstone (may be older); FAIRHOLME GROUP: Lower Part: fine-

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

QUATERNARY

TRIASSIC

MISSISSIPPIAN

DEVONIAN

UPPER DEVONIAN

PLEISTOCENE AND RECENT

30 Till, gravel, sand, silt, alluvium

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

CRETACEOUS (?) AND (?) TERTIARY

PENNSYLVANIAN AND (?) PERMIAN

nodular shaly limestone

MIDDLE (?) AND UPPER DEVONIAN

MIDDLE DEVONIAN AND (?) EARLIER

limestone; shale

SILURIAN AND/OR DEVONIAN

ORDOVICIAN AND SILURIAN

CAMBRIAN AND ORDOVICIAN

Mc KAY GROU conglomerate

MIDDLE CAMBRIAN

WINDERMERE OR LATER

14 Conglomerate

WINDERMERE

PURCELL

16 BURTON

UPPER CAMBRIAN AND LOWER ORDOVICIAN

17 JUBILEE AND ELKO FORMATIONS: dolomite

13 TOBY FORMATION: conglomerate, argillite, sandstone

MIDDLE AND/OR UPPER CAMBRIAN

LOWER AND (?) MIDDLE CAMBRIAN

MOUNT NELSON FORMATION: 12 MOUNT NEEDOWN 2 argillite, dolomite, quartzite

ROOSVILLE FORMATION:

limestone, both commonly stromatolitic and oolitic

9 quartzite, siltstone, and argillite

8 and green argillite and siltstone,

5a, green, grey, and purple siltstone, argillite, and quartzite;

in part, and quartzite

PHILLIPS FORMATION: red

GATEWAY FORMATION: grey

partly dolomitic, grey quartzite; buff and orange weathering

dolomite, commonly stromatolit and in part oolitic; conglomerate;

8a, lower contact may be above

base of rest of Gateway formation

5b, chiefly andesitic lava, breccia,

south of latitude 49°30' where

accompanied by green and grey

argillite and siltstone, dolomitic

KITCHENER FORMATION: grey

to brown); quartzite; grey limestone

ALDRIDGE FORMATION: grey quartzite and siltstone, commonly

2 massive, interbeds, partings, and bed-tops of dark argillite; thinly

Note A - Purcell undivided

Anticline (defined, approximate; showing direction

Anticline, overturned (showing dip of limbs, trace of crest plane, and approximate direction of plunge

Syncline (defined, approximate; showing direction of

Syncline, overturned (showing dip of limbs, trace of trough plane, and approximate direction of plunge

Placer Gold. , , . . Placer Au

Note C - Palaeozoic undivided

mostly rusty weathering; 2a, dark grey to black laminated argillite grey siltstone and quartzite, rusty weathering. May be equivalent

Note B - Purcell and Cambrian undivided

MINERAL SYMBOLS

Cadmium......Cd Silver......Ag

Gold. . . , . . . . . . Au Tin . . . . . . . . . Sn

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

Cartography by the Geological Survey of Canada, 1960

Approximate magnetic declination, 21° 30' East

116°00′ PUBLISHED. 1960 COPIES OF THIS MAP MAY BE OBTAINED FROM THE

and green argillite and dolomitic argillite, grey dolomite, sandy in part (dolomitic rocks weather buff

3 green, white, and purple quartzite

to only upper part of 2

and tuff except in Purcell Mountains

laminated black and grey argillite;

grey quartzite; orange-weathering grey dolomite and grey-weathering

laminated green argillite and siltstone, dolomitic in part;

ORDOVICIAN

CAMBRIAN

DESCRIPTIVE NOTES

These notes deal chiefly with the south half of the maparea. 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 (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 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

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 brownweathering 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

lower, main, lava zone in the Purcells near the International

Boundary.

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 Greek 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

The Mount Nelson formation (12) is absent in the

The Moyie fault, the largest in the southwest part of the map-area, is a reverse fault that dips steeply northwest. t 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 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

overturned, east limb.

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

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. Eastwest 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 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

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

eastward thrusting or incipient thrusting older than the gravity



MAP 11-1960 **GEOLOGY FERNIE** (WEST HALF) KOOTENAY DISTRICT

BRITISH COLUMBIA

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.

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> MAP 11-1960 FERNIE WEST HALF BRITISH COLUMBIA