GEOLOGY
N.E. NIDDERY LAKE
N.T.S. 105O-9, 10, 15, & 16

Scale 1:50,000

0 — 5 km

Compiled by M.P. Cecile 1981

Geology by M.P. Cecile 1979-80 and published maps of S.L. Blusson (1974) and J.O. Wheeler (1964)

REFERENCE

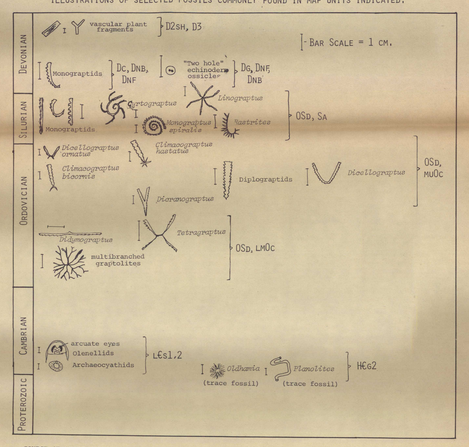
Geological boundary (defined, approximate and assumed)
Bedding (horizontal, inclined, vertical, overturned)
Foliation (inclined, vertical)
Normal fault (defined, approximate, assumed, symbol on hanging wall)
Reverse fault (defined, approximate, assumed, teeth indicate hanging wall)
Thrust fault (defined, approximate, assumed, teeth indicate upthrust side)
Anticline (arrow indicate plunge direction)
Syncline (arrow indicate plunge direction)
Anticline, syncline (overturned)
Mineral occurrence ..... × Zn
Springs (hot, cold) ..... SPR-H, SPR-C
Faulted contact
Unconformity
Gas seep, colourless, odourless, CO_2?
Colour boundary (leave pg uncoloured)
Thrust fault, overturned, teeth on upthrust side

MINERALS

ZnO-0.25%, 20 m - means assayed 0.25% of ZnO over a 20 m stratigraphic interval
Zinc, rocks reset to zinc map ..... Zn
Zinc moss, bright yellow-green sphagnum moss that retains water in droplets at the moss surface ..... ZnMs
Barite, nodular form - D3, or in vugs - Dc, or in veins LMOc ..... Ba
Barite, thick, laminated ..... BA
Howeite, $BaSi(CO_3)_2$, occurs as platy heavy, grey sedimentary rock, reacts with HCl ..... Nrs
Witherite ..... $BaCO_3$
Copper, minor chalcocite, malachite, bornite stain ..... Cu
Idaite (copper iron sulphide) ..... Cu-Id
Phosphorite, minor occurrences ..... P
Pyrite, massive ..... Py

ACKNOWLEDGEMENTS (1979-80): the area was mapped mainly by ground traverses from fly camps. Field assistance was given by Rob Gibson in 1979 and Brian Plasker in 1980. Helicopter support was given by Northern Mountain Helicopters in 1979, Kamiks Helicopters in 1980. Ed Debicki, Ben Robertson and Alyson Robertson with the Canadian Nickel company allowed extensive casual charter of their La Verendrye helicopter and provided us with many hours of critical comment and discussion on the geology of the area in 1980. Stirling Lapointe 1979-80 and S.P. Gordey 1980 provided a logistical base for field operations. S.P. Gordey and W.D. Goodfellow contributed many hours of discussion on similar strata in the Rabbitkettle map-area and helped in understanding the many complexities of this map.

ILLUSTRATIONS OF SELECTED FOSSILS COMMONLY FOUND IN MAP UNITS INDICATED.



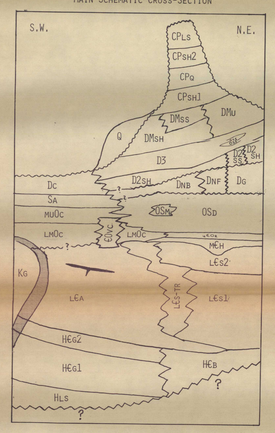
SOURCE OF CHART ILLUSTRATIONS

Churkin, M. Jr. and Carter, C., 1973: Graptolite identification chart for determination of geological age; U.S.G.S., Oil and Gas Investigations chart, OC86.

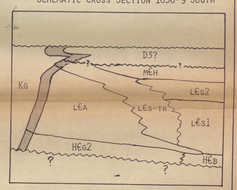
Hofmann, H.J. and Cecile, M.P., 1981: Occurrence of Oldhamia and other trace fossils in Lower Cambrian(?) argillites, Selwyn Mountains, Yukon (N.E. Niddery Lake, 106O); G.S.C. Paper 81-1A.

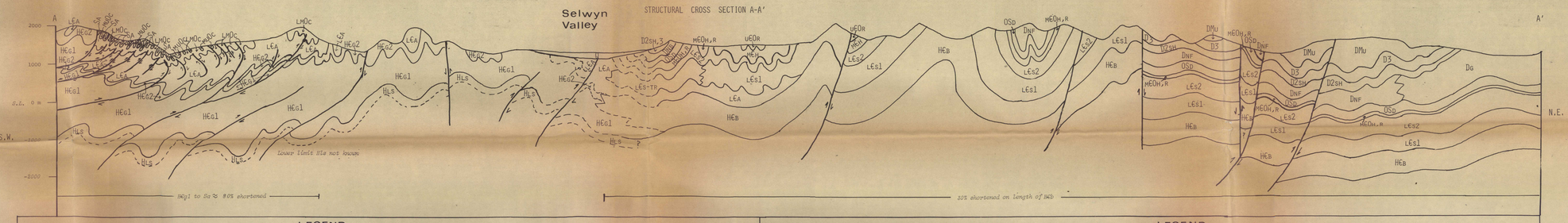
Norford, B.S., 1963: Illustrations of Canadian fossils Cambrian, Ordovician and Silurian of the western Cordillera; G.S.C. Paper 63-14.

MAIN SCHEMATIC CROSS-SECTION



SCHEMATIC CROSS-SECTION 1050-9 SOUTH





LEGEND
SOUTHWEST OF THE SELWYN VALLEY

PLEISTOCENE AND RECENT

T — *Tuffa, light brown to grey weathering porous, calcareous*

CRETACEOUS (?)

Kg — *Quartz monzonite with biotite and hornblende, megacrysts common towards contacts.*

PLEISTOCENE AND RECENT

QRA — *Rock avalanche, unconsolidated, huge blocks of chert pebble conglomerate - NO KNOWN OUTCROP SOURCE IN AREA?*

Alteration halos; contact metamorphic zone around Kg intrusions; crystalline carbonates, well indurated shale, siltstones, schists, phyllites and skarns. Altered map units as shown.

DEVONIAN(?)
MIDDLE AND UPPER DEVONIAN(?)

D3? — *Siltstone, siliceous, black-white weathering, thin to medium bedded; age uncertain but thought to be D3 unconformably overlying Cambrian strata, south 1060-9.*

NOTE ON MAP UNITS

Most Ordovician to Devonian rock units in this area are a windowed basin facies succession. Fold and thrust faulting, and the lack of good stratigraphic control, make the stratigraphic order and thickness of units difficult to assess. Because of this the usual practice of arranging the units in order of decreasing age has been abandoned and the units include most significant bedded and structural features.

DEVONIAN
LOWER AND MIDDLE DEVONIAN

Dc — *Chert, dark grey to black, medium bedded, massive; with 10-20% shale, whitish black to black weathering; shale occurs as partings between chert beds and as a m thick unit with monograptids at the base of the succession. Measured 430 m thick.*

SILURIAN
LOWER TO LATE SILURIAN

SA — *Argillite, very rusty dark green to buff weathering, thin bedded; minor shale, black, graptolitic, shale occurs in thin units or as partings; minor dolostone as a single medium to thick massive bright orange bed near the base of the succession. Measured 20 to 20 m thick.*

ORDOVICIAN
MIDDLE AND LATE ORDOVICIAN

MUOc — *Chert, black, thin bedded; with 20-20% shale, whitish black to black weathering; shale abundantly graptolitic, especially Diplograptids; minor argillite, green near base of succession. Measured 16 to 36 m thick.*

LOWER AND MIDDLE ORDOVICIAN

LMOc — *Chert, white, dark grey and black weathering, dull grey from a distance, medium bedded, thin to medium bedded and argillaceous in lower part; more massive and extensively bioturbated in upper part; minor shale partings, thin units with milkbranched graptolites; very minor limestone, buff to brown weathering as one to six thin beds near the base of the succession. Measured 80 to 130 m thick.*

ORDOVICIAN AND SILURIAN
LOWER ORDOVICIAN TO LOWER(?) SILURIAN

OSD — *DUO LAKE FORMATION: shale, black, recessive, graptolitic; occurs as interstratified thick units of rusty black shale, calcareous black shale and siliceous shale; minor siltstone, buff weathering, thin bedded; minor limestone, brown weathering, arenaceous; minor volcaniclastic sandstone; and includes thin LMOc. Estimated 100-200 m thick.*

CAMBRIAN
LOWER CAMBRIAN

LEA — *Argillite, buff and dark green weathering, thin bedded (pervasively cleaved); locally black shale forms a major part of the succession; minor limestone, buff weathering thin bedded, minor quartzite, thin bedded, fine grained; minor volcaniclastic sandstone, green weathering, blocky partings, massive; sandstone occur locally near top of the succession. Estimated 400 m thick.*

HADRYNIAN AND CAMBRIAN
HADRYNIAN AND LOWER CAMBRIAN

HEG2 — *UPPER 'GRIT UNIT': argillite, maroon and apple green weathering, thin bedded, pervasively cleaved; minor quartzite and quartz pebble conglomerate, green and white weathering, thin fine grained quartzite beds preserve trace fossils. Measured 5-150 m thick.*

HEG1 — *LOWER 'GRIT UNIT': argillite, green, black and buff weathering, thin bedded, pervasively cleaved; with 5-10% quartz sandstone to quartz pebble conglomerate, thin to thick bedded, in resistant thick units. Measured 400 m thick.*

HADRYNIAN

HLS — *Limestone, arenaceous limestone; upper part grey weathering, blocky parted, massive; middle part dark grey weathering, thin bedded mainly limestone; basal part buff weathering, thin to medium bedded, very arenaceous and with minor sandstone. Base of unit not exposed. Estimated 200+ m thick.*

CAMBRIAN AND ORDOVICIAN
LOWER(?) CAMBRIAN TO (?) ORDOVICIAN

EOVC — *Sandstone, volcaniclastic, brown weathering, green to grey fresh surfaces, medium to very thick bedded, massive: minor basaltic lapilli tuff and welded tuff. Estimated 100 to 200+ m thick.*

CAMBRIAN
MIDDLE CAMBRIAN

MEH — *HESS RIVER FORMATION: shale, black, pyritic, unfossiliferous, occurs as interstratified thick units of rusty black and calcareous black shale in S.E. 1060-9. Estimated 100 m thick.*

LOWER CAMBRIAN

Diabase sills, brown weathering, biotite-phlogopite phenocrysts; minor associated basaltic tuff.

LEs-TR — *'TRANSITIONAL' SEMI FORMATION: argillite, shale and limestone, dark green, black and light grey weathering respectively; upper part is a resistant succession of thin bedded grey limestone and limestone slope breccia; lower part similar to both LEA but with more black shale and LEs1, but with less limestone.*

LEGEND
SELWYN VALLEY AND NORTHEAST OF THE SELWYN VALLEY

PLEISTOCENE AND RECENT

T — *Tuffa, light brown to light grey weathering, porous, calcareous.*

MISSISSIPPIAN TO PERMIAN

CPLs — *Calcarenite, siliceous, white to buff weathering in fulcrumear and orange, weathering in outcrop, medium to thin bedded, matrix fine to medium grained; calcilutite, dense fine to very coarse grained; minor grey quartzite. Estimated 300+ m thick.*

CPsh2 — *Shale, calcareous, black; with 10-20% calcarenite units, siliceous, grey-white weathering, distributed through the shale succession but increase in abundance upwards. Estimated 150-200 m thick.*

CPq — *Quartzite, brown to buff weathering, resistant, blocky partings, fine to medium grained; usually well indurated; usually clean and well sorted; locally secondary surfaces and shale intercalate are abundant. Measured 200-300+ m thick.*

CPsh1 — *Shale, calcareous, black; with 10-30% limestone, arenaceous, buff weathering, platy weathering; limestone units distributed through the succession. Measured 100-180 m thick.*

DEVONIAN AND MISSISSIPPIAN
UPPER DEVONIAN AND LOWER MISSISSIPPIAN

DMu — *Sandstone, brown weathering, medium to thick bedded; massive, laminated, ripple cross-laminated; flute casts and mud chips common; interstratified with 20-60% shale or siltstone, grey to black; shale units can be traced for several kilometres. Estimated 600+ m thick.*

DEVONIAN
MIDDLE AND UPPER DEVONIAN

D3 — *Siltstone, siliceous, black-white to black weathering, platy to slabby; some units white flaeile; some units rich in spherular pyrite fragments; upper 30-60 m usually includes a thick unit with barite nodules; locally thick succession of bioclastic beds and/or meter-scale lenses of platy, brown-weathering limestone, that are composed of black spherules or calcite crystals. Measured 100-400 m thick.*

D2SH — *Shale, siliceous, black, recessive; thin limonitic beds; some units with abundant vascular plant fragments; minor sandstone and/or chert pebble conglomerate as beds or thick units. Measured 20-200 m thick.*

LOWER AND MIDDLE DEVONIAN

DNB, DNF — *NAPA FORMATION: limestone, calcarenite, calcirudite, shale; F - limestone, rusty grey to white weathering, thin bedded with 10-20% calcarenite and/or calcirudite as massive tongues and lenses; and with 20-80% shale, calcareous, black; contains "two-hole" echinoderm ossicles, monograptids. Measured 300 m thick. B-as in F but with shale at 20-40% and calcarenite and/or calcirudite <10%.*

DEVONIAN AND MISSISSIPPIAN
UPPER DEVONIAN AND LOWER MISSISSIPPIAN

DMss, DMsh — *SH-Shale, rusty black weathering; disseminated pyrite forms large nodules that are crusted with hematite and limonite; contains shale intercalate and ? plant fragments; with 10-50% sandstone, brown weathering, medium to thick bedded, in very thick units throughout the shale succession; locally (East 1020-9) chert pebble conglomerate is abundant. Measured 300-400 m thick. SS - Sandstone, brown weathering, medium to thick bedded, massive, laminated, ripple cross-laminated, flute casts; with 20 to 40% shale as in SH. Measured 0-200 m thick.*

DEVONIAN
MIDDLE AND UPPER DEVONIAN

D3s — *Sandstone, brown weathering, medium to thick bedded; occurs as local tongue in the middle of unit D3 , S.E. 1060-16. Estimated 20-50 m thick.*

D2ss — *Sandstone, yellow-brown weathering, medium to thick bedded, massive, laminated, ripple cross-laminated, flute casts; with 20-80% shale, grey to black weathering, in thin to thick units. Estimated 200-400 m thick.*

LOWER AND MIDDLE DEVONIAN

Dg — *GRIZZLY BEAR FORMATION: limestone, white grey weathering, cliff forming, blocky partings, massive, fine to medium crystalline; scattered corals, brachiopods, bryozoans and "two-hole" echinoderm ossicles.*

DEVONIAN
MIDDLE AND UPPER DEVONIAN

D2SH,3 — *Undivided D2SH and D3*

CAMBRIAN TO SILURIAN
MIDDLE CAMBRIAN TO EARLY SILURIAN

MESH,D — *HESS RIVER AND DUO LAKE FORMATIONS: undivided in N.E. 1060-16 and N.W. 1070-16 where shale units are replaced by slow equivalent shale.*

MESU — *HESS RIVER, RABBITKETTLE AND DUO LAKE FORMATIONS: undivided in areas of poor exposure and tight, small-scale folding.*

MEOH,R — *HESS RIVER AND RABBITKETTLE FORMATIONS: undivided.*

ORDOVICIAN AND SILURIAN
LOWER ORDOVICIAN TO LOWER SILURIAN

OSD — *DUO LAKE FORMATION: shale, black, recessive, abundantly graptolitic; occurs as interstratified thick units of black calcareous shale and rusty black shale; minor chert, black. Measured 150-240 m thick.*

CAMBRIAN AND ORDOVICIAN
UPPER CAMBRIAN AND LOWER ORDOVICIAN

UEOR — *RABBITKETTLE FORMATION: limestone, pale yellow weathering, resistant, medium to thick bedded; contains large crystalline pyrite nodules and ubiquitous fossil trails oriented parallel to bedding but found throughout individual beds on a lamellae scale; interstratified with 30% shale, calcareous, grey-black. Measured 60-120 m thick.*

CAMBRIAN
MIDDLE CAMBRIAN

MEH — *HESS RIVER FORMATION: shale, black, pyritic, unfossiliferous; occurs as interstratified thick units of black calcareous shale and rusty black shale; shows marked changes in thickness, and where only a few metres thick, is dominantly chert. Estimated and measured as 10 to 130 m thick.*

LOWER CAMBRIAN

LEs, LEs2, 1, 2, LEs1 — *SEMI FORMATION: 1-limestone, white, limestone, orange and grey weathering, recessive, thin bedded; minor siltstone and black shale; 2-limestone and limestone slope breccia; grey to dark grey, resistant; thin bedded, fine to medium crystalline; locally abundant trilobite fauna and brachiopod coquina. 1 and 2 combined measure approximately 900 m thick, Fritz, 1976, G.S.C. Paper 76-22, Section 6.*

LEA — *Argillite and shale, buff to dark green and black respectively; occurs as a tongue estimated to be as much as 100 m thick in a small area of N.E. 1060-16.*

HADRYNIAN AND CAMBRIAN
HADRYNIAN AND LOWER CAMBRIAN

HEB — *BACKBONE RANGE FORMATION: quartzite, red-brown and minor grey or green weathering, blocky partings; massive or laminated, fine to medium grained; minor siltstone; maroon weathering. Only upper part exposed. Estimated 300+ m thick.*

ORDOVICIAN AND SILURIAN
MIDDLE ORDOVICIAN TO EARLY SILURIAN

OSM — *MARMOT FORMATION: lapilli tuff to volcanic breccia, altered, calcareous, brown or green weathering; occurs a lense in OSD, N.W. 1060-16. Estimated 5-100+ m thick.*

G.S.C. OPEN FILE 765

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