GEOLOGICAL SURVEY OF CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES

PAPER 72-19

DESCRIPTION OF CARBONIFEROUS AND PERMIAN STRATIGRAPHIC SECTIONS, NORTHERN YUKON TERRITORY AND NORTHWESTERN DISTRICT OF MACKENZIE (N.T.S. 106M; 116 C, F, G, H, I, J, P; 117 A, B, C)

(Report and 3 figures)

E. W. Bamber

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ABSTRACT

This report provides additional data to complement a previous comprehensive report on the upper Paleozoic rocks of the area. Thirty-three stratigraphic sections are described in detail. Lithologic descriptions are based on field data supplemented by microscopic study of thin sections and etched surfaces.

DESCRIPTION OF CARBONIFEROUS AND PERMIAN STRATIGRAPHIC SECTIONS, NORTHERN YUKON TERRITORY AND NORTHWESTERN DISTRICT OF MACKENZIE (N.T.S. 106M; 116 C, F, G, H, I, J, P; 117 A, B, C)

INTRODUCTION

Upper Paleozoic stratigraphic sections described in this paper formed the basis for an earlier paper (Bamber and Waterhouse, 1971) which outlined the Carboniferous and Permian stratigraphic and faunal successions of the northern Yukon. Only sections measured by members of the Geological Survey of Canada are included here. Measurements were made by tape and staff, unless stated otherwise; descriptions are based on microscope study of thin sections and etched surfaces, with some data from X-ray analyses. Section locations (Fig. 2) are given in terms of longitude and latitude, and by aerial photograph number and co-ordinates. The latter were obtained using a method described by Norris (in press), in which the co-ordinates were determined with respect to the center of the aerial photograph with the aid of a millimeter grid overlay. The section numbers used here coincide with those given by Bamber and Waterhouse (1971, p. 241, Fig. 2). For stratigraphic relationships within the upper Paleozoic of the northern Yukon and adjacent areas, the reader is referred to figure 3 and to Bamber and Waterhouse (1971). Member names used within the Hart River Formation are those established by Martin (in press) in a subsurface study of upper Paleozoic rocks in the Eagle Plain Basin.

STRATIGRAPHIC SECTIONS

WILLOW RIVER SOUTH SECTION (106M-7)

Located in northern Richardson Mountains, approximately 6 miles south of Willow River, near headwaters of Longstick River; 67°52'N, 135°48'W; aerial photograph A14133-39, slightly west and north of center; base of section at photo co-ordinates X=-1.1, Y=+2.0, top of section at photo co-ordinates X=-0.4, Y=+1.55. Measured by R.M. Procter, June, 1962, through unnamed Permian sandstone unit of Bamber and Waterhouse (1971, p. 88).

JURASSIC (Bug Creek Fm.)
(disconformity)

PERMIAN (undivided)
Unnamed sandstone unit — 800 feet
(Angular? unconformity)

?LOWER PALEOZOIC (Road River Fm.)

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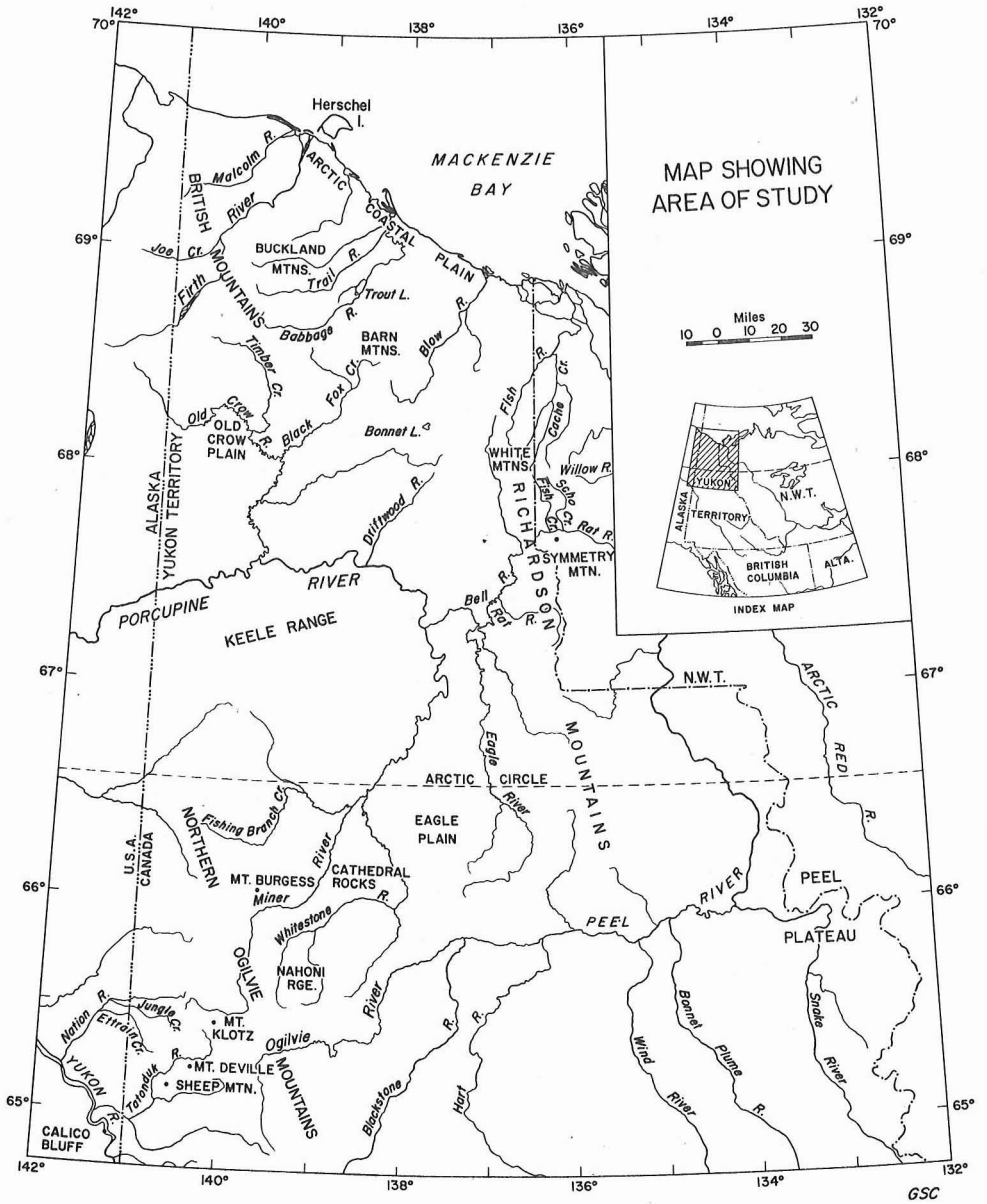

Figure 1. Map showing area of study

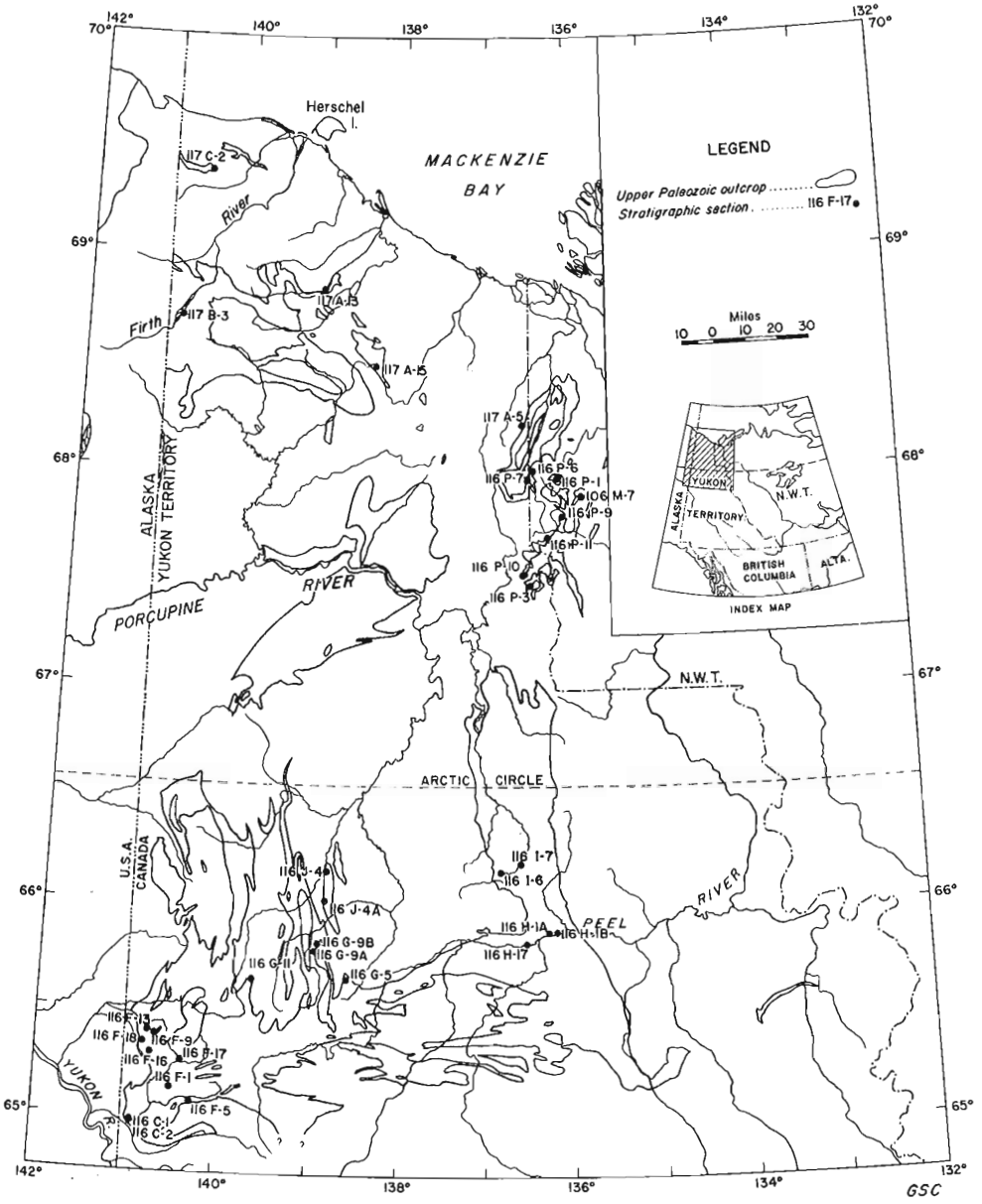

Figure 2. Location of Carboniferous and Permian stratigraphic sections

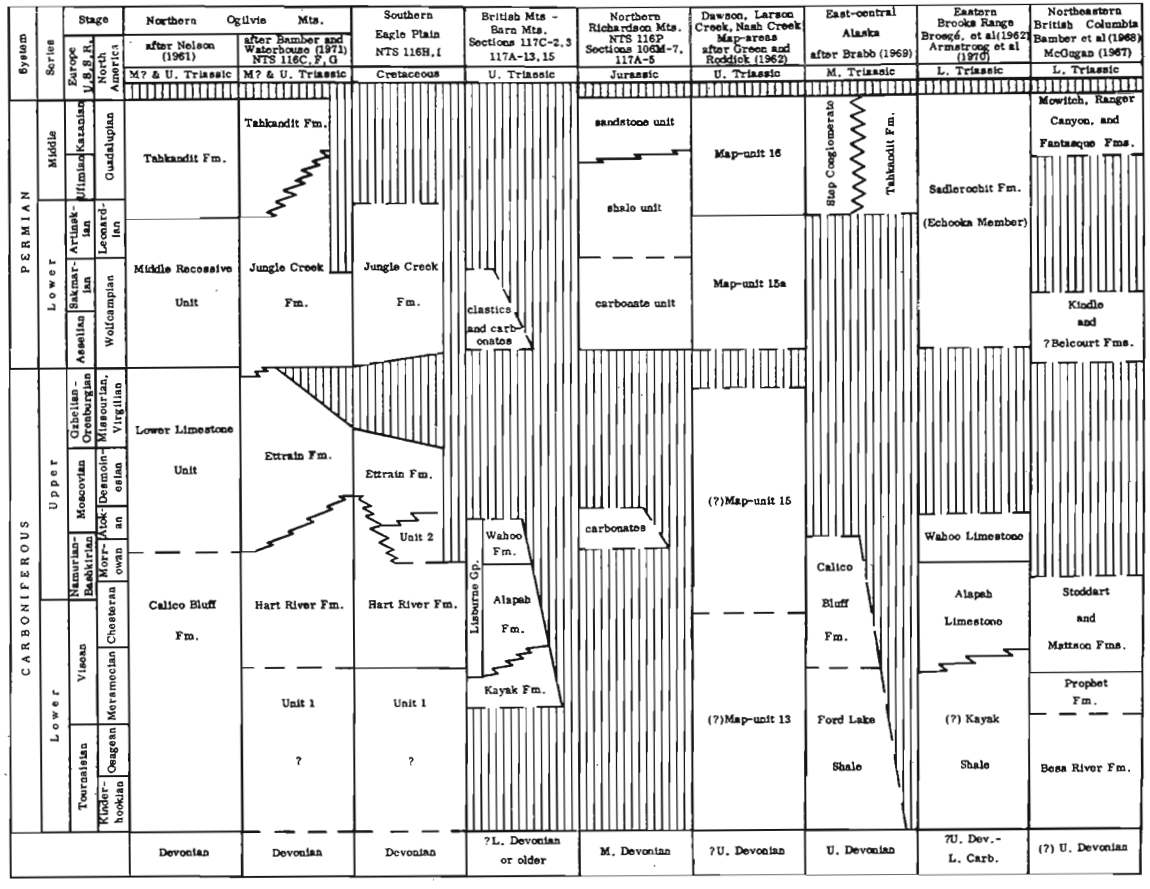

Figure 3. Upper Paleozoic formations, northern Yukon, northern and east-central Alaska, and northeastern British Columbia

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	PERMIAN (undivided)		
	Unnamed sandstone unit (800 feet thick)		
2	Sandstone: quartzose, ?dolomitic; medium greyish brown; very fine-grained; mainly angular quartz grains with minor orange-weathering ?dolomite cement; thin-bedded; indistinctly laminated; interbedded with yellowish grey, very fine-grained calcareous, quartzose sandstone, grading to siltstone; unit capped by 5-foot unit of sandstone, cherty, conglomeratic; yellowish grey, mottled with medium grey and orange; very coarse-grained grading to conglomerate; mainly angular chert grains and pebbles up to 1/4 inch maximum diameter. Unit weathers bright orange, recessive, poorly exposed	20	800
1	Interbedded sandstone and conglomerate; poorly exposed, thickness approximate: Conglomerate: chert-pebble; mottled light grey, dark grey, and brown; pebbles vary greatly in size, up to 1 1/2 inches maximum diameter, well-rounded mainly, but angular in some beds, composed of light grey, dark grey, and yellowish brown chert; matrix of fine- to very coarse-grained, quartzose sandstone (described below); conglomerate occurs in thin beds, mainly in upper part of unit and in lower 50 feet; conglomerate dominates lower 50 feet, where it is mainly dark brownish red with dark grey, angular chert pebbles. Sandstone: quartzose, cherty, slightly glauconitic, calcareous in part; yellowish brown to medium brownish grey; fine- to very coarse-grained, poorly sorted, angular grains; some beds contain small chert pebbles, mainly quartz grains with glauconite grains and scattered dark grey chert grains in some beds; some beds have calcite cement; thin-bedded; *Zoophycos* and ?worm tubes present; sandstone weathers yellowish grey, conglomeratic intervals at top and base of unit weather dark reddish grey; unit resistant	780	780

TATONDUK RIVER EAST SECTION (116C-1)

Located in northern Ogilvie Mountains on north side of Tatonduk River, approximately 4 miles east of the Yukon-Alaska boundary (approximately 1 mile east of section 116C-2); 64°58 1/2'N, 139°52 1/2'W; aerial photograph A13784-39, slightly north and east of center; base of section at photo co-ordinates X=+2.4, Y=+2.0, top of section at photo co-ordinates X=+0.35, Y=+2.85 (Bamber and Waterhouse, 1971, Fig. 7). Measured by E.W. Bamber and D. Mayes, August, 1962, in east limb of syncline containing section 116C-2, through upper Jungle Creek Formation and Tahkandit Formation. Unit 1 of section 116C-1 is approximately equivalent to unit 99 of section 116C-2; measured interval below unit 1 of section 116C-1 is not included in this description because it is mainly covered and corresponds to the upper part of section 116C-2, described elsewhere in the paper.

MESOZOIC (Triassic? and Cretaceous clastics)
(Disconformity)

PERMIAN [upper Artinskian-Kazanian? (Leonardian-Guadalupian)] Tahkandit Fm. — 1,341 feet (only upper 975 feet described here)

Underlain by Lower Permian Jungle Creek Fm.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER AND MIDDLE PERMIAN		
	Tahkandit Formation (975 feet thick, incomplete)		
19	Chert: spicular; light grey to light yellowish grey; contains numerous dark and light grey spicules (up to 1/2 inch long) and small dark grey blebs (possibly organic matter), some botryoidal patches surrounding cavity fillings of clear quartz; some intervals of light to medium greyish brown chert (silicified limestone?) with sugary texture, light and medium brown laminae and small fragments of brachiopods and echinoderms, in lenses up to 30 feet thick, scattered throughout the unit and associated with lenses and discontinuous beds of limestone; chert beds approximately 6 inches to 2 feet thick; 25 per cent of outcrop in intervals 897 to 903 feet, 860 to 870 feet, and 765 to 826 feet, is composed of limestone, skeletal; light brown; very fine- to fine-grained, recrystallized in part, lenses and discontinuous beds 3 to 6 inches thick within chert; one 3-foot lens of limestone at 806 to 809 feet, made up of small fragments of brachiopods, spicules, rare echinoderms and foraminifers, and other fossils, which are partly replaced by a mosaic of calcite crystals and are set in a matrix of chert; abundant very		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	fine euhedral dolomite crystals in some of the limestone from 765 to 826 feet; contacts between chert and limestone lenses irregular with patches of limestone in chert, which appears to be replacing limestone; unit weathers light to medium greyish brown with much orange-brown stain and dark grey lichen; forms prominent cliffs and breaks into irregular slabs and blocks	210	975
18	Limestone: cherty, spicular; light grey and light to medium brownish grey; very fine-grained; beds approximately 4 inches to 1 foot thick, composed mainly of very small spicules and other rare fossil fragments with rare glauconite grains; largely replaced by chert with some unsilicified lenses and patches, contains lenses of chert (as in unit 19) up to 1 foot thick comprising less than 20 per cent of outcrop; unit weathers light greyish brown with orange stain and dark grey lichen; breaks into small blocks, cliff-former	28	765
17	Chert: as in unit 19, but glauconite grains more abundant, and from 660 to 705 feet unit weathers white to light grey with lenses which are light grey to light brownish grey; no limestone seen; covered from 705 to 729 feet	77	737
16	Chert: spicular, as in unit 19, alternating with 2-inch to 2-foot lensing, irregular beds of dolomite, slightly calcareous; medium grey with brown tinge; microcrystalline to very finely crystalline; composed mainly of irregular to euhedral crystals of dolomite, scattered fine grains of glauconite and disseminated organic matter; dolomite beds comprise 10 to 20 per cent of outcrop; weathers orange-brown; breaks into 1- to 2-inch thick irregular pieces	20	660
15	Limestone: cherty; dark grey with very dark grey lenses and stringers; very fine-grained; beds approximately 4 inches to 1 foot thick; composed mainly of spicules and other indeterminate fossil fragments with organic matter, both disseminated and concentrated in numerous thin, irregular, discontinuous laminae and stringers, up to 1/8 inch thick; appears to be reworked, with numerous worm burrows; chert bed at 625 to 627.5 feet, dark grey; unit weathers mottled dark grey, light yellowish brown with dark grey stringers; breaks to small blocks; cliff-former. Unit 15 grades into unit 14 over interval from 576 to 585 feet, in which limestone beds of unit 15 make up about 30 per cent of outcrop and the rest is dolomite and chert of unit 14	55	640

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
14	Alternating lenses and irregular beds of dolomite and chert: Dolomite: slightly calcareous; medium greyish brown with some dark grey lenses; very finely crystalline, beds irregular and lensing, commonly 4 inches to 1 foot thick, but rarely up to 5 feet thick, composed of very fine interlocking dolomite crystals, slightly sugary texture, contains chert lenses and occurs as lenses within chert; weathers medium grey in part, but commonly orange-brown to medium greyish brown; breaks into irregular pieces approximately 1 to 6 inches thick. Chert: dark grey with conchoidal fracture, beds and lenses similar to those of dolomite; weathers medium to dark grey with white mottling, stands out slightly from dolomite; breaks to small irregular pieces. From 545 to 576 feet, chert and dolomite approximately equal in proportion. From 505 to 545 feet, chert comprises 70 per cent or more of outcrop.	80	585
13	Covered	8	505
12	Chert: spicular; dark grey with small, irregular, light grey masses, beds approximately 6 inches to 3 feet thick, contains numerous very small, thin spicules and masses of dark greyish brown stringers of ?organic matter; weathers dark grey with some white stain and rare orange-brown patches, conchoidal fracture; cliff-former	52	497
11	Covered	63	445
10	Chert: as in unit 12, with rare 1/2- to 1-inch shale partings from 330 to 337 feet	60	382
9	Covered	90	322
8	Mudstone: siliceous, silty; dark grey; bedding not apparent, composed of quartz grains with scattered glauconite and abundant disseminated dark brown organic matter throughout; matrix is clay-size quartz; weathers medium to dark brownish grey; breaks to thin plates and slabs; ledge-former	3	232
7	Covered	62	229

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
6	Top 2 1/2 feet composed of mudstone, as in unit 8. Lower 2 feet composed of limestone, glauconitic, skeletal; dark grey; very fine- to fine-grained; one 2-foot bed; abundant spicules, rare bryozoan, brachiopod and other fossil fragments, numerous rounded glauconite grains and quartz? grains, rare well-rounded chert pebbles up to 1/2-inch maximum diameter; unit partly silicified limestone; weathers medium to dark brownish grey (GSC loc. 53928)	4.5	167
5	Covered	18.5	162.5
4	Limestone: skeletal; light to medium brownish grey with orange flecks; coarse- to very coarse-grained; 1- to 4-foot beds; composed of brachiopod, bryozoan and echinoderm fragments with rare ostracods, fossils silicified in part; clear calcite cement; rare partings of argillaceous limestone from 117 to 124 feet; weathers light grey with dark grey and orange-brown patches; cliff-former (GSC loc. 53929)	27	144
3	Limestone: skeletal; dark grey; fine-grained; beds approximately 6 inches to 2 feet thick; rare argillaceous limestone partings; contains brachiopod and other fossil fragments; weathers light to medium greyish brown with orange-brown patches; cliff-former	29	117
2	Covered	32	88
1	Limestone: skeletal; light to medium brownish grey with white mottling; very coarse-grained; beds approximately 1 to 2 feet thick; composed of fossil fragments (echinoderm, brachiopod, fusulinacean, bryozoan), which are silicified in part; numerous pore fillings of glauconite and euhedral crystals of siderite partly altered to limonite, clear calcite cement; rare intervals of dark grey, skeletal, argillaceous limestone; very fine-grained, with scattered large fossil fragments and rare rounded glauconite grains; unit weathers light to medium greyish and yellowish brown with orange-brown patches, surface shows silicified fossil fragments - echinoderms, brachiopods and fusulinacean foraminifers most abundant; cliff-former (GSC locs. 53930, 53931, 53932); from 15 to 29 feet, covered interval within unit	56	56

TATONDUK RIVER WEST SECTION (116C-2)

Located in northern Ogilvie Mountains on north bank of Tatonduk River, approximately 3 miles east of Yukon-Alaska boundary; 64°58 1/2'N, 140°54'W; aerial photograph A13784-39, center; base of section at photo co-ordinates X=-2.05, Y=-1.05, top of section at photo co-ordinates X=-0.7, Y=+0.1 (Bamber and Waterhouse, 1971, p. 60, Fig. 7; Bamber and Barss, 1969, pp. 22-30, Pl. 1). Measured by E.W. Bamber and A. Kuhme, August, 1963, in west limb of syncline, through unnamed western equivalents of upper Hart River? and Ettrain Formations (rock units A and B of Bamber and Barss, ibid.), type section of Jungle Creek (Bamber and Waterhouse, 1971, pp. 233-240), and lower Tahkandit Formation. Units 1 to 36 measured on south bank of river, units 36 to 94 measured on north bank, units 95 to 99 measured on hillside on north side of river; unit numbers from original description of type Jungle Creek Formation (ibid.) are included in parentheses with new numbers assigned to corresponding units here. Unit 99 of section 116C-2 is approximately equivalent to unit 1 of section 116C-1, measured on the east limb of the syncline.

PERMIAN [Asselian-Ufimian (Wolfcampian-Guadalupian)]
Tahkandit Fm. 366 feet (incomplete)
Jungle Creek Fm. (type section) 1,395 feet

(Disconformity)

CARBONIFEROUS [Visean?-Gzhelian? (Chesteran?-Missourian?)]
Unnamed equivalents of Ettrain Fm. and upper Hart River Fm. 2,118 feet

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER AND MIDDLE PERMIAN		
	Tahkandit Formation (366 feet thick, incomplete)		
99	Limestone: skeletal-micritic; medium to dark brownish grey; fine- to medium-grained with some coarse-grained intervals, beds approximately 1 to 3 feet thick, worm burrows present; composed mainly of bryozoan and brachiopod fragments with ostracods and rare echinoderm fragments in micritic matrix; some chert as replacement of skeletal fragments and in matrix, glauconite grains and fillings common, numerous dolomite crystals in matrix, some intervals with scattered, well-rounded, dark grey, light grey, and yellow chert pebbles up to 1/2-inch maximum diameter, some small masses of organic matter; weathers medium to dark brownish grey with much light and medium grey lichen and orange-brown patches; numerous intervals with abundant fossils, mainly brachiopods and bryozoans; unit resistant (GSC locs. 56925, 56947, 56979, 57117, 57148, 57152, 57244)	50	3,879

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
98	Limestone: skeletal, partly conglomeratic, glauconitic; varies from dark brownish red to medium brownish grey with strong green tinge; coarse- to very coarse-grained; beds approximately 1 to 2 feet thick, composed of brachiopods, echinoderms, bryozoans, fusulinaceans, and rare gastropods in sparry calcite cement, some fossil fragments silicified, chert grains and pebbles scattered throughout, some beds grade to chert-pebble conglomerate, chert mainly dark grey, yellow, and brown, much glauconite as pore fillings in fossils which appears to be altered to hematite and limonite over much of unit; unit weathers dark reddish brown to medium brownish grey with yellowish brown patches; resistant; brachiopods and fusulinaceans very numerous in some beds (GSC locs. 56985, 57057, 57058, 57118, 57151, 57265)	63	3,829
97	Covered	131	3,766
96	Limestone: skeletal, conglomeratic; medium brownish grey with green and red tinge in many beds; coarse- to very coarse-grained; beds approximately 6 inches to 3 feet thick, composed of echinoderm, brachiopod, fusulinacean, and bryozoan fragments, with calcite cement, some glauconite pore fillings, contains numerous chert grains and pebbles (sand size to more than 1 inch maximum diameter; rounded to well-rounded, dark grey, light yellowish brown, light grey, rarely green), grades to conglomerate in many beds; unit weathers dark reddish brown with some dark greyish brown beds; unit resistant (GSC locs. 56939, 56981, 56986, 57121, 57242, 57150, 57259, 57260)	46	3,635
95	Limestone: skeletal, cherty; medium grey to medium brownish grey with reddish hue where partly weathered; coarse- to very coarse-grained with rare fine-grained, irregular intervals several inches thick; beds approximately 1 to 3 feet thick; composed mainly of fusulinacean, bryozoan, and brachiopod fragments, which are subrounded to rounded and are coated with limonite; scattered chert grains which are light grey to dark grey, rarely green, rounded to well-rounded, abundant in some beds; sparry calcite cement, some irregular layers with abundant dark grey organic matter with numerous very fine grains of dark and light grey chert,		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	and fossil fragments; several recessive beds 4 to 6 inches thick, of very silty, dolomitic, dark grey shale with abundant organic matter separate the limestone beds; unit weathers medium greyish brown with orange-brown patches; resistant (GSC locs. 56926, 56933, 56993, 57002, 57007, 57029, 57040, 57050, 57120, 57148, 57256, 57268, 57269, 57276)	27	3,589
94	Covered	32	3,562
93	Limestone: skeletal, silty; dark grey; very fine- to fine-grained with numerous larger skeletal fragments; beds approximately 6 inches to 2 feet thick; composed mainly of brachiopod fragments with some bryozoan and echinoderm fragments and numerous foraminifers, numerous quartz silt grains and scattered grains of dark grey chert and glauconite; organic matter disseminated throughout and concentrated in some irregular lenses and laminae; sparry calcite cement; limestone beds separated by 2-inch to 1-foot beds of dark grey, silty, calcareous shale which has abundant organic matter and contains skeletal limestone lenses; shale beds make up approximately 30 per cent of outcrop. Limestone beds weather medium orange-brown; unit resistant (GSC locs. 56917, 56922, 57035, 57037, 57039, 57052, 57267, 57275)	17	3,530
	LOWER PERMIAN		
	Jungle Creek Formation (type section) (1,395 feet thick)		
	Upper Member (945 feet thick)		
92(1)	Covered, recessive	130	3,513
91(2)	Sandstone: quartzose, cherty, calcareous; dark grey to medium brownish grey; very fine- to fine-grained; beds approximately 4 inches to 1 foot thick; poorly developed light grey and dark grey laminae; composed mainly of subangular to subrounded quartz grains with numerous dark grey chert grains; calcite cement; weathers medium to dark greyish brown; resistant; basal contact sharp	18	3,383

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
90(3)	Sandstone: quartzose, cherty, calcareous; light grey with slight green tinge, mottled with light brown in layers; very fine-grained; beds approximately 6 inches to 1 foot thick; composed mainly of angular to subrounded quartz grains, with numerous medium brown to dark grey chert grains and scattered glauconite grains; calcite cement; 1/4- to 1/2-inch thick layers are present, with very numerous fusulinacean foraminifers which make up approximately 30 to 40 per cent of the unit, are oriented with their axes parallel to bedding, and have been abraded (outer shell layers missing in many); unit weathers light brown with slight yellowish tinge, fusulinaceans evident on weathered surface as layers of white specks; rare brachiopods and cup corals are present; unit resistant (GSC locs. 56932, 56937, 56976, 57005, 57066, 57078)	6	3,365
89(4)	Sandstone: as in unit 91(2) containing rare fossil fragments and some irregular laminae and lenses with organic matter, interval 70 per cent covered, but all resistant	22	3,359
88(5)	Covered	246	3,337
87(6)	Limestone: bryozoan-echinoderm; medium to dark grey; medium- to coarse-grained with larger skeletal fragments; beds approximately 6 inches to 2 feet thick, composed of bryozoan fragments with numerous spines, some echinoderm and brachiopod fragments, and rare foraminifers; some spines and echinoderm fragments silicified and replaced by pyrite; rare glauconite grains; cement is finely crystalline calcite; irregular laminae and lenses rich in organic matter; unit resistant	6	3,091
86(7)	Covered, recessive	25	3,085
85(8)	Limestone: micritic-skeletal, cherty, silty; dark grey with light brown and white skeletal fragments; beds 4 inches to 2 feet thick; contains numerous medium- to coarse-grained bryozoan fragments and siliceous spicules, quartz silt grains abundant; numerous worm burrows; organic matter abundant, concentrated in worm burrows; abundant chert replacement throughout; minor intervals, 1 to 2 inches thick, which are very high in organic matter; unit weathers light grey to medium brownish grey; resistant (GSC locs. 56936, 56982, 57000, 57246, 57255)	47	3,060

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
84(9)	Limestone: micritic, silty; medium to dark grey; beds approximately 6 inches to 1 foot thick; numerous angular quartz silt grains and dark brown organic flecks; some brachiopod and bryozoan fragments, much disseminated organic matter; much finely crystalline calcite in matrix (?recrystallized); worm burrows; weathers dark brownish grey to dark orange-brown, resistant	33	3,013
83(10)	Limestone: micritic, silty, as in unit 84(9), but with rare glauconite pellets; numerous worm burrows; forms cliff on riverbank (GSC locs. 56990, 57266)	39	2,980
82(11)	Mudstone: siliceous, silty; dark grey to medium brownish grey; beds approximately 2 to 5 feet thick; composed of subangular quartz and chert silt and very fine-grained sand, with scattered glauconite grains and flecks of dark brown organic matter and associated pyrite; matrix of clay-size quartz; several 6-inch to 1-foot beds which have more organic matter than in rest of unit and are slightly recessive; unit weathers dark brownish grey with many light grey to orange-brown patches; unit slightly recessive (GSC loc. 57006)	31	2,941
81(12)	Mudstone: silty, calcareous to very calcareous; medium brownish grey to dark grey; grades to very silty limestone in part; poorly defined beds up to 10 feet thick; composed of angular quartz silt and very fine sand grains, with numerous very fine-grained calcite skeletal fragments; matrix of clay-size quartz; disseminated, dark brown organic matter and rare glauconite grains; weathers medium brownish grey with orange stain on joint faces, forms slightly recessive breaks in unit. From 6 to 16 feet and from 30 to 34 feet above base of unit there is limestone: bryozoan-echinoderm; medium to dark grey; medium- to coarse-grained with some larger skeletal fragments; beds 1 to 3 feet thick; composed mainly of bryozoan fragments, with some echinoderm and brachiopod fragments and foraminifers, some glauconite infillings in fossil fragments; sparry calcite cement, rare silt grains and small silicified fossil fragments, some patches rich in organic matter; weathers medium brownish grey with much yellowish brown stain; resistant ribs in unit (GSC locs. 56934, 57145)	38	2,910

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
80(13)	Mudstone: calcareous, silty, grading to very silty limestone as in unit 81(12), but with dark grey fresh surface; one bed; weathers dark brownish grey, slightly recessive	15	2,872
79(14)	Limestone: spicular, silicified, dark grey; very fine-grained, with some large skeletal fragments; composed mainly of siliceous spicules with some coral and brachiopod fragments and scattered glauconite grains; abundant disseminated organic matter which is concentrated in worm burrows; beds 2 to 5 feet thick; weathers dark brownish grey with yellowish brown patches; resistant	14	2,857
78(15)	Shale: silty, calcareous; dark grey; no obvious bedding or sedimentary structures; contains abundant disseminated organic matter; weathers medium brownish grey with light grey patches; recessive (GSC loc. 57034)	8	2,843
77(16)	Limestone: spicular, as in unit 79(14) (GSC loc. 56935)	16	2,835
76(17)	Mudstone: silty, calcareous; medium to dark grey; composed of quartz grains with scattered glauconite grains, much dark brown disseminated organic matter and pyrite, which is concentrated in well-defined worm burrows; small skeletal fragments scattered throughout; matrix of clay-size quartz; beds poorly defined; weathers medium brownish grey. Interbedded with this mudstone, in beds 4 inches to 1 foot thick and 2 to 10 feet apart, is limestone: micritic, slightly silty; dark grey; contains much disseminated organic matter concentrated in worm burrows and small lenses, and scattered silt-size quartz grains, brachiopods present; weathers light yellowish brown; makes up approximately 10 per cent of unit (GSC locs. 57010, 57046, 57049)	41	2,819
75(18)	Shale: calcareous, very silty; medium brownish grey; numerous dark brown flecks of organic matter; one bed; weathers medium grey with light grey patches; recessive; brachiopods present (GSC loc. 56960)	12	2,778
74(19)	Limestone: spicular, silty; dark grey; very fine-grained, with some large skeletal fragments; composed of calcareous spicules and other small skeletal fragments (some silicified) with disseminated organic matter and numerous quartz silt grains, numerous worm burrows; matrix contains some clay-size quartz; beds 2 to 5 feet thick; weathers dark brownish grey with yellowish brown patches, resistant (GSC loc. 57059)	15	2,766

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
73(20)	Limestone: micritic, silty, medium to dark grey; abundant dark brown organic matter concentrated in laminae and worm burrows; some calcareous spicules present; abundant quartz silt; clay-size quartz in matrix; weathers medium brownish grey	13	2,751
72(21)	Shale: as in unit 75(18)	8	2,738
71(22)	Limestone: spicular, silty, as in unit 74(19)	16	2,730
70(23)	Limestone: spicular, silty, as in unit 74(19) with increased organic matter in 60 per cent of beds, making them slightly recessive	28	2,714
69(24)	Limestone: skeletal, silty; very fine-grained with some medium- to coarse-grained fragments; mainly very fine-grained indeterminate fossil fragments and quartz silt, abundant disseminated organic matter, minor 6-inch to 1-foot beds of medium-grained fragmental limestone with fossils; unit weathers dark brownish grey, resistant (GSC loc. 57273)	17	2,686
68(25)	Limestone: micritic, very silty; medium brownish grey to dark grey; abundant disseminated organic matter and quartz silt, clay-size quartz in matrix, contains lensing beds, 1 to 2 feet thick, of micritic limestone that is less silty than the rest of the unit and contains rare foraminifers and disseminated organic matter	9	2,669
67(26)	Limestone: spicular, silty; medium to dark grey; very fine-grained; weathers dark brownish grey, resistant	7	2,660
66(27)	Limestone: micritic, silty; medium to dark grey; contains numerous calcite spicules, rare coarse-grained echinoderm and other skeletal fragments, and abundant disseminated organic matter, clay-size quartz in matrix: weathers medium brownish grey, resistant	6	2,653
65(28)	Limestone: spicular, silty; medium to dark grey; very fine-grained; weathers dark brownish grey, resistant (GSC loc. 57044)	7	2,647
64(29)	Shale: calcareous, silty; medium brownish grey; abundant organic matter; weathers medium grey, recessive	11	2,640
63(30)	Limestone: micritic, very silty; medium brownish grey to dark grey; abundant organic matter, clay-size quartz in matrix (GSC locs. 56920, 56959)	10	2,629

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
62(31)	Shale: calcareous, silty, as in unit 64(29) with one bed of micritic, very silty limestone, from 2 to 3 feet above base of unit	8	2,619
61(32)	Limestone: skeletal, glauconitic; medium grey to brownish grey; coarse-grained; composed of skeletal fragments with scattered glauconite grains; bed 2 feet thick; weathers medium yellowish brown to orange-brown; resistant	2	2,611
60(33)	Covered, recessive, with rubble of calcareous, silty shale	24	2,609
59(34)	Mudstone: very silty, calcareous; medium brownish grey to dark grey; mainly quartz silt and very fine sand grains with clay-size quartz in matrix; disseminated organic matter and fine-grained skeletal fragments; weathers medium brownish grey, resistant (GSC loc. 56951)	6	2,585
58(35)	Shale: calcareous, silty; medium brownish grey; grading to calcareous siltstone	11	2,579
	Lower Member (450 feet thick)		
57(36)	Sandstone: quartzose, slightly cherty, very calcareous, very slightly glauconitic; medium to dark grey; very fine-grained; composed of angular quartz grains with scattered dark grey chert grains and rare glauconite grains; abundant foraminifers and other fine-grained, indeterminate skeletal fragments; sparry calcite cement; grades to sandy limestone; scattered small, dark brown masses of organic matter; beds 2 feet thick; weathers medium orange-brown; resistant	4	2,568
56(37)	Shale: very silty, calcareous, grading to calcareous siltstone in part, with three 6-inch to 1-foot beds of orange-brown weathering, resistant, silty limestone at 4- to 6-foot intervals (GSC loc. 56954)	21	2,564
55(38)	Sandstone: as in unit 57(36), but slightly coarser grained; very calcareous, grading to sandy limestone; contains foraminifers and fragments of brachiopods, bryozoans and echinoderms (silicified in part); 2-foot bed with carbonaceous material on top surface (flattened stems)	2	2,543

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
54(39)	Interbedded shale and limestone: Shale: very silty, calcareous; medium brownish grey; makes up 60 per cent of unit; forms intervals up to 10 feet thick, recessive. Limestone: micritic-skeletal, slightly silty; dark brownish grey; numerous skeletal fragments, including bryozoans, brachiopods, ostracods and foraminifers; some scattered quartz silt grains; abundant disseminated organic matter and pyrite; several 4- to 6-inch intervals of coarse-grained skeletal limestone with macrofossils; limestone weathers medium brownish grey and orange-brown; resistant, forms intervals from 2 to 3 feet thick, beds 6 inches to 2 feet thick (GSC locs. 57033, 57143, 57155)	32	2,541
53(40)	Covered, recessive	18	2,509
52(41)	Sandstone: quartzose, cherty, calcareous, dolomitic in part; medium grey with dark grey speckling; fine- to medium-grained, poorly sorted; composed mainly of subangular quartz grains with numerous light brown to dark grey chert grains, scattered glauconite grains; cement composed of interlocking crystals of calcite; rare pyrite crystals; grades to sandy limestone in part; calcite makes up 40 to 60 per cent of the rock in some intervals; abundant dolomite crystals in approximately 20 per cent of outcrop; 1- to 3-foot beds; minor crossbedding in lower 10 feet of unit, rare 1/4- to 1/2-inch laminae with abundant dark grey, very coarse chert grains and pebbles (some up to 1/4-inch maximum diameter); unit weathers light brownish grey with orange stain, resistant	28	2,491
51(42)	Sandstone: quartzose, cherty, calcareous; dark brownish grey; fine-grained angular to subangular grains; composed of quartz (approximately 70 per cent) and light brown to dark grey chert grains (approximately 30 per cent), with minor calcite cement; 1- to 3-foot beds, in intervals of 3 to 5 feet, separated by intervals 6 inches to 1 foot thick, of very sandy, medium grey shale which is recessive and weathers medium to light grey; sandstone weathers light yellowish grey to orange-brown; resistant (GSC loc. 56957)	19	2,463
50(43)	Covered, recessive	23	2,444

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
49(44)	Sandstone: conglomeratic, calcareous, dolomitic; contains numerous subrounded pebbles of light grey, light to medium brown, and dark grey chert (up to 1/4-inch maximum diameter) and numerous pebble-size skeletal fragments (mainly brachiopods, with some echinoderm and bryozoan fragments); some small masses of pyrite present; minor amount of finely crystalline dolomite cement; chert pebbles and fossil fragments make up about 30 per cent of rock; one bed, resistant	1.5	2,421
48(45)	Conglomerate: chert-pebble; medium grey mottled with light and dark grey pebbles; matrix is fine-grained, calcareous, dolomitic sandstone, and makes up 10 to 20 per cent of the rock; pebbles of light grey, dark grey, and pale green chert, rounded to subrounded, mainly 1/8- to 1/4-inch maximum diameter, but some up to 1 inch, size grades down to 1/16-inch maximum diameter and less; one bed; weathers dark grey with light brown mottling; resistant	.5	2,419.5
47(46)	Sandstone: quartzose, cherty, slightly glauconitic, very calcareous, grades to sandy limestone, scattered foraminifers; beds 1 to 2 feet thick, weathers orange-brown; resistant	4	2,419
46(47)	Covered, recessive	75	2,415
45(48)	Shale: silty, calcareous; with abundant organic matter; dark brownish grey, recessive, mainly rubble (GSC loc. 56962)	3	2,340
44(49)	Covered, recessive	19	2,337
43(50)	Limestone: skeletal, sandy, conglomeratic, slightly glauconitic; medium grey, mottled with dark grey; composed mainly of fine-grained to pebble-size skeletal fragments (mainly brachiopods, with some bryozoans, foraminifers, and ostracods), cemented by sparry calcite; numerous very fine to fine grains of subangular quartz and chert (light to dark grey) and rare, fine glauconite grains scattered throughout; also numerous scattered granules and small pebbles of light to dark grey, light green and brown chert (subangular to subrounded); quartz and chert make up 20 to 30 per cent of rock; one bed; weathers medium orange-brown to yellowish brown; resistant	2.5	2,318
42(51)	Limestone: skeletal, sandy; medium to dark grey; very fine- to fine-grained; composed of skeletal fragments (brachiopods and calcispheres,		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	rare foraminifers) with sparry calcite cement; contains numerous (40 per cent) subangular, fine grains of quartz and chert (light and dark grey, brown, pale green), grades to sandstone; some thin layers contain rounded small chert pebbles; beds 1 to 2 feet thick; weathers orange-brown to yellowish brown; resistant	4.5	2,315.5
41(52)	Conglomerate: chert-pebble, slightly calcareous; mottled light and dark grey; pebbles up to 1 inch maximum diameter, subrounded to rounded, poorly sorted, light grey, dark grey, brown, and pale green chert; matrix is fine, medium and coarse grains of chert (similar in color to pebbles), subangular with small amount of calcite cement; upper 2 feet of unit are very coarse-grained sandstone with "floating" chert pebbles; contains same grains and pebbles as in rest of unit, but chert cement; unit weathers dark grey with light grey patches, resistant	8	2,311
40(53)	Covered, recessive, small outcrop, 17 feet below top of unit, of dark brownish grey, silty, calcareous shale with abundant organic matter (GSC loc. 56955)	51	2,303
39(54)	Sandstone: cherty, quartzose, calcareous; dark grey; fine-grained; composed of approximately equal proportion of quartz and chert grains, subangular to subrounded, chert is light grey, dark grey, and brown; sparry calcite cement, rare brachiopod fragments and small pyrite masses; some iregular lensing beds (up to 4 inches thick) with numerous dark grey, light grey, light brown and pale green chert pebbles up to 2 inches maximum diameter, rounded to subrounded; these beds make up about 5 per cent of outcrop; sandstone beds 1 to 2 feet thick, unit weathers medium to dark brownish grey with yellow and orange-brown stain; resistant	5	2,252
38(55)	Shale: silty, calcareous; dark brownish grey; beds 1 inch to 3 feet thick; weathers dark brownish grey; recessive; makes up approximately 70 per cent of unit. Contains beds, 2 to 6 inches thick, of limestone, recrystallized; light to medium brownish grey; very finely crystalline to microcrystalline; composed of interlocking anhedral calcite		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	crystals with dark brown organic matter and pyrite disseminated throughout and forming irregular laminae; weathers medium grey to orange-brown and stands out as ribs between shale beds (GSC locs. 56953, 57038)	71	2,247
37(56)	Conglomerate: chert-pebble; medium grey mottled with light and dark grey, poorly sorted, complete size range from coarse grains to pebbles with 2-inch maximum diameter; pebbles and grains are almost entirely chert (mainly dark grey with some light grey, brown, and green), some quartz grains; grains are subangular, pebbles rounded; cement is microcrystalline quartz mosaic, several lensing beds (up to 6 inches thick) of sandstone, dark grey, mottled with light grey; medium- to very coarse-grained; same composition and colours as grains in conglomerate, but 10 to 20 per cent quartz grains, quartz cement; sandstone makes up approximately 30 per cent of outcrop, contains some scattered chert pebbles; unit weathers deep reddish brown to dark grey, mottled with chert-pebble colours; forms resistant rib causing abrupt bend in river	12	2,176
36(57)	Sandstone: similar to lenses of sandstone in unit 37(56) but with sparry calcite cement and some skeletal fragments	9	2,164
35(58)	Covered, recessive	21	2,155
34(59)	Conglomerate: as in unit 37(56), but no sandstone beds	7	2,134
33(60)	Sandstone: cherty, dark grey, as in unit 37(56) with rare dark grey chert pebbles	9	2,127
	LOWER AND UPPER CARBONIFEROUS		
	Unnamed equivalents of Upper Hart River and Ettrain Formations (2,118 feet thick)		
32	Covered	64	2,118
31	Shale: calcareous, slightly silty; dark brownish grey; weathers dark grey; recessive (GSC locs. 57032, 56924)	4	2,054
30	Shale: very calcareous; dark brownish grey; contains numerous very fine fossil fragments, rare glauconite grains, rare large fossil fragments (brachiopods); beds 4 inches to 1 foot thick; weathers dark brownish grey with orange-brown stain; moderately resistant;		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	within unit are several beds, 1 to 2 feet thick, of limestone, fragmental, argillaceous; dark brownish grey with some light grey mottling; medium- to very coarse-grained, with numerous larger fossil fragments; composed largely of fossil fragments (mainly echinoderms, brachiopods and bryozoans with rare foraminifers) with matrix of very finely crystalline calcite and scattered argillaceous material; some indistinct worm burrows; rare blebs of glauconite filling spaces in fossil fragments; weathers medium brownish grey with orange-brown stain; from 2,006 to 2,029 feet this limestone makes up 70 per cent of outcrop; above 2,029 feet it makes up 20 per cent of outcrop (GSC locs. 56970, 57247)	44	2,050
29	Shale: very calcareous, slightly silty; dark grey; much less calcareous from 1,989 to 1,996 feet; recessive; weathers dark grey; bed, 3 feet thick, of more resistant calcareous shale, as in unit 30, from 1,996 to 1,999 feet (GSC locs. 57030, 56993)	17	2,006
28	Alternating limestone and shale: Limestone: spicular, argillaceous; medium to dark grey; composed largely of spicules (silicified in part) with cement of finely crystalline calcite and much disseminated argillaceous material; numerous worm burrows; many dark grey to black flecks of ?organic material; beds 1 to 3 feet thick; weathers medium greyish brown with yellowish and orange-brown stain; resistant; makes up approximately 58 per cent of outcrop, in 1- to 10-foot intervals. Shale: very calcareous; dark brownish grey; contains numerous very fine calcite ?fossil fragments, some of which are silicified; some pyrite blebs; beds 4 inches to 1 foot thick; weathers dark brownish grey; moderately resistant (GSC locs. 57004, 56938)	135	1,989
27	Limestone: skeletal-micritic, argillaceous, silty; medium to dark grey; medium- to coarse-grained with many large fossil fragments; composed mainly of fossil fragments (brachiopods, with some bryozoan and echinoderm fragments); rare glauconite fillings, much disseminated argillaceous material; scattered angular silt grains and very fine sand grains of quartz; one bed; resistant	4	1,854

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
26	Covered, recessive	32	1,850
25	Limestone: as in unit 28 (GSC loc. 57075)	8	1,818
24	Siltstone: calcareous, argillaceous; dark grey; weathers dark brownish grey; no obvious bedding; recessive	7	1,810
23	Limestone: similar to limestone in unit 28, but fewer spicules, more argillaceous material, and numerous fragments of brachiopods, bryozoans and echinoderms; some beds, 6 inches to 1 foot thick, of shale, as in shale of unit 28, making up less than 10 per cent of outcrop (GSC loc. 57147)	43	1,803
22	Alternating limestone and shale, as in unit 28, with several 2-foot thick beds of calcareous, argillaceous siltstone near base. Limestone: in beds, 2 to 15 feet thick, makes up about 65 per cent of outcrop. Shale: in beds, 1 to 9 feet thick, makes up about 30 per cent of outcrop. Siltstone makes up about 5 per cent of outcrop	108	1,760
21	Covered, slightly recessive	10	1,652
20	Shale: very calcareous, silty; dark brownish grey; contains numerous silt-size calcite grains and quartz grains; some pyrite blebs, and numerous worm burrows; irregular laminae present, defined by concentrations of argillaceous material; no obvious bedding; weathers dark brownish grey with some reddish brown stain; slightly recessive; from 1,626 to 1,633 feet there are several 4- to 6-inch thick beds of shale, as in unit 28; the interval from 1,615 to 1,617 1/2 feet is composed of limestone, as in unit 28 (GSC loc. 57036)	49	1,642
19	Limestone: as in unit 28, but fewer spicules; grades to calcareous siltstone in approximately 10 per cent of outcrop (GSC loc. 57263)	43	1,593
18	Shale: calcareous, silty, as in unit 20	5	1,550
17	Shale: as in unit 28	16	1,545
16	Limestone: as in unit 28	16	1,529

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
15	Shale: calcareous, very silty; dark grey; one bed; contains solitary corals (GSC loc. 56944)	1.5	1,513
14	Limestone: as in unit 28	2.5	1,511.5
13	Shale: calcareous, silty; dark brownish grey; contains numerous silt-size calcite grains and scattered quartz grains; numerous large fossil fragments (bryozoans and brachiopods); grades to very argillaceous limestone in part; beds 1 to 5 feet thick; weathers light to medium grey with some yellowish brown stain; resistant; at 1,494 to 1,495 feet there is a lensing bed of limestone, as in unit 28	20	1,509
12	Limestone: as in unit 28, with minor 2- to 6-inch thick beds of shale, as in unit 13 (10 per cent of outcrop)	28	1,489
11	Alternating limestone and shale. Limestone: spicular, argillaceous, as in unit 28, more argillaceous in part, grading to calcareous shale, some beds contain much silt-size quartz and few spicules; 1 1/2- to 15-foot thick beds; makes up about 55 per cent of outcrop; resistant. Shale: as in unit 13, in 1 1/2- to 30-foot thick beds (mainly 1 1/2 to 5 feet thick); makes up about 45 per cent of outcrop; relatively recessive (GSC locs. 56930, 56931, 56994, 57063, 57071, 57278). Interval from 1,263 to 1,298 feet in middle of unit is covered	241	1,461
10	Alternating limestone and shale. Limestone: spicular, argillaceous, as in unit 28, approximately 55 per cent of outcrop in intervals of 1 to 30 feet, rarely up to 45 feet. Shale: silty, calcareous, pyritic (blebs and stringers); dark grey; in intervals of 2 to 20 feet; weathers medium to dark grey; recessive (GSC locs. 56940, 56987, 57028, 57062, 57072). Rare thin beds of limestone, skeletal-micritic, glauconitic, spicular, medium to dark grey, coarse-grained, scattered throughout unit	381	1,220
9	Covered	237	839
8	Shale: calcareous, slightly silty, pyritic; dark grey with slight brown tinge; no bedding seen; weathers dark brownish grey; recessive	3	602

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
7	Covered, recessive	26	599
6	Shale: as in unit 8	6	573
5	Covered, recessive	35	567
4	Shale: as in unit 8	13	532
3	Covered, recessive	25	519
2	From 431 to 494 feet, shale, as in unit 8. From 284 to 431 feet, shale: slightly silty, pyritic; dark grey with slight brown tinge; weathers dark brownish grey with orange stain; recessive; contains 4-inch to 1-foot thick beds (rarely up to 2 feet thick) of - Siltstone: pyritic, slightly calcareous; medium greenish grey; contains numerous small blebs and crystals of pyrite; weathers medium orange-brown; resistant; occurs as beds at 2- to 20-foot intervals in shale and scattered between as small and large lenses, makes up less than 5 per cent of outcrop; much less pyritic and more calcareous from 284 to 431 feet, and contains worm burrows (GSC locs. 56919, 56949, 56950, 56952, 56961, 56975)	210	494
1	Covered, recessive, shale visible across river	284	284
	Interval below section contorted, not measured, thickness estimated at 10 to 20 feet; consists of chert: dark grey; conchoidal fracture; beds regular, 1/2 to 2 inches thick; weathers dark grey with dark reddish brown stain.		

SHEEP MOUNTAIN SECTION (116F-1)

Located in northern Ogilvie Mountains on south face of Sheep Mountain, approximately 4 miles east of Tatonduk River; 65°07 1/2'N, 140°32'W; aerial photograph A13138-237, east and slightly south of center; base of section at photo co-ordinates X=+3.6, Y=-2.8, top of section at photo co-ordinates X=+3.65, Y=-2.5. Measured by E.W. Mountjoy and U. Upitis, 1962, through upper Jungle Creek Formation and Tahkandit Formation.

MIDDLE PERMIAN [Ufimian-Kazanian (Guadalupian)]

Tahkandit Fm.	846 feet (incomplete)
Jungle Creek Fm.	345 feet (incomplete)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	MIDDLE PERMIAN		
	Tahkandit Formation (846 feet thick, incomplete)		
21	Limestone: skeletal, cherty; light brown; very fine- to fine-grained; fossiliferous; abundant replacement by light grey chert in irregular patches and lenses; beds, 1 to 2 feet thick, of dark bluish grey chert at base, which truncates bedding of underlying unit along a very undulatory contact; chert makes up 50 per cent in most of upper 119 feet of unit; at 100 feet above base, limestone becomes fine-grained, light brown, very cherty, and is interbedded with light to medium grey chert, alternating in beds 4 inches to 2 feet thick; upper 27 feet of unit are chert; unit weathers light greyish brown with orange lichen, in sharp contrast with light grey weathering limestone below; resistant (GSC locs. 52756, 52761, 52762)	134	1,191
	(Moved along strike 1/4 mile to west after measuring unit 20)		
20	Limestone: ?spicular, slightly silty; light to medium grey; very fine-grained; almost entirely ?spicules with rare silt grains; irregular nodules and patches of medium to dark grey chert from 1/2 to 2 inches thick, spaced fairly regularly at 1/2- to 2-foot intervals; above 60 feet from base, chert layers and lenses are spaced 2 to 4 feet apart and average 10 inches in thickness; unit weathers brownish grey; resistant and massive (GSC locs. 52755, 52758, 52759)	387	1,057

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
19	Limestone: silty to slightly silty, slightly cherty; light brownish grey; very fine-grained; partly recrystallized skeletal fragments (?spicules); traces of laminations with concentrations of organic matter; 3-inch to 3-foot thick beds well developed; unit weathers light brown with light grey to white lichen, several lighter brown weathering layers, 1 to 6 inches thick, of less silty limestone; resistant	18	670
18	Limestone: silty, cherty; medium grey; very fine-grained; mainly indeterminate skeletal fragments in chert matrix, grading to calcareous chert; 1- to 12-inch thick indistinct beds; rare light grey weathering lenses and beds, 1 to 6 inches thick, of light grey, dolomitic limestone; rare medium grey chert lenses and nodules; middle of unit contains cherty, spicular limestone with poor laminations of organic matter and very irregular chert nodules and lenses from 1/4 to 6 inches thick; unit weathers light grey and forms basal part of main cliff; *Zoophycos* on bedding surface 4 feet above base of unit	61	652
17	Limestone: slightly dolomitic, slightly silty, cherty; very fine-grained skeletal fragments, partly recrystallized; 2- to 18-inch thick beds; 1- to 4-inch thick beds and rare partings of medium grey siltstone weathering dark grey; unit as a whole weathers light grey and forms a slightly recessive interval; gradational into overlying unit	27	591
16	Limestone: dolomitic in part, slightly silty; light grey; very fine-grained; partly recrystallized skeletal fragments; minor chert in matrix; beds 3 to 15 feet thick, basal 9 feet thinner bedded and recessive; top 46 feet contain regular lenses and beds, 1 to 4 inches thick, of limestone, cherty, dolomitic, spicular, light brown, recrystallized, numerous burrows with concentrations of organic matter; more recessive than surrounding rock; contains occasional patches of medium grey chert; unit weathers light grey, in part yellowish brown; very massive and resistant	154	564
15	Chert: spicular, slightly calcareous; medium grey; mainly siliceous spicules with some calcareous spicules, small masses of finely		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	to medium crystalline calcite and irregular laminae rich in organic matter; bedding obscure; weathers light grey to light brown; very resistant, except for prominent recessive interval at base	24	410
14	Chert: spicular; medium grey; some layers and irregular lenses of calcareous chert with small masses of finely to medium crystalline calcite and irregular laminae rich in organic matter; in upper 21 feet of unit there are irregular patches of medium brownish grey dolomite, microcrystalline, not over 2 inches thick; chert beds 1/2 to 2 feet thick, poorly developed; unit weathers light to medium grey; resistant	41	386
	LOWER AND ?MIDDLE PERMIAN		
	Jungle Creek Formation (345 feet thick, incomplete)		
13	Siltstone: medium grey; poorly developed beds 10 to 12 inches thick; rare fossil fragments; 1- to 2-foot thick beds of calcareous, light grey siltstone, weathering very light brown, situated 15, 25, 33, 41, and 80 feet above base of unit; lenses and layers of chert, 1 to 12 inches thick, becoming prominent near the top; unit weathers reddish to yellowish brown; fairly resistant with top forming cliff	82	345
12	Mudstone: silty; medium to dark grey; contains 2-foot thick bed of medium grey, brown-weathering, strongly calcareous siltstone; unit weathers dark grey; recessive	26	263
11	Mudstone: siliceous, silty; medium grey; disseminated organic matter and pyrite, traces of fossil fragments, abundant siliceous spicules; weathers reddish brown to medium grey; moderately resistant	8	237
10	Mudstone: silty; medium grey; contains concretions and lenses, 6 to 12 inches thick, of medium grey, very fine-grained, slightly silty, skeletal limestone; unit weathers medium grey; very recessive	33	229

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
9	Mudstone: cherty, silty, slightly glauconitic; dark grey; contains disseminated organic matter and pyrite; bedding obscure; weathers reddish brown; moderately resistant; gradational over 1 to 2 feet into adjacent units	28	196
8	Shale: slightly silty; dark grey; weathers dark grey with reddish brown stain; recessive	24	168
7	Mudstone: as in unit 4; weathers reddish brown; moderately resistant	25	144
6	Siltstone: argillaceous; dark grey; weathers dark grey; recessive	7	119
5	Mudstone: as in unit 4; some chert in basal 3 feet, weathers reddish brown; moderately resistant	20	112
4	Mudstone: silty, cherty, glauconitic; medium grey with light grey streaks; disseminated organic matter and pyrite; beds distinct, 2 to 5 feet thick; upper and lower contacts gradational; weathers medium brownish grey; very resistant	34	92
3	Mudstone: silty, cherty, slightly glauconitic; medium to dark grey; disseminated organic matter and pyrite; obscure 2- to 3-foot thick beds; contains chert beds 1/2 to 3 feet thick, spaced 1 to 2 feet apart; weathers greyish brown; moderately resistant	38	58
2	Covered	11	20
1	Mudstone: slightly silty, cherty; dark grey; no bedding seen; weathers brown; recessive	9	9

MONSTER SYNCLINE SECTION (116F-5)

Located in northern Ogilvie Mountains, approximately 10 miles southeast of Sheep Mountain; 65°04'N, 140°14 1/2'W; aerial photograph A13231-161, slightly north and west of center; base of section at photo co-ordinates X=-1.3, Y=+3.1; top of section at photo co-ordinates X=-1.3, Y=+2.8. Measured by E.W. Mountjoy and U. Upitis, August, 1962, in north limb of Monster Syncline, through Tahkandit Formation.

?UPPER TRIASSIC (covered)
(Disconformity)

MIDDLE PERMIAN [Kazanian (Guadalupian)]
Tahkandit Fm. 358 feet

(Underlain by covered, recessive ?shale of upper Jungle Creek Formation)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	MIDDLE PERMIAN		
	Tahkandit Formation (358 feet thick)		
6	Chert: calcareous; medium brown-grey, with lenses and nodules of purer chert, generally lighter in colour, some chert is white with fine crenulated banding; indistinct 1/2- to 2-foot thick beds; weathers light brown; fine-grained limestone in lower half of unit, in part coquina; chert in upper half of unit, light grey, with darker grey patches; unit resistant, castellated	27	358
5	Limestone and chert: as in unit 3, with lenses and nodules of limestone, light grey, very fine-grained, beds 1/2 to 3 feet thick, prominent laminated chert structure from 25 to 43 feet above base; above 43 feet most of the limestone is light grey, very fine- to fine-grained; 91 feet above base of unit some of the limestone is fine to medium grained, possibly dolomitic (GSC locs. 52754, 52757, 52763)	214	331
4	Covered, forms a prominent bench in cliff	2	117
3	Limestone: very cherty, spicular; medium to dark grey, with numerous thin interbeds, lenses and nodules of dark grey chert, which are predominantly 1/2 to 2 inches thick and form 30-40 per cent of rock, with lenses and nodules of limestone, light grey, very fine-grained to micritic; beds 2 to 18 inches thick; unit weathers light grey; forms a resistant cliff (GSC loc. 52760)	68	115

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
2	Covered	11	47
1	Limestone: micritic, spicular; medium grey, suggestion of fine laminations, with 1- to 4-inch thick interbeds and lenses of chert, dark grey, grading laterally into limestone; one very large chert nodule at base of exposure; 1- to 12-inch thick beds; unit weathers light grey; moderately resistant, chert forms 20 to 30 per cent of rock	36	36

JUNGLE CREEK EAST SECTION (116F-9)

Located in northern Ogilvie Mountains between headwaters of Jungle Creek and Ettrain Creek, approximately 10 miles east of Yukon-Alaska boundary; 65°23'N, 140°40'W; aerial photograph A13138-232, west and south of center; base of section at photo co-ordinates X=-2.95, Y=-3.5; top of section at photo co-ordinates X=-7.0, Y=-3.8; section line passes through photo co-ordinates X=-4.2, Y=-3.7, and X=-4.6, Y=-5.3. Measured by E.W. Bamber and D. Mayes, August, 1962, through upper Hart River Formation (undivided), Ettrain Formation and most of Jungle Creek Formation. Includes type section of Ettrain Formation; unit numbers from original description (Bamber and Waterhouse, 1971, pp. 227-233) are included in parentheses with new numbers assigned to corresponding units here.

LOWER PERMIAN [Asselian-Artinskian (Wolfcampian-Leonardian)]
Jungle Creek Fm. 1,871 feet (incomplete)

UPPER CARBONIFEROUS [Upper Namurian-?Orenburgian (Morrowan-?Virgilian)]
Ettrain Fm. (type section) 1,800 feet
Hart River Fm. (undivided; lower age limit not determined) 1,371 feet (incomplete)

LOWER PERMIAN

Jungle Creek Formation
(1,871 feet thick, incomplete)

151	Sandstone, as in unit 138, but slightly calcareous	45	5,042
150	Sandstone, as in unit 138	30	4,997
149	Sandstone, as in unit 138, but slightly calcareous	14	4,967
148	Mudstone: slightly calcareous with brachiopods, as in unit 130 (4,552 to 4,557 feet) (GSC loc. 54001)	8	4,931

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
147	Sandstone, as in unit 138, but slightly calcareous	20	4,945
146	Covered, non-recessive	18	4,925
145	Sandstone, as in unit 138	12	4,907
144	Covered, non-recessive	9	4,895
143	Mudstone: siliceous, slightly calcareous with brachiopods, as in unit 130 (4,552 to 4,557 feet), with 8-inch thick bed, at 4,883 feet, of limestone, skeletal-micritic, silty, sandy; dark grey; coarse- to very coarse-grained bryozoan, echinoderm, and brachiopod fragments in silty, micritic matrix; numerous medium to coarse, angular chert grains throughout; bed weathers orange-brown; much of fossil debris silicified and stands out on surface (GSC loc. 54000)	8	4,886
142	40 per cent covered, 60 per cent outcrop in 1- to 4-foot intervals of sandstone, as in unit 138	37	4,878
141	Covered, slightly recessive	13	4,841
140	Sandstone, as in unit 138	24	4,828
139	Covered, slightly recessive	14	4,804
138	Sandstone, siliceous; medium to dark grey; very fine-grained; chert and quartz sand grains with minor matrix of clay-size quartz; beds 4 inches to 1 foot thick; weathers medium to dark greyish brown; resistant	75	4,790
137	Covered, slightly recessive	16	4,715
136	Mudstone: siliceous, very silty, as in unit 130	24	4,699
135	Covered, slightly recessive	20	4,675
134	Mudstone: siliceous, very silty, as in unit 130	3	4,655
133	Covered, non-recessive	11	4,652
132	Mudstone: siliceous, very silty, as in unit 130	6	4,641
131	Covered, recessive	43	4,635

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
130	Mudstone: siliceous, very silty, grading to siltstone in part; medium to dark grey with orange-brown flecks; silt-size quartz with abundant dark brown organic matter; from 4,552 to 4,557 feet, mudstone is slightly calcareous and contains brachiopods; from 4,557 to 4,561 feet, mudstone is non-calcareous, very argillaceous; beds commonly 4 inches to 1 foot thick, some up to 3 feet thick; unit weathers medium to dark greyish brown with orange-brown patches; resistant (GSC loc. 53999)	40	4,592
129	Covered, recessive; appears from rubble to be shale, as in unit 128	335	4,552
128	Shale: silty, dolomitic; dark brownish grey; some 2- to 4-inch thick nodular beds of dark grey siltstone; weathers dark grey; recessive	155	4,217
127	Conglomerate: chert-pebble, calcareous; dark brownish grey mottled with light and dark grey; pebbles up to 1/4 inch maximum diameter, rounded, mainly light grey, medium brown, and dark grey chert, with some quartz, some ?radiolarian chert; matrix is silty skeletal-micritic limestone, as in unit 126; one 5-foot thick lensing bed, which is discontinuous along strike; weathers medium brownish grey to orange-brown, mottled with dark grey and light grey pebbles; resistant (GSC loc. C-2757)	5	4,062
126	Limestone: skeletal-micritic, slightly siliceous, silty; dark grey; fine- to coarse-grained bryozoan, echinoderm and brachiopod fragments in micrite matrix with some clay-size quartz and organic matter; much angular to subrounded quartz and chert silt; skeletal fragments partly dolomitized; this limestone grades upward into siltstone, dolomitic; dark grey; angular quartz and chert silt grains with numerous small masses of organic matter in matrix of microcrystalline dolomite; unit has beds 6 inches to 2 feet thick; weathers medium greyish brown with rusty brown intervals near top; resistant	6	4,057
125	Shale: silty, dolomitic; dark grey; contains beds up to 2 feet thick of siltstone, dark grey with orange flecks, weathers orange-brown to medium brownish grey, occurs about every 10 to 15 feet, making up less than 5 per cent of outcrop; shale weathers dark grey, recessive	65	4,051

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
124	Mainly covered, resistant; rubble consists mainly of medium to dark grey, echinoderm-bryozoan limestone with rare intervals of dark grey, dolomitic siltstone	31	3,986
123	Mudstone: silty, siliceous, as in unit 113	12	3,955
122	Covered, recessive	4	3,943
121	Limestone: skeletal-micritic, siliceous, silty, with much organic matter; dark grey; fine- to very coarse-grained bryozoan and echinoderm fragments in micritic matrix with clay-size quartz, abundant subrounded quartz and chert silt grains throughout; much dark brown organic matter, mainly in matrix, but also filling pore spaces in skeletal fragments; some skeletal fragments partly silicified; partings of calcareous, silty shale from 3,915 to 3,927 feet; silty, coarse-grained skeletal limestone with brachiopods from 3,938 to 3,939 feet; beds 1/2 to 2 feet thick; unit weathers dark grey with slight brown tinge; resistant (GSC locs. 53997, 53998)	24	3,939
120	Covered, recessive	8	3,915
119	Limestone: bryozoan-echinoderm, as in unit 108	4	3,907
118	Mudstone: siliceous, silty, as in unit 113	8	3,902
117	Covered, recessive	57	3,895
116	Limestone: bryozoan-echinoderm with scattered medium- to very coarse-grained chert sand; medium grey with orange flecks; medium- to very coarse-grained bryozoan and echinoderm fragments, with rare brachiopod fragments and fusulinacean foraminifers, in sparry calcite cement; scattered medium to light grey, medium- to coarse-grained, rounded chert grains with some pebbles up to 1/4 inch maximum diameter, chert abundant in 10 per cent of exposure (1/2- to 2-inch intervals); some skeletal fragments silicified; dark brown organic matter fills pore spaces in many skeletal fragments; unit weathers medium orange-brown with chert grains and silicified skeletal fragments standing out on surface; unit is resistant (GSC loc. C-2756)	20	3,838
115	Covered	3	3,818

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
114	Limestone: skeletal-micritic, as in unit 112	15	3,815
113	Mudstone: very silty, siliceous; medium grey with orange flecks and dark grey lenses and stringers up to 1/8 inch thick; composed of angular quartz and chert silt and very fine sand with matrix of clay-size quartz and very finely crystalline dolomite rhombs; pyrite and dark brown organic matter throughout, concentrated in irregular lenses and stringers; beds 1 to 2 feet thick; weathers medium brownish grey; resistant	21	3,800
112	Limestone: skeletal-micritic, silty, dolomitic; dark grey; mainly medium- to very coarse-grained bryozoan fragments with some brachiopod and echinoderm fragments, some skeletal fragments partly silicified; abundant silt grains of quartz and chert; micritic matrix with much microcrystalline dolomite and numerous very fine- to fine-grained indeterminate skeletal fragments; dark brown organic matter and pyrite throughout; beds 1/2 to 2 feet thick; weathers medium brownish grey; resistant	25	3,779
	At 3,754 feet, section cut by small fault, displacement of about 50 feet, beds matched on either side and section continued		
111	Covered, recessive	17	3,754
110	Limestone, as in unit 108, but no skeletal-micritic limestone	2	3,737
109	Covered, slightly recessive	12	3,735
108	Limestone: bryozoan-echinoderm; dark grey; medium- to very coarse-grained bryozoan and echinoderm fragments with brachiopods and rare horn coral fragments and fusulinaceans in some beds; sparry calcite cement; scattered very finely crystalline dolomite rhombs; some skeletal-micritic, silty limestone with fine-grained bryozoan and echinoderm fragments in micritic matrix containing very finely crystalline dolomite rhombs; unit weathers medium orange-brown and dark grey; resistant (GSC locs. 53995, 53996 - talus)	33	3,723
107	Covered	5	3,690

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
106	Limestone: bryozoan; dark grey with orange flecks; mainly medium- to very coarse-grained bryozoan fragments, with some echinoderm and brachiopod fragments and rare fusulinaceans; sparry calcite cement; some skeletal fragments partly silicified; unit weathers medium orange-brown; resistant	14	3,685
105	Limestone: skeletal-micritic, silty; dark grey; contains numerous fine- to medium-grained bryozoan and echinoderm fragments; silty, calcareous shale partings present; 20 per cent of unit composed of 2- to 6-inch thick beds of skeletal-micritic, dolomitic, silty limestone with much organic matter in matrix; unit weathers dark grey; recessive	13	3,671
104	Covered, recessive	19	3,658
103	Limestone: bryozoan-echinoderm; dark grey; medium- to very coarse-grained bryozoan and echinoderm fragments with numerous fusulinaceans and some brachiopod fragments; rare quartz silt grains and medium to very coarse chert grains; sparry calcite cement; some skeletal fragments partly silicified; weathers medium orange-brown; resistant (GSC loc. C-2755)	22	3,639
102	Covered	3	3,615
101	Conglomerate: as in unit 90, with 6-inch thick bed of skeletal limestone with chert pebbles at base of unit; beds 1/2 to 2 feet thick; unit weathers medium brownish grey; resistant	8	3,614
100	Covered, recessive	14	3,606
99	Limestone: bryozoan-echinoderm; medium to dark grey; medium- to very coarse-grained bryozoan and echinoderm fragments with some fusulinaceans and brachiopod fragments; sparry calcite cement; some skeletal fragments partly silicified; 1- to 6-inch thick irregular beds; unit weathers medium orange-brown, resistant (GSC loc. C-2754a)	10	3,592
98	Conglomerate: as in unit 96, but large-scale crossbedding present; rare 1- to 6-inch thick lenses of very coarse-grained skeletal limestone with chert sand and pebbles	15	3,582
97	Covered, recessive	8	3,567

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
98	Conglomerate: as in unit 96, but large-scale crossbedding present; rare 1- to 6-inch thick lenses of very coarse-grained skeletal limestone with chert sand and pebbles	15	3,582
97	Covered, recessive	8	3,567
96	Conglomerate: chert pebbles; light to medium brownish grey with dark grey mottling; composed of moderately to well-rounded chert pebbles and rare, very coarse-grained bryozoan and echinoderm fragments, with coarsely crystalline calcite cement containing numerous coarsely crystalline dolomite rhombs; chert pebbles are light grey, dark grey, brown, and pale green, and some are composed of ?radiolarian chert; much medium- to very coarse-grained chert sand is present between pebbles, which range up to 1/2 inch maximum diameter in most of the unit; on the top surface of the unit there are pebbles and cobbles from 1 to 6 inches maximum diameter; some 2- to 6-inch thick lensing beds contain numerous skeletal fragments that predominate over the chert pebbles; unit weathers dark grey; resistant	13	3,559
95	Covered, with rare outcrops of bryozoan-echinoderm limestone with chert pebbles, as in unit 94	37	3,546
94	Limestone: bryozoan-echinoderm, as in unit 86, but with no chert or quartz grains	7	3,509
93	Covered, recessive	23	3,502
92	Limestone: bryozoan-echinoderm, as in unit 86, but contains chert pebbles up to 1/4 inch maximum diameter in lower 6 feet; abundance of chert pebbles increases upward and maximum diameter reaches 2 inches in upper 2 feet; upper 4 inches are conglomerate; unit weathers medium orange-brown and dark grey; resistant	8	3,479
91	Covered, resistant	3.5	3,471
90	Conglomerate: chert pebble; light to medium grey with dark grey mottling; mainly chert pebbles and very coarse-grained chert sand; coarsely crystalline calcite cement with rare bryozoan and echinoderm fragments and abraded fusulinaceans; pebbles and sand grains moderately to well rounded, composed mainly of microcrystalline quartz with some ?radiolarian chert and rare calcareous sandstone pebbles; scattered irregular pebbles from 1/4 to 2 inches maximum diameter; large-scale crossbedding from 3,461 to 3,466 feet; unit weathers dark grey, resistant (GSC loc. C-2754)	6.5	3,467.5

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
89	Covered, recessive	15	3,461
88	Limestone: skeletal-micritic, silty, dolomitic as in unit 83 with bryozoan-echinoderm limestone (as in unit 86) from 3,444.5 to 3,446 feet	49	3,446
87	Covered, recessive	27	3,397
86	Limestone: bryozoan-echinoderm; medium to dark grey, mottled light brown; medium- to very coarse-grained bryozoan and echinoderm fragments with some brachiopod fragments and rare fusulinaceans; rare medium to very coarse, rounded chert and quartz sand grains, chert light grey and brown; sparry calcite cement; pore spaces in skeletal fragments filled with micrite, numerous small masses and crystals of pyrite, rare patches of chert replacement; irregular beds, 1 to 6 inches thick; unit weathers medium orange-brown; resistant (GSC loc. C-2753)	17	3,370
85	Covered, recessive	43	3,353
84	Conglomerate: chert pebbles, calcareous; light to medium grey with dark grey mottling; mainly chert pebbles, less than 1/8 inch maximum diameter, rarely up to 1/4 inch, subrounded to well rounded; matrix is angular to subrounded, poorly sorted chert grains and indeterminate skeletal fragments with bryozoan and abraded fusulinaceans, sparry calcite cement; some pyrite masses replacing matrix; chert grains and pebbles are light to dark grey and medium brown, mainly microcrystalline quartz with ?radiolarian chert; pebbles are coarsest from 3,297 to 3,310 feet; some poorly developed crossbedding; beds 6 inches to 2 feet thick, irregular; unit weathers dark grey with slight brown tinge; resistant (GSC loc. C-2752)	18	3,310
83	Limestone: skeletal-micritic, dolomitic, very silty; dark grey; fine-grained, indeterminate skeletal fragments with medium- to coarse-grained echinoderm and bryozoan fragments; abundant silt and very fine sand grains of quartz and chert, which predominates in some beds; micritic matrix with much microcrystalline dolomite, organic matter and pyrite; unit weathers medium brownish grey; resistant	33	3,292
82	Limestone: bryozoan, as in unit 79	7	3,259

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
81	Shale: silty, calcareous; medium to dark grey, similar to that in unit 74; interbedded with 2-inch thick beds of bryozoan limestone, from 3,250 to 3,252 feet, as in unit 79; weathers dark grey; recessive	13	3,252
80	Covered, recessive	10	3,239
79	Limestone: bryozoan; medium brownish grey; mainly medium- to very coarse-grained bryozoan fragments with echinoderm and brachiopod fragments and rare calcareous foraminifers; some fragments partly silicified, many have pore spaces filled with micrite; sparry calcite cement; rare very finely crystalline dolomite rhombs; weathers orange-brown to medium greyish brown; resistant (GSC loc. C-2728)	3	3,229
78	Covered, recessive	5	3,226
77	Limestone: skeletal, with very fine- to fine-grained quartz and chert sand; medium grey with orange flecks; medium- to coarse-grained brachiopod, bryozoan, echinoderm and indeterminate skeletal fragments in sparry calcite cement; skeletal fragments silicified in part; 10 to 20 per cent of rock is very fine- to fine-grained, poorly rounded chert and quartz sand; chert is light green, light to dark brown, dark grey, and clear; rare, small pyrite masses; in some 1/2- to 2-inch thick lensing beds the sand grains predominate over skeletal grains, some coarse-grained sand present; unit generally weathers medium to orange-brown with more sandy beds weathering dark brownish grey, sand grains and silicified fossils stand out on weathered surface; unit is resistant (GSC loc. 53994)	17	3,221
76	Covered, recessive	4	3,204
75	Limestone: bryozoan, dolomitic; dark grey; coarse-grained bryozoan fragments with brachiopod, echinoderm, and coral fragments in sparry calcite cement; finely crystalline dolomite rhombs throughout, concentrated in laminae with micritic material in matrix; dark grey chert lenses up to 2 inches thick; some fossil fragments replaced by chert; unit weathers orange-brown to medium greyish brown; resistant (GSC locs. 53992, 53993)	8	3,200

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
74	Shale: silty, calcareous; medium to dark grey; contains abundant fine-grained skeletal fragments and rare coarser bryozoan, echinoderm, and brachiopod fragments; contains several 1- to 3-inch thick beds of bryozoan limestone (as in unit 75) from 3,189 to 3,192 feet; shale weathers dark grey, recessive; limestone weathers orange-brown to medium greyish brown, resistant	5	3,192
73	Covered, recessive	8	3,187
72	Limestone: skeletal, silty and sandy; dark grey; mainly very fine- to fine-grained, indeterminate skeletal fragments and numerous calcareous foraminifers in sparry calcite cement; numerous angular quartz silt and fine sand grains concentrated in 1/16- to 1/8-inch thick laminae, from 3,171 to 3,174 feet. The sand and silt stand out on weathered surfaces and show indistinct cross-laminae; weathers medium brown to light yellowish brown; resistant (GSC loc. 53991)	8	3,179
	UPPER CARBONIFEROUS		
	Ettrain Formation (type section) (1,800 feet thick)		
	Upper Member (515 feet thick)		
71(46)	Covered, recessive	28	3,171
70(45)	Limestone: skeletal-micritic, as in unit 67(42)	23	3,143
69(44)	Limestone: skeletal-micritic, silty; dark grey; abundant echinoderm and bryozoan fragments with some brachiopod fragments in micritic matrix, irregular lenses of calcareous, silty shale; alternates with beds of skeletal--micritic limestone, as in unit 67(42), which increases upward and becomes dominant at top of unit	15	3,120
68(43)	Covered, recessive	7	3,105
67(42)	Limestone: skeletal-micritic, as in unit 65(40), but less fine-grained, indeterminate skeletal debris, fewer foraminifers, and no chert seen; also, some irregular laminae with scattered microcrystalline to very finely crystalline dolomite rhombs; 20 per cent of unit covered; recessive	27	3,098

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
66(41)	Covered, recessive	8	3,071
65(40)	Limestone: skeletal-micritic; dark grey; composed of very fine- to fine-grained, indeterminate skeletal fragments with numerous coarse- to very coarse-grained bryozoan, echinoderm and brachiopod fragments and calcareous foraminifers, micritic matrix with some sparry calcite; some skeletal fragments partly silicified; bedding planes rarely have scattered, dark grey, well-rounded chert pebbles from 1/8 to 2 inches maximum diameter; lenses of dark grey chert make up about 10 per cent of the unit; beds 4 inches to 1 foot thick; unit weathers medium orange-brown to light yellowish brown, with dark grey chert lenses; resistant (GSC locs. 53989, 53990 - talus, C-2751)	27	3,063
64(39)	Limestone: skeletal-micritic, silty, with lenses of silty shale; weathers dark brownish grey; recessive	2	3,036
63(38)	Covered, recessive	8	3,034
62(37)	Limestone: bryozoan; dark grey, mainly coarse- to very coarse-grained bryozoan fragments with some echinoderm and brachiopod fragments and calcareous foraminifers, some skeletal fragments partly silicified; sparry calcite cement; beds mainly 4 inches to 1 foot thick, irregular; rare lenses of dark grey chert; rare bedding planes have slightly rounded, dark grey chert pebbles up to 1/4 inch maximum diameter; abundant fenestellid bryozoans; some beds of dark grey, skeletal-micritic, very dolomitic limestone, with abundant medium- to very coarse-grained, partly silicified bryozoan, echinoderm, and brachiopod fragments in microcrystalline, calcareous dolomite matrix, showing numerous very fine crystals of dolomite and some scattered quartz silt grains and very fine-grained, indeterminate skeletal fragments; unit weathers medium orange-brown to light yellowish brown with dark grey chert lenses; resistant (GSC loc. C-2727)	34	3,026
61(36)	Limestone: skeletal-micritic, silty, as in unit 58(33), with very abundant echinoderm and bryozoan fragments and some brachiopods. From 17 to 23 feet above the base of the unit this limestone is interbedded with 2- to 6-inch thick beds of bryozoan limestone as in unit 62(37) (GSC loc. 53988)	23	2,992

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
60(35)	Covered	5	2,969
59(34)	Upper 9 feet: skeletal-micritic limestone, as in unit 55(30), but skeletal fragments coarse-grained; basal 5 feet: echinoderm-bryozoan limestone, as in unit 55(30)	14	2,964
58(33)	Limestone: skeletal-micritic, silty; dark grey; abundant bryozoan and echinoderm fragments in micritic matrix; contains irregular lenses of dark grey, silty, calcareous shale; unit weathers dark brownish grey; recessive	17	2,950
57(32)	Interbedded bryozoan-echinoderm limestone and skeletal-micritic limestone, as in unit 55(30), but with oolites and more numerous fusulinaceans in some beds. Bryozoan-echinoderm limestone is present in the basal 12 feet, from 31 to 41 feet above the base of the unit and in the top 8 feet. The remainder of the unit is skeletal-micritic limestone. The intervals from 41 to 43 feet and from 87 to 93 feet above the base of the unit are covered (GSC locs. 53985 to 53987, C-2749, C-2750)	101	2,933
56(31)	Limestone: skeletal-micritic; dark grey; abundant medium- to coarse-grained bryozoan fragments, with some brachiopod and echinoderm fragments and rare calcareous foraminifers; some skeletal fragments partly silicified; micritic matrix with some sparry calcite; numerous 1/4- to 1-inch thick irregular layers of dolomite, calcareous, silty; dark grey; mainly microcrystalline dolomite with scattered medium- to coarse-grained skeletal fragments (calcite) partly replaced by chert; and some very finely to finely crystalline dolomite, much pyrite and organic matter; beds of limestone 1 to 2 inches thick, separated by 1/8- to 1-inch thick partings and beds of dark grey, silty, calcareous shale; limestone weathers medium grey, dolomite weathers orange-brown, and shale weathers medium to dark grey; unit recessive (GSC loc. C-2726)	8	2,832
55(30)	Interbedded skeletal-micritic limestone and bryozoan-echinoderm limestone. The former is similar to the dark grey, skeletal-micritic limestone in unit 53(28), but has more abundant organic matter, pyrite, and micrite concentrated in irregular laminae and burrows, and filling pore spaces in skeletal fragments; also, much fine-grained, indeterminate skeletal material is present; beds are 4 inches to 2		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	feet thick, and this limestone contains 2-inch to 1-foot thick lensing beds and irregular beds of dark grey chert making up approximately 30 per cent of outcrop. Skeletal-micritic limestone occupies the following intervals: 2,725-2,731, 2,748-2,774, 2,783-2,803, 2,811-2,824 feet. The bryozoan-echinoderm limestone is dark brownish grey; mainly medium- to very coarse-grained bryozoan and echinoderm fragments, with some brachiopod fragments, ostracods, fusulinaceans and other calcareous foraminifers, calcareous algae (encrusting skeletal fragments), and micritic limestone intraclasts; skeletal fragments rounded, have pore spaces filled with micrite, and some have been replaced by sparry calcite, now surrounded by dark layer of micrite; sparry calcite cement, rare pyrite and organic matter; bryozoan-echinoderm limestone occupied the intervals from 49 to 58 feet and 81 to 86 feet above base of unit; covered intervals from 6 to 23 feet and from 78 to 81 feet above base of unit; unit weathers yellowish brown with dark grey chert bands; resistant (GSC locs. 53984, C-2725, C-2748)	99	2,824
54(29)	Covered	20	2,725
53(28)	Limestone: bryozoan-echinoderm; dark brownish grey; mainly medium- to coarse-grained bryozoan and echinoderm fragments with abundant oolites and rare fusulinaceans, ostracods, calcareous algae, and brachiopods; some skeletal fragments replaced by sparry calcite with their relict shapes outlined by dark micrite coatings; thin micritic coatings occur on most skeletal fragments and micrite fills their internal cavities; sparry calcite cement; rare patches of organic matter and pyrite; some skeletal fragments partly silicified; from 5 to 31 feet above base of unit and in top 3 feet there is limestone, skeletal-micritic, dark grey, medium- to very coarse-grained bryozoan, echinoderm, and brachiopod fragments with rare fusulinaceans and other calcareous foraminifers, micritic matrix, some skeletal fragments partly silicified, scattered organic matter and pyrite, pore spaces in skeletal fragments filled with micrite, numerous irregular laminae marked by concentrations of organic matter, stylolites present, 2- to 6-inch thick lensing beds of dark grey chert make up about 15 per cent of these intervals; unit, as a whole, has 6-inch to 1-foot thick beds; weathers medium yellowish brown with dark grey bands (chert); resistant (GSC locs. 53981 to 53983)	49	2,705

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	The rocks above this level have a general brown weathering colour in contrast to the light grey colour of the limestone below		
	Lower Member (1,285 feet thick)		
52(27)	Covered	41	2,656
51(26)	Limestone: bryozoan-echinoderm, medium brownish grey with orange flecks; coarse- to very coarse-grained bryozoan, echinoderm, and brachiopod fragments with numerous calcareous foraminifers; sparry calcite cement; scattered patches of yellowish brown, finely crystalline to medium crystalline dolomite in cement and replacing skeletal fragments; rare pyrite crystals; irregular lensing beds and masses of dark brownish grey chert make up 20 to 30 per cent of outcrop; limestone is cherty with rare chert beds, and weathers yellowish brown in several 3- to 5-foot intervals from 68 feet above the base to top of unit; unit has overall light grey weathering colour with dark grey chert bands, and is resistant (GSC loc. C-2724)	118	2,615
	At top of unit 51(26), the section is offset by a small fault zone marked by white-weathering, very coarsely crystalline calcite. The beds on either side of this zone were matched and the section was continued		
50(25)	Covered	16	2,497
49(24)	Limestone: bryozoan-echinoderm; medium brownish grey; mainly coarse- to very coarse-grained bryozoan and echinoderm fragments with numerous brachiopod fragments; sparry calcite cement; some intraclasts of micritic-skeletal limestone; beds 1 to 2 feet thick, with numerous irregular beds of cherty limestone and dark brownish grey chert; unit weathers light grey to light brownish grey, chert weathers dark grey and stands out on surface; unit is cliff-former	44	2,481
48(23)	Mainly covered, with rare outcrops of slightly silty, micritic-skeletal limestone with chert lenses	24	2,437

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
47(22)	Limestone, skeletal-micritic, medium brownish grey; mainly fine- to very coarse-grained bryozoan and echinoderm fragments with some brachiopods; sparry calcite cement with some sparry calcite and chert in skeletal fragments; one 3-foot thick bed with rare 2- to 6-inch thick chert lenses; unit weathers light grey with silicified brachiopods on surface; resistant (GSC loc. 53980)	3	2,413
46(21)	Limestone: micritic-skeletal, slightly silty; medium to dark grey; fine- to very coarse-grained skeletal fragments (mainly bryozoan, with some brachiopods, echinoderms, and foraminifers) in micritic matrix; scattered quartz silt grains; some sparry calcite and chert replacing skeletal fragments; beds 6 inches to 1 foot thick, irregular, with irregular lenses and beds of medium to dark greyish brown chert, up to 6 inches thick, making up approximately 40 per cent of outcrop; limestone weathers light grey, chert weathers dark grey and stands out; unit resistant	27	2,410
45(20)	Covered, except for upper 3 feet, which are sandy, skeletal limestone as in unit 41(16), but has very little chert	25	2,383
44(19)	Limestone: bryozoan-echinoderm, with beds and irregular masses of chert as in unit 40(15), with chert making up 40 to 50 per cent of unit	54	2,358
43(18)	Limestone: skeletal, sandy, with lenses and irregular beds of chert, as in unit 41(16)	30	2,304
42(17)	Limestone: bryozoan-echinoderm, with chert as in unit 40(15); chert makes up about 30 per cent of outcrop	24	2,274
41(16)	Limestone: skeletal, sandy; dark grey; fine-grained, indeterminate skeletal fragments with rare, coarse bryozoan fragments and abundant small, calcareous foraminifers, numerous angular grains of fine quartz sand, and many silicified skeletal fragments; sparry calcite cement; beds 1 to 3 feet thick, irregular; unit contains lenses and irregular beds of chert, making up about 20 per cent of outcrop; some coarse-grained echinoderm fragments in top 7 feet of unit; weathers medium brownish grey; resistant (GSC loc. C-2723)	18	2,250

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
40(15)	Limestone: bryozoan-echinoderm; medium to dark brownish grey; mainly coarse- to very coarse-grained bryozoan and echinoderm fragments and rare fusulinaceans and other calcareous foraminifers; sparry calcite cement; some fine-grained intervals present, making up less than 20 per cent of unit; limestone beds 1 foot thick, irregular lensing beds and masses of dark brownish grey chert or cherty limestone make up 15 to 20 per cent of unit; between 75 and 86 feet above base of unit, approximately 40 per cent of outcrop is made up of 2-inch to 1-foot thick irregular beds and lenses of medium- to coarse-grained, cherty limestone and chert; covered interval 118 to 126 feet above base of unit; in top 40 feet of unit, chert beds and lenses make up about 30 per cent of outcrop; unit, as a whole, weathers light grey to light brownish grey, chert and cherty limestone weather dark grey and medium brown and stand out on surface; unit is cliff-former (GSC locs. 53975 to 53979, C-2747)	166	2,232
39(14)	Covered	3	2,066
38(13)	Limestone: bryozoan-echinoderm, medium to dark brownish grey; mainly medium- to very coarse-grained, rounded bryozoan and echinoderm fragments, with some fusulinaceans, brachiopods, and oolites; sparry calcite cement; some skeletal fragments completely replaced by sparry calcite, with their relict shape outlined by dark micritic coatings; some skeletal fragments partly replaced by chert; consists of a 5-foot thick bed overlain by a 1-foot thick bed of finer grained limestone; weathers light brown to light greyish brown with silicified fragments on the surface; unit is resistant but forms a rubble-covered interval (GSC locs. 53973, 53974 - talus, C-2746)	6	2,063
37(12)	Covered	31	2,057
36(11)	Limestone: skeletal; mainly fine-grained skeletal fragments with scattered, very coarse-grained, echinoderm, bryozoan and brachiopod fragments, sparry calcite cement (GSC locs. 53971, 53972 - talus)	23	2,026
35(10)	Covered	21	2,003

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
34(9)	Limestone: fusulinacean; medium to dark brownish grey; mainly fusulinacean foraminifers with very coarse-grained bryozoan, echinoderm and brachiopod fragments; sparry calcite cement; some chert replacing fossil fragments; beds regular, 4 inches to 1 foot thick; weathers light brownish grey, some silicified skeletal fragments on surface; unit slightly less resistant than those above and below (GSC locs. 53963 to 53970)	13	1,982
33(8)	Limestone: bryozoan-echinoderm, dolomitic in part, medium brownish grey; mainly coarse- to very coarse-grained bryozoan and echinoderm fragments, with some brachiopod fragments, calcareous foraminifers, and rare organic matter with pyrite; sparry calcite cement; some irregular intervals and patches with abundant microcrystalline to very finely crystalline dolomite; beds 1 to 1 1/2 feet thick; limestone beds include, and are separated by, lensing beds and irregular masses of medium brown and dark grey chert and cherty limestone making up less than 10 per cent of outcrop; from 76 to 147 feet above base of unit, limestone is composed mainly of fine-grained skeletal debris with scattered, very coarse-grained, echinoderm, bryozoan, and brachiopod fragments, and rare large calcareous foraminifers; sparry calcite cement; rare coarse-grained intervals from 1 to 3 feet thick are present; from 147 to 150 feet above base of unit, limestone contains scattered, rounded chert pebbles with maximum diameter up to 1 inch but mainly 1/4 inch or less; fine grains of chert also present; numerous fusulinaceans and other calcareous foraminifers; unit, as a whole, weathers light grey with cherty limestone and chert weathering medium brown to dark brownish grey; siliceous material stands out on weathered surface; unit forms cliffs (GSC locs. C-2721, C-2722, C-2745)	208	1,969
32(7)	Dolomite: microcrystalline, very cherty, calcareous; medium to dark brownish grey; mainly microcrystalline dolomite with some coarsely crystalline calcite and small patches of organic matter in chert matrix; some laminae almost entirely chert with floating dolomite crystals; numerous laminae, 1/16 to 1/8 inch thick, interrupted by rare burrows; numerous lenses and irregular masses of dark grey chert, predominating in some intervals; this dolomite is interbedded with limestone, very cherty,		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	dolomitic, medium to dark grey; mainly microcrystalline to finely crystalline calcite and microcrystalline dolomite, with abundant organic matter and pyrite, in chert matrix; some laminae almost entirely chert with floating calcite and dolomite crystals; numerous laminae and cross-laminae, many disrupted by burrows; numerous irregular masses of chert; limestone makes up 30 per cent of unit; beds discontinuous, lensing, 4 inches to 2 feet thick; limestone weathers light to medium grey, slightly recessive; dolomite weathers medium brown to dark greyish brown, shows laminae of chert on surface; unit is cliff-former; silicified brachiopods present (GSC locs. 53961, 53962 - talus)	114	1,761
31(6)	Limestone: echinoderm-bryozoan, cherty; light to medium brownish grey; coarse- to very coarse-grained echinoderm and bryozoan fragments with brachiopod fragments and rare foraminifers, sparry calcite cement, some fossil fragments are silicifed; 15 per cent of unit consists of lenses of medium brownish grey chert, up to 1 foot thick; limestone weathers light grey, chert weathers dark grey; unit is a cliff-former (GSC loc. C-2720)	18	1,647
30(5)	Limestone: skeletal, slightly silty, cherty, similar to that in unit 29(4), but medium to dark grey in fresh colour	25	1,629
29(4)	Limestone: skeletal, slightly silty, cherty, with silicified limestone and chert beds; light to medium grey; between 40 and 50 feet above base of unit there is coarse- to very coarse-grained, echinoderm-bryozoan limestone with fusulinaceans and other foraminifers; unit weathers light grey with dark grey chert and is resistant (GSC loc. C-2719)	50	1,604
28(3)	Limestone: skeletal-micritic, dolomitic, cherty in part; medium to dark grey; consists mainly of very fine- to fine-grained, indeterminate skeletal fragments in micritic matrix with microcrystalline dolomite, clay-size quartz, organic matter, and pyrite; patches and lenses of chert are present; unit weathers mainly light grey; cliff-former	12	1,554

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
27(2)	Limestone: skeletal, slightly silty, cherty; medium brownish grey; mainly very fine- to fine-grained, indeterminate skeletal fragments, some medium-size grains, numerous foraminifers, and scattered quartz silt grains, sparry calcite cement, patches of chert; numerous irregular beds and lenses, up to 6 inches thick, of silicified limestone associated with 2- to 6-inch thick lensing beds of dark grey chert; from 108 to 114 feet above the base of the unit is limestone, bryozoan-echinoderm, coarse- to very coarse-grained rare foraminifers and brachiopods, sparry calcite cement, some silicified limestone lenses; top 5 feet of unit is limestone, skeletal, medium brownish grey, mainly fine- to medium-grained bryozoan, echinoderm, and indeterminate skeletal fragments with abundant foraminifers and rare ostracods, sparry calcite cement, rare patches of chert; beds irregular, generally 1 to 2 feet thick in unit; weathering light grey with silicified limestone medium brownish grey and chert dark grey; silicified laminae and cross-laminae stand out on weathered surface of silicified limestone; unit is cliff-former (GSC locs. 53958 to 53960, C-2716 to C-2718)	135	1,542
26(1)	Limestone: bryozoan-echinoderm; medium brownish grey; mainly medium- to coarse-grained bryozoan and echinoderm debris with brachiopod fragments and rare foraminifers and oolites, sparry calcite cement, rarely skeletal fragments are partly replaced by chert; beds 6 inches to 1 1/2 feet thick; weathers light brownish grey with some silicified fossil fragments on weathered surface, cliff-former (GSC loc. C-2715)	36	1,407
	Hart River Formation (undivided) (1,371 feet thick, incomplete)		
25	Mainly covered, with some outcrops of dolomitic limestone, calcareous dolomite, and chert, as in unit 21	39	1,371
24	Limestone: skeletal-micritic, slightly dolomitic, cherty and silty; consists mainly of very fine- to fine-grained, indeterminate skeletal fragments with some coarse echinoderm and brachiopod grains; micritic matrix with microcrystalline dolomite and clay-size quartz, organic matter, and pyrite mainly concentrated in numerous burrows; scattered quartz silt grains and		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	patches of chert replacing some skeletal fragments; numerous lenses (up to 1 foot thick) and irregular masses of highly silicified limestone associated with rare lenses of medium brownish grey to dark grey chert; from 1,317 to 1,319 feet there is a bed of limestone, skeletal, cherty; medium brownish grey; consists mainly of fine- to medium-grained, echinoderm, brachiopod and coral fragments with scattered fine, angular grains of dark grey chert; almost entirely replaced by silica; beds throughout unit are 6 inches to 2 feet thick and change thickness along strike; unit weathers light grey with cherty limestone and chert weathering light brown to medium brownish grey; forms small cliff (GSC loc. 53957)	27	1,332
23	Limestone and dolomite: with rare beds of dark grey chert, as in unit 21; discontinuous outcrop; 30 per cent covered	117	1,305
22	Mainly rubble-covered, but some 6-inch to 1-foot outcrop intervals of limestone, skeletal-micritic, dolomitic, slightly silty; medium grey; consists of very fine- to fine-grained, indeterminate skeletal fragments with scattered quartz silt grains and organic matter, in a matrix of micrite and microcrystalline dolomite; some small patches of chert, which appears to have replaced some skeletal fragments; numerous burrows and disrupted laminae; weathers light grey; this limestone appears to alternate with skeletal-micritic, dolomitic, medium to dark brownish grey limestone with abundant organic material, silt, and chert, weathers dark greyish brown and predominates in the rubble	273	1,188
21	Limestone: micritic-skeletal, slightly dolomitic, slightly silty; laminated medium and dark grey; consists of scattered very fine- to fine-grained, indeterminate skeletal fragments and rare quartz silt grains in matrix of microcrystalline dolomite and micrite; abundant chert and organic matter with pyrite, concentrated in irregular laminae; chert has replaced some skeletal fragments; beds 2 to 6 inches thick with rare lenses and discontinuous beds of dark grey chert; weathered surface shows light grey and medium brownish grey, irregular, 1/16- to 1/8-inch thick laminae; chert weathers medium to dark grey; unit forms small cliffs at base of lowest cliff-forming limestone; 803 to 870 feet mainly covered	170	915

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
20	Limestone and shale: as in unit 19, but dark grey intervals with shale partings make up only 10 to 20 per cent of unit and are from 2 to 4 inches thick; unit partly covered from 700 to 745 feet	125	745
19	Limestone: skeletal-micritic, very dolomitic, silty, cherty; dark grey; composed of very fine- to fine-grained, indeterminate skeletal fragments and scattered quartz silt grains set in a matrix of micrite and microcrystalline to very finely crystalline dolomite; irregular masses and lenses of chert are present, and pyrite and organic material are scattered throughout; beds 4 inches to 1 foot thick with irregular laminae, weather medium greyish brown; between these beds are 2- to 6-inch intervals of dark grey, silty, dolomitic limestone with dark grey, silty, calcareous shale partings; these intervals make up approximately 30 per cent of unit; unit measured through small drag fold, may be some repetition	84	620
18	Dolomite and siltstone: as in unit 16, but very calcareous in part, grading to silty limestone	47	536
17	Shale: slightly silty, calcareous, from 469 to 472 feet; very silty, non-calcareous from 472 to 487 feet; unit weathers dark grey; recessive	18	487
16	Dolomite: microcrystalline, silty to sandy, calcareous; dark grey; composed mainly of microcrystalline to very finely crystalline dolomite with scattered very fine-grained to silt-size quartz, and very finely crystalline calcite; very silty bands occur with finely crystalline to medium crystalline calcite, and silt-size to very fine quartz grains set in microcrystalline dolomite; these bands grade to calcareous, dolomitic siltstone in part; pyrite and organic matter scattered throughout unit; upper half of unit contains partings of dark grey, calcareous, silty shale; beds 6 inches to 1 foot thick in upper half of unit, 1 to 3 feet thick in lower half; weathers medium brown with dark brown areas, shale weathers dark grey; unit generally resistant	45	469
15	Limestone: skeletal-micritic, dolomitic, silty, dark grey, weathers medium brown, 2- to 5-foot intervals; alternating with siltstone, slightly calcareous, dark grey, 1- to 2-foot intervals; contains partings of shale, calcareous in part, silty, dark grey; from 413 to 424 feet this shale predominates	60	424

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
14	Limestone and siltstone, as in unit 12, but limestone makes up 40 per cent of unit and occurs in 6-inch to 2-foot beds in intervals up to 10 feet thick, separated by shale and siltstone	56	364
13	Shale: silty, calcareous in part, dark grey; 1/2- to 2-inch, irregular, lensing beds of argillaceous siltstone make up 10 to 15 per cent of unit; at 5- to 10-foot intervals there are 4-inch to 1-foot beds of skeletal-micritic, silty, dolomitic limestone; unit generally weathers dark grey; recessive	46	308
12	Limestone: skeletal-micritic, dolomitic, silty; dark grey; mainly very fine-grained, indeterminate skeletal fragments in matrix of very finely crystalline dolomite and clay-size quartz, with scattered patches and irregular laminae of organic matter and pyrite, and numerous quartz silt grains; beds 2 to 3 feet thick; several intervals of calcareous siltstone and rare beds of non-calcareous, dolomitic siltstone make up approximately 25 per cent of this unit; unit weathers medium brown; resistant	71	262
11	Mainly covered, with some outcrops of argillaceous limestone and calcareous, slightly silty, dark grey shale	17	191
10	Limestone: skeletal-micritic, dolomitic, silty; dark grey; beds 2 to 3 feet thick, weathers medium brown; resistant	14	174
9	Mainly covered, with 2-foot thick lens of micritic limestone from 154 to 156 feet, lithology same as in unit 7; weathers orange-brown	16	160
8	Limestone: as in unit 1, but more cherty; unit contains 3- to 6-inch thick beds of shale, silty, slightly calcareous, dark grey, makes up 30 per cent of outcrop; weathers medium to dark grey; slightly recessive	16	144
7	Dolomite: slightly calcareous, silty; dark grey; contains rare, very fine-grained, indeterminate skeletal fragments and scattered quartz silt in microcrystalline dolomitic matrix, and irregular patches and laminae of dark brown organic matter and pyrite; unit forms a lens; weathers orange-brown; resistant	4	128

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
6	Mainly covered, with a small outcrop, at 118 feet, of siliceous limestone as in unit 1; from 118 to 124 feet: poor outcrop of slightly calcareous, slightly silty, dark grey shale	19	124
5	Limestone, as in unit 1	17	105
4	Mainly covered, with small outcrop, at 80 to 82 feet, of shale, slightly silty, dark grey; weathers dark grey; recessive	8	88
3	Limestone, as in unit 1, but less cherty	24	80
2	Shale: slightly silty, dark grey; 3-foot bed; contains lenses of argillaceous siltstone; weathers dark grey; recessive	3	56
1	Limestone: skeletal-micritic, very cherty, silty; dark grey; very fine- to fine-grained, indeterminate skeletal grains in micritic matrix with much clay-size quartz; contains numerous silt grains composed mainly of quartz with rare feldspar, also scattered, small, irregular masses of dark brown organic matter with disseminated pyrite; beds 1 to 3 feet thick; rare lenses and beds up to 2 feet thick of silty, slightly dolomitic, dark grey, micritic limestone make up less than 10 per cent of unit, weathers orange-brown; unit resistant (GSC loc. 53956)	53	53

JUNGLE CREEK WEST SECTION (116F-13)

Located in northern Ogilvie Mountains approximately 2 1/2 miles south of Jungle Creek and 8 miles east of Yukon-Alaska boundary; 65°24'N, 140°44'W; aerial photograph A13137-31, south and east of center; base of section at photo co-ordinates X=+3.2, Y=-8.2, top of section at photo co-ordinates X=+3.35, Y=-8.3. Measured by E.W. Bamber and A. Kuhme, July, 1963, on west limb of small syncline from near base to top of Tahkandit Formation.

MESOZOIC (?Triassic)
(Disconformity - contact not exposed)

MIDDLE PERMIAN [Kazanian (Guadalupian)]
Tahkandit Fm. 94 feet
(Contact not exposed)
Jungle Creek Fm. not measured

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	MIDDLE PERMIAN		
	Tahkandit Formation (94 feet thick)		
3	Limestone: skeletal, sandy; light to medium grey; fine- to medium-grained echinoderm, brachiopod and bryozoan fragments with rare foraminifers and ostracods in sparry calcite cement; abundant fine chert and quartz grains, some large brachiopod fragments; 4-inch to 1-foot thick beds; weathers medium to dark grey; resistant	25	94
2	Limestone: similar to that in unit 1, but brachiopod fragments make up 60 to 70 per cent of this unit; weathers medium to dark grey with yellowish brown patches; cliff-former (GSC locs. 57127, 57132, 57279)	52	69
1	Limestone: skeletal, cherty, silty to sandy, slightly dolomitic; light brownish grey to medium grey; fine-grained, indeterminate skeletal fragments with some coarse-grained brachiopod fragments, abundant quartz and chert silt and very fine sand; matrix mainly chert; 2- to 5-foot thick beds; some small masses of medium grey chert; unit weathers light to medium grey; cliff-former. From 13 to 17 feet, sparry calcite cement, no chert, abundant silt and sand grains with some glauconite grains (GSC loc. 57269)	17	17
	Basal contact with shale of Jungle Creek Formation not exposed.		

ETTRAIN CREEK EAST SECTION (116F-16)

Located in northern Ogilvie Mountains, in headwaters of Ettrain Creek, approximately 8 miles east of Yukon-Alaska boundary; 65°17 1/2'N, 140°42 1/2'W; aerial photograph A13138-234, west of center; base of section at photo co-ordinates X=-7.15, Y=+0.25; top of section at photo co-ordinates X=-9.9, Y=-3.7. Measured by E.W. Bamber and A. Kuhme, July, 1963, through uppermost Ettrain Formation and most of Jungle Creek Formation. Section overlain by approximately 185 feet of resistant beds, probably of Permian age.

LOWER PERMIAN [Asselian-Sakmarian (Wolfcampian)]
Jungle Creek Fm. 2,053 feet (incomplete)

UPPER CARBONIFEROUS [?Orenburgian (?Virgilian)]
Jungle Creek Fm. 121 feet (incomplete)
Ettrain Fm. 134 feet (incomplete)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER PERMIAN AND UPPER CARBONIFEROUS		
	Jungle Creek Formation (2,174 feet thick, incomplete)		
106	Mudstone: sandy, siliceous, very calcareous, dark grey; skeletal fragments (brachiopod, bryozoan and echinoderm) in matrix of clay-size quartz; grades to siliceous limestone by increase in skeletal fragments; 1- to 2-inch thick beds; weathers dark brownish grey; resistant (GSC loc. 57153)	22	2,308
	Section continued on north end of next ridge south at approximately the same stratigraphic level as the top of unit 105		
105	Limestone: bryozoan-echinoderm, slightly silty; medium brownish grey; mainly coarse-grained bryozoan and echinoderm fragments with minor quartz and chert silt; sparry calcite cement; 8-inch to 2-foot thick beds; weathers dark greyish brown with medium brown patches; resistant. Limestone makes up 70 per cent of outcrop and alternates with dark grey weathering, recessive intervals of silty, slightly calcareous, dark grey shale with 1/4-inch to 1-foot thick beds of silty, micritic-skeletal limestone (GSC locs. 56972, 56977, 57017, 57019, 57141, 57174, 57183, C-2739)	68	2,286
104	Limestone: micritic-skeletal, sandy, siliceous; medium to dark grey; medium- to coarse-grained brachiopod, echinoderm, and bryozoan fragments, silicified in part; abundant fine-grained		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	quartz and chert sand (grades to very calcareous sandstone); scattered rhombs of finely crystalline dolomite; micritic matrix with clay-size quartz and disseminated organic matter concentrated in irregular laminae and burrows; beds 6 inches and 2 feet thick; weathers dark brownish grey; resistant (GSC loc. 57053, 57257, 56999).	25	2,218
103	Covered, recessive	71.5	2,193
102	Sandstone, as in unit 100	8.5	2,121.5
101	Covered, recessive	13	2,113
100	Very poor outcrop of sandstone, similar to that in unit 90, but less finely crystalline calcite cement	3	2,100
99	Covered, recessive	28	2,097
98	Poor outcrop of sandstone: very calcareous, cherty, dolomitic, as in unit 90	41	2,069
97	Covered, recessive	88	2,028
96	Sandstone: cherty, slightly dolomitic, siliceous; medium grey; fine-grained; quartz and chert grains with scattered rhombs of finely crystalline calcite, matrix mainly clay-size quartz; 6-inch to 1 1/2-foot thick beds; weathers medium grey; resistant (GSC loc. 57240)	4	1,940
95	Covered, recessive	47	1,936
94	Sandstone: very calcareous, cherty, dolomitic, as in unit 90	8.5	1,889
93	Covered, recessive, with some rubble at 1,872 feet of sandstone as in unit 90	14	1,880.5
92	Sandstone: very calcareous, cherty, dolomitic, as in unit 90	2.5	1,866.5
91	Covered, recessive	6.5	1,864
90	Sandstone: very calcareous, cherty, dolomitic; medium grey; very fine- to fine-grained; chert and quartz grains in matrix of finely crystalline calcite; abundant disseminated rhombs of finely crystalline dolomite; 6-inch to 1 1/2-foot thick beds; weathers medium grey; resistant (GSC loc. 56946)	4.5	1,857.5

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
89	Covered, recessive	147	1,853
88	Poor rubbly outcrop of sandstone; cherty, calcareous, dolomitic, as in unit 84	8	1,706
87	Covered, recessive; with small outcrop of shale, silty, dark grey; weathers medium grey (GSC loc. 57020)	54.5	1,698
86	Sandstone: cherty, calcareous, dolomitic, as in unit 84	1.5	1,643.5
85	Covered, recessive talus of shale below 1,557 feet	80	1,642
84	Sandstone: cherty, calcareous, dolomitic; medium grey with slight green tinge; fine-grained; chert and quartz grains in cement of finely crystalline calcite; abundant disseminated rhombs of finely crystalline dolomite; weathers medium grey to orange-brown; resistant ridge	5	1,562
	(Section shifted to next ridge south - measuring up section; one bed followed)		
83	Rubble of shale: as in unit 69	37	1,557
82	Rubble of sandstone: similar to that in unit 65, but with much less finely crystalline calcite cement	5	1,520
81	Rubble of shale, as in unit 69	83	1,515
80	Rubble of sandstone: calcareous, dolomitic, cherty, as in unit 65	7	1,432
79	Recessive, with rubble of shale, as in unit 69	42	1,425
78	Rubble and poor outcrop of sandstone: cherty, dolomitic as in unit 76	14	1,383
77	Rubble of shale, as in unit 69	45	1,369
76	Rubble of sandstone: cherty, dolomitic; dark grey; fine-grained; mainly chert and quartz sand with numerous rhombs of finely crystalline dolomite	24	1,324
75	Rubble of shale, as in unit 69 (GSC loc. 57012)	5	1,300
74	Covered, recessive	34	1,295
73	Recessive; with rubble of shale, as in unit 69	17	1,261

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
72	Slightly resistant; rubble of sandstone: calcareous, cherty, dolomitic, as in unit 65	17	1,244
71	Rubble of limestone: skeletal; dark grey; fine-grained; mainly fine-grained, indeterminate skeletal fragments with numerous brachiopod fragments and foraminifers; sparry calcite cement; abundant disseminated finely crystalline dolomite (rhombs); abundant quartz and chert silt and very fine sand; 2- to 6-inch thick beds; weathers medium to dark brownish grey; resistant (GSC loc. C-2738)	1	1,227
70	Rubble of sandstone: calcareous, cherty, dolomitic, as in unit 65	3	1,226
69	Covered, recessive; with rubble of shale: silty, dark grey, weathers medium to dark grey, numerous fragments of orange-weathering "claystone" concretions (GSC loc. 57196)	125	1,223
68	Covered, non-recessive	90	1,098
67	Limestone: skeletal-micritic, dark grey; mainly bryozoan, echinoderm, and brachiopod fragments with some foraminifers in micritic matrix containing minor quartz silt; scattered rhombs of very finely crystalline dolomite; minor disseminated organic matter concentrated in irregular laminae and burrows; some skeletal fragments partly silicified; 2- to 6-inch thick beds; weathers medium to dark brownish grey; resistant	7	1,008
66	Covered, slightly recessive	75	1,001
65	Sandstone: calcareous, dolomitic, cherty; dark grey; very fine- to fine-grained; quartz and chert grains with very finely crystalline calcite cement; abundant disseminated rhombs of very finely to finely crystalline dolomite; 4-inch to 1-foot thick beds; weathers medium to dark brownish grey; resistant	15	926
64	Covered back slope	90	911
63	Covered, resistant; much rubble of skeletal limestone that weathers brown and greyish brown	82	821
62	Limestone: bryozoan-echinoderm, as in unit 61	9	739

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
61	Limestone: bryozoan-echinoderm; medium grey; mainly medium- to coarse-grained bryozoan and echinoderm fragments with numerous fine-grained indeterminate skeletal fragments and foraminifers; sparry calcite cement; micrite fillings in skeletal fragments; 4- to 8-inch thick beds; weathers light yellowish brown; resistant (GSC loc. C-3222)	3	730
60	Limestone: skeletal, cherty; dark grey; composed of fine- to medium-grained brachiopod, bryozoan, and echinoderm fragments, and numerous fine-grained, indeterminate skeletal fragments in sparry calcite cement; minor quartz silt; micrite fillings in some skeletal fragments; abundant chert replacing matrix and skeletal fragments; 1/2- to 3-inch thick beds; weathers light greyish brown; numerous 1/2- to 2-inch thick lensing beds of dark grey chert stand out on surface; unit resistant (GSC loc. C-2737)	10	727
59	Limestone: bryozoan-echinoderm; medium grey; mainly coarse- to very coarse-grained bryozoan and echinoderm fragments with some brachiopod fragments and scattered fusulinaceans; sparry calcite cement; micrite fillings in skeletal fragments; very minor chert replacement; 4- to 8-inch thick beds; weathers light yellowish brown; resistant; rare dark grey chert lenses present (GSC loc. C-3221)	6	717
58	Limestone: bryozoan-echinoderm, slightly silty, dolomitic; dark grey; coarse-grained bryozoan, echinoderm, and brachiopod fragments, some partly replaced by chert; sparry calcite cement; scattered silt grains of quartz and minor chert; abundant disseminated, finely crystalline dolomite; (?)burrows are present, which are rich in organic matter and clay-size quartz; 1- to 4-inch thick beds; weathers dark brownish grey; resistant	13	711
57	Limestone: bryozoan-echinoderm, as in unit 53	4	698
56	Limestone: bryozoan-echinoderm; dark grey; fine- to medium-grained; 1- to 4-inch thick beds; weathers dark brownish grey; resistant; some dark grey shale partings present (see unit 58 for more complete description of similar limestone)	14	694
55	Limestone bryozoan-echinoderm, as in unit 53; one 4-foot bed; weathers yellowish brown; resistant (GSC loc. 56918)	4	680

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
54	Limestone: micritic-skeletal, silty, with irregular lensing beds of calcareous, silty shale (GSC loc. 57014)	13	676
53	Limestone: bryozoan-echinoderm, as in unit 52, but coarser grained (GSC loc. 57241)	5	663
52	Limestone: bryozoan-echinoderm; medium grey; coarse- to very coarse-grained bryozoan and echinoderm fragments with some brachiopod fragments and foraminifers; micrite fillings in skeletal fragments; minor quartz silt; sparry calcite cement; some disseminated organic matter; some replacement of skeletal fragments by chert; 1- to 3-foot thick beds; weathers light to medium greyish brown; resistant; thin irregular (1/2 to 2 inches thick) lenses of dark grey chert present (GSC loc. C-2764)	11	658
51	Covered, recessive	16	647
50	Interbedded: Limestone: bryozoan-echinoderm, sandy; dark grey; fine- to medium-grained bryozoan and echinoderm fragments with rare foraminifers and brachiopod fragments; abundant fine-grained quartz and chert sand; sparry calcite cement; 4-inch to 1-foot thick beds; weathers light greyish brown to medium yellowish brown; resistant, makes up 70 per cent of outcrop from 616 to 626 feet, 50 per cent of outcrop from 626 to 631 feet. Limestone: of similar type, but with coarse to very coarse grains of quartz and chert, and micrite fillings in some skeletal fragments; interbedded with conglomerate composed of green, light grey, and dark grey, well-rounded chert pebbles with maximum diameter up to 2 inches, in matrix of skeletal limestone; beds are 2 inches to 1 foot thick; weathers dark grey; resistant (GSC locs. C-2762, C-2763)	15	631
49	Covered, recessive	5	616
48	Limestone: bryozoan-echinoderm, as in unit 44	12	611
47	Covered	3	599
46	Limestone: echinoderm-bryozoan; medium grey; mainly coarse-grained echinoderm and bryozoan fragments with scattered brachiopod fragments and foraminifers; minor quartz and chert silt; rare patches of dark brown organic matter; sparry calcite cement; beds 1 to 3 feet thick; resistant (GSC loc. C-2736)	11	596

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
45	Covered, recessive	15	585
44	Limestone: bryozoan-echinoderm, medium grey; mainly coarse-grained bryozoan, echinoderm, and brachiopod fragments with sparry calcite cement; rare quartz silt grains; abundant finely crystalline dolomite in matrix and replacing skeletal fragments; weathers orange-brown; resistant (GSC loc. 56974)	7	570
43	Covered	13	563
42	Limestone: bryozoan-echinoderm, as in unit 39	2	550
41	Limestone: bryozoan-echinoderm, as in unit 39, but many skeletal fragments partly replaced by chert (GSC loc. C-3220)	2	548
40	Covered, recessive	3	546
39	Limestone: bryozoan-echinoderm, as in unit 35, but coarse- to very coarse-grained, fusulinaceans numerous (GSC loc. C-2761)	12	543
38	Covered, recessive, with rubble of shale: calcareous, silty, as in unit 29	6	531
37	Limestone: bryozoan-echinoderm, sandy; medium to dark grey; mainly fine- to medium-grained bryozoan and echinoderm fragments with some brachiopod fragments and numerous foraminifers; abundant fine-grained quartz and chert sand; sparry calcite; 1- to 2-foot thick beds; weathers light to medium brownish grey; resistant (GSC loc. C-2760)	8	525
36	Covered	26	517
35	Limestone: bryozoan-echinoderm; medium grey; mainly coarse-grained bryozoan and echinoderm fragments with rare brachiopod fragments and some fusulinacean foraminifers; fillings in skeletal fragments of micrite and dark brown organic matter with pyrite; some skeletal fragments partly replaced by chert; sparry calcite cement; one 12-foot bed; weathers orange-brown; resistant (GSC locs. 57055, C-3219)	12	491
34	Covered, recessive	31	479

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
33	Limestone: micritic-skeletal, very silty, slightly siliceous; dark grey with light brown skeletal fragments; contains abundant bryozoan and echinoderm fragments and silt grains of quartz and chert in micritic matrix with clay-size quartz and abundant disseminated organic matter; beds 1 to 6 inches thick; weathers medium grey; beds separated by 1/8- to 2-inch thick lensing irregular beds of shale, as in unit 29 (GSC loc. 57018)	28	448
32	Covered, recessive	49	420
31	Covered, resistant	52	371
30	Sandstone: calcareous, cherty; light grey; very fine- to fine-grained; mainly quartz and chert grains with minor finely crystalline calcite cement; 4-inch to 1-foot thick beds; weathers medium brownish grey with dark grey patches; contains rare lenses, up to 1 1/2 feet thick, of limestone: bryozoan-echinoderm, sandy; medium brownish grey; mainly coarse-grained bryozoan and echinoderm fragments in sparry calcite cement; numerous rounded coarse grains of quartz and chert; weathers medium grey to orange-brown; unit resistant	10	319
29	Poor outcrop of shale: calcareous, silty; contains medium- to coarse-grained skeletal fragments; numerous silt grains and abundant disseminated organic matter; matrix of clay-size quartz and micrite; weathers dark grey; recessive (GSC loc. 57016)	2	309
28	Covered, recessive	44	307
27	Limestone: bryozoan; medium to dark grey; mainly coarse-grained bryozoan fragments with rare echinoderm and brachiopod fragments; scattered fine- to coarse-grained quartz and chert sand; sparry calcite cement; some micrite fillings in skeletal fragments and rare flecks of organic matter; one bed 5 feet thick; resistant	5	263
26	Limestone: skeletal, sandy; medium greyish brown; medium- to coarse-grained with scattered quartz grains and dolomite rhombs; 6-inch beds; weathers medium to dark brownish grey; resistant (GSC loc. 57142)	3	258

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
25	Covered, recessive; 1 foot at base is rubbly outcrop of silty, calcareous shale with abundant organic matter and well-preserved brachiopods, in matrix of clay-size quartz and micritic calcite	7	255
24	Limestone: echinoderm-bryozoan, sandy, dolomitic; medium to dark brownish grey; mainly coarse-grained echinoderm and bryozoan fragments with some brachiopod fragments and numerous fine grains of quartz sand; scattered small, rounded chert pebbles; sparry calcite cement; numerous rhombs of finely crystalline dolomite in both matrix and skeletal fragments; 6-inch to 1-foot thick irregular beds; weathers orange-brown; crossbedded in part; resistant	4	248
23	Mainly covered, recessive; small outcrop, at 235 feet, of shale: calcareous, silty; dark grey; rare medium- to coarse-grained skeletal fragments, abundant disseminated organic matter; matrix of clay-size quartz and micrite; weathers dark grey; recessive (GSC loc. 57281)	16	244
22	Rubbly outcrop of sandstone: calcareous; medium brownish grey; very fine-grained grading to siltstone; grains mainly quartz with some chert; scattered medium-grained bryozoan and brachiopod fragments; matrix of sparry calcite; weathers medium grey with orange patches	3	228
21	Covered	3	225
20	Limestone: skeletal, sandy; dark grey; mainly fine-grained bryozoan and other indeterminate skeletal fragments with numerous fine sand grains of quartz and chert; cement of sparry calcite; abundant finely crystalline dolomite(?) throughout; grades to calcareous sandstone in part; 6-inch to 1-foot thick beds; weathers medium orange-brown; some 1- to 4-inch thick lenses and beds of limestone, bryozoan-echinoderm, sandy; dark grey with white mottling; mainly medium- to coarse-grained bryozoan, echinoderm, and brachiopod fragments with numerous fillings of dark brown organic matter; sparry cement; abundant rounded to sub-angular, medium to coarse grains of chert and quartz; grades to calcareous sandstone in part; weathers dark brownish grey; unit resistant	5	222
19	Covered, resistant from 200 to 209 feet, recessive from 209 to 217 feet	17	217

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
18	Interbedded: Conglomerate: chert pebble; medium grey matrix with black, grey and green pebbles; chert pebbles poorly sorted -- 1/16- to 1/2-inch maximum diameter, angular to subrounded, rare pebbles of calcareous, quartzose sandstone present; matrix of fine- to medium-grained skeletal-micritic limestone with quartz and chert sand grains; beds 3 inches to 1 foot thick, irregular; makes up 70 per cent of outcrop. Sandstone: very calcareous, cherty, quartzose; medium grey; fine- to medium-grained; sand grains angular, mainly chert with some quartz; matrix is fine-grained, some crossbedding; 2- to 4-inch thick beds; makes up 30 per cent of outcrop. Unit weathers medium to dark brownish grey mottled with dark grey pebbles; resistant	4	200
17	Limestone: bryozoan; slightly dolomitic; medium grey; mainly coarse-grained bryozoan fragments with some brachiopod and echinoderm fragments and rare gastropod fragments, in sparry calcite cement; scattered rhombs of fine- to medium-crystalline dolomite in matrix; numerous micritic fillings in skeletal fragments; beds approximately 2 feet thick; rare 2- to 4-inch lenses of dark grey chert; limestone weathers medium orange-brown, chert weathers dark grey; unit resistant	5	196
16	Covered, mainly resistant, but recessive from 187 to 191 feet	26	191
15	Limestone: skeletal-micritic; dark grey; mainly coarse-grained bryozoan fragments, with rare echinoderm, gastropod and brachiopod fragments and foraminifers; some disseminated organic matter and pyrite and rare quartz silt grains present; matrix and grains partly replaced by chert; rare lenses of dark grey chert up to 4 inches thick; weathers light brownish grey; resistant	30	165
14	Conglomerate: chert pebble; medium grey matrix with dark grey, medium grey, and green chert pebbles; chert pebbles well rounded, maximum diameter 1/4 to 2 inches, flattened along bedding; matrix of fine- to medium-grained skeletal limestone with abundant quartz and chert sand grains; one bed, with sharp upper and lower contacts; weathers light to medium brown with mottling caused by pebble colours; resistant	1	135

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	UPPER CARBONIFEROUS		
	Ettrain Formation (134 feet thick, incomplete)		
13	Shale: calcareous, silty; medium grey; contains numerous bryozoan and brachiopod fragments; abundant disseminated organic matter; matrix of clay-size quartz and micrite; weathers medium to dark grey; recessive (GSC loc. 57249)	8	134
12	Limestone: bryozoan-echinoderm; medium to dark grey; mainly medium- to coarse-grained bryozoan fragments with echinoderm and brachiopod fragments and foraminifers; sparry calcite cement; irregular laminae with micrite and abundant dark brown organic matter; 1- to 2-foot thick beds; weathers light brownish grey; resistant (GSC loc. C-3218)	20	126
11	Covered, recessive	6	106
10	Limestone, as in unit 7, but fine- to medium-grained	9	100
9	Interbedded shale and limestone as in unit 6, with limestone making up 60 per cent, in 1- to 3-inch thick beds (GSC locs. 56992, 56995)	11	91
8	Covered, recessive	13	80
7	Limestone: skeletal-micritic, slightly dolomitic; medium to dark grey; mainly coarse-grained bryozoan and echinoderm fragments, with some brachiopod fragments; matrix of micrite with some finely crystalline dolomite and sparry calcite; 1- to 2-foot thick beds; weathers light brownish grey; resistant	23	67
6	Shale: calcareous, silty, with abundant organic matter, as in unit 2, interbedded with limestone, micritic-skeletal, as in unit 5 (30 per cent of outcrop) (GSC loc. 57022)	8	44
5	Limestone: micritic-skeletal; medium to dark grey; contains abundant medium- to coarse-grained bryozoan fragments and some echinoderms; abundant disseminated organic matter, some skeletal fragments silicified in part; 2- to 8-inch thick beds; weathers light brownish grey with orange-brown patches and beds; resistant	6	36

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
4	Covered, except for upper 1 foot, which is micritic-skeletal limestone with abundant organic matter, as in unit 2 (GSC locs. 57013, C-2759)	7	30
3	Limestone: skeletal-micritic, cherty; medium to dark grey; mainly medium- to coarse-grained bryozoan and echinoderm fragments with some brachiopod fragments, calcispheres, and foraminifers; abundant micrite as matrix and as fillings in skeletal fragments; irregular beds, up to 6 inches thick, of medium to dark grey chert make up about 20 per cent of outcrop; 1- to 2-foot thick beds of limestone; unit weathers light greyish brown with orange coatings; resistant	5	23
2	Covered, except for upper 6 inches, which are shale, calcareous, silty; dark grey; contains numerous fine- to medium-grained bryozoan fragments and abundant disseminated organic matter and pyrite; matrix of clay-size quartz and micrite; weathers dark grey; recessive (GSC loc. 57015)	13	18
1	Limestone, bryozoan-echinoderm; medium grey; mainly medium- to coarse-grained bryozoan and echinoderm fragments, with rare brachiopod fragments and foraminifers; sparry calcite cement; small laminae and irregular masses of micrite; numerous irregular masses of medium grey chert; 2-inch to 1-foot thick beds; weathers light grey with some light greyish brown patches; resistant; cliff-former	5	5

MOUNT DEVILLE SECTION (116F-17)

Located in northern Ogilvie Mountains on north side of Tatonduk River approximately 3 miles north of Mt. Deville; 65°16 1/2'N; 140°24'W; aerial photograph A13134-25, immediately south of center; base of section at photo co-ordinates X=-0.4, Y=-1.7, top of section at photo co-ordinates X=+0.5, Y=-4.25. Measured by E.W. Bamber and A. Kuhme, August, 1963, through most of Jungle Creek and Tahkandit Formations.

PERMIAN [?Asselian or Sakmarian - Kazanian (Wolfcampian-Guadalupian)]

Tahkandit Fm.	411 feet (incomplete)
Jungle Creek Fm.	1,828 feet (incomplete)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	MIDDLE PERMIAN		
	Tahkandit Formation (411 feet thick, incomplete)		
40	Limestone: micritic, spicular, cherty in part; dark grey; mainly spicules in micritic matrix; some beds partly replaced by chert; beds 6 inches to 1 foot thick; limestone weathers light grey, chert weathers dark grey; unit resistant (GSC loc. 57057)	47	2,239
39	Limestone, as in unit 36	101	2,192
38	Limestone: cherty, skeletal, spicular, with burrows, as in unit 36	29	2,091
37	Limestone: cherty, skeletal, spicular, silty, similar to unit 36, but with more chert and scattered silt grains of quartz	20	2,062
36	Limestone: cherty, skeletal, spicular; dark grey, very fine-grained; mainly spicules and indeterminate skeletal fragments; partly replaced by chert; matrix is chert; numerous burrows with concentrations of organic matter; beds 2 to 3 feet thick; weathers light to medium brownish grey, resistant	24	2,042
35	Chert: calcareous, spicular, with indeterminate skeletal fragments and spicules, as in unit 25, but non-dolomitic. This alternates with cherty limestone, where skeletal fragments predominate over chert. Limestone makes up approximately 20 per cent of outcrop and occurs in 1- to 2-foot thick beds (same lithology as unit 36)	92	2,018
34	Limestone: skeletal, siliceous, slightly silty, with organic matter, as in unit 24	11	1,926

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
33	Limestone, as in unit 29	5	1,915
32	Limestone: skeletal, siliceous, spicular, slightly silty, as in unit 30	6.5	1,910
31	Limestone: skeletal, slightly silty, spicular, dolomitic, as in unit 29	3.5	1,903.5
30	Limestone: skeletal, siliceous, spicular, slightly silty, as in unit 27, but slightly more siliceous matrix	6	1,900
29	Limestone: skeletal, slightly silty, spicular, as in unit 27, but non-siliceous and partly replaced by dolomite	4	1,894
28	Mainly covered, non-recessive; basal 3 feet composed of skeletal, siliceous limestone, as in unit 26	24	1,890
27	Limestone: skeletal, slightly siliceous, spicular, slightly silty; dark grey; very fine- to fine-grained; mainly indeterminate skeletal fragments and spicules with scattered quartz and chert silt and disseminated organic matter; matrix is clay-size quartz; numerous burrows; one 2-foot thick bed; weathers medium greyish brown; resistant	2	1,866
26	Limestone: skeletal, siliceous, spicular, with several 2-to 6-inch intervals of chert, as in unit 25, making up less than 5 per cent of interval	20	1,864
25	Chert: dolomitic, calcareous, spicular; dark grey; mainly spicules and indeterminate skeletal fragments; largely replaced by chert and dolomite and containing irregular masses of very finely crystalline dolomite; disseminated organic matter; beds 1 to 4 inches thick; weathers light yellowish brown; resistant	3	1,844
24	Limestone: skeletal, siliceous, slightly silty; dark grey; mainly very fine- to fine-grained, indeterminate skeletal fragments with scattered quartz silt grains in matrix of clay-size quartz; abundant disseminated organic matter; no apparent bedding; weathers dark brownish grey; resistant	13	1,841

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER AND ?MIDDLE PERMIAN		
	Jungle Creek Formation (1,828 feet thick, incomplete)		
23	Covered below steep limestone cliffs	89	1,828
22	Covered, resistant	30	1,739
21	Mudstone, as in unit 20, but only slightly silty	117	1,709
20	Mudstone: siliceous, silty; dark grey; numerous quartz and chert silt grains in matrix of clay-size and very fine silt-size quartz with abundant disseminated organic matter; beds 2 to 6 inches thick; weathers dark grey with orange-brown stain; resistant	11	1,592
19	Covered, recessive	33	1,581
18	Shale: silty; dark grey; weathers dark grey; recessive; mainly covered	40	1,548
17	Covered	220	1,508
16	Mudstone: siliceous, very silty; dark grey; abundant quartz and chert (minor) silt and very fine sand grains in matrix of clay-size quartz, grades to siliceous siltstone: disseminated organic matter; numerous burrows; rubble and minor outcrop; weathers dark grey; resistant	79	1,288
15	Covered, recessive; measured across valley	1,017	1,209
14	Sandstone: calcareous; medium brownish grey; fine-grained; mainly quartz grains with minor chert grains in finely crystalline calcite matrix; rare fine-grained skeletal fragments; beds 2 to 3 feet thick; weathers medium brownish grey; resistant. From 189 to 189 1/2 feet is a 6-inch thick bed of fine-grained, sandy, skeletal limestone (GSC loc. C-2741)	9	192
13	Covered, recessive	12	183
12	Limestone, as in unit 10, but skeletal fragments are mainly bryozoan and echinoderm, some foraminifers, fine sand very abundant, grades to sandstone (GSC loc. 56921)	2	171
11	Covered	21	169

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
10	Limestone: skeletal, sandy; medium brownish grey; medium- to coarse-grained bryozoan, echinoderm, brachiopod, and gastropod fragments in sparry calcite matrix with abundant quartz and minor chert sand grains (mainly fine-grained); irregular masses of limonite present; beds 1 to 2 feet thick; weathers medium orange-brown; resistant	11	148
9	Sandstone: calcareous; medium grey; fine-grained, mainly angular quartz grains with minor chert grains, cement is finely crystalline calcite; partly rubble covered, outcrop makes up 40 per cent; beds 4 inches to 1 foot thick; weathers dark brownish grey; resistant	20	137
8	Limestone: bryozoan-echinoderm, very sandy, dolomitic; light and dark grey (mottled); coarse-grained bryozoan, echinoderm and brachiopod fragments, abundant fine-grained quartz and chert sand; sparry calcite cement; replaced by medium to coarsely crystalline dolomite in irregular laminae; beds 6 inches to 5 feet thick; weathers dark brownish grey with orange patches; 4-inch to 1-foot thick lensing beds of conglomerate make up 30 per cent of outcrop. Conglomerate: light grey mottled with dark grey; pebbles of chert (mainly dark grey), partly replaced by medium to coarsely crystalline calcite, rounded, up to 1/4-inch diameter; matrix is limestone, as in rest of unit	14	117
7	Limestone: bryozoan, silty; medium grey with light brown flecks; coarse-grained bryozoan fragments with rare echinoderm and brachiopod fragments and foraminifers; scattered quartz silt; sparry calcite cement, some micrite fillings in skeletal fragments; beds 6 inches to 2 feet thick; weathers dark brownish grey; resistant (GSC locs. 56927, C-2740)	19	103
6	Covered, recessive; lower 3 feet composed of shale, silty, calcareous, dark grey; weathers dark grey	12	84
5	Limestone: bryozoan-echinoderm, slightly silty; medium grey, mainly coarse-grained bryozoan, echinoderm, and brachiopod fragments, scattered quartz silt grains, sparry calcite matrix; scattered pyrite masses; beds 1 to 3 feet thick; weathers medium orange-brown; resistant	9	72

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
4	Siltstone: dolomitic, calcareous; dark grey; silt grains (quartz and minor chert) in matrix of finely crystalline calcite and dolomite; beds 4 inches to 2 feet thick; weathers medium brownish grey; resistant	7	63
3	Covered, recessive	45	56
2	Sandstone: calcareous; dark grey; fine-grained, mainly quartz with some chert grains; sub-rounded; matrix of finely crystalline calcite; beds 1 to 3 feet thick; weathers medium brownish grey; resistant	8	11
1	Limestone: bryozoan-echinoderm, sandy; dark grey; coarse-grained bryozoan and echinoderm fragments with abundant rounded, coarse-grained quartz and chert sand; sparry calcite matrix; beds up to 4 inches thick; crossbedded; weathers medium yellowish brown; resistant	3	3

ETTRAIN CREEK WEST SECTION (116F-18)

Located in northern Ogilvie Mountains, approximately 1 mile east of Ettrain Creek, 6 miles east of Yukon-Alaska boundary; 65°21'N, 140°48'W; aerial photograph A13137-30, south of center; base of section at photo co-ordinates X=-0.95, Y=-7.3; top of section at photo co-ordinates X=-1.15, Y=-7.25. Measured by E.W. Bamber and A. Kuhme, August, 1963, through Tahkandit Formation.

TRIASSIC? (covered)
(Disconformity)

MIDDLE PERMIAN [Kazanian (Guadalupian)]
Tahkandit Fm. 320 feet
Jungle Creek Fm. (uppermost) not measured

MIDDLE PERMIAN

Tahkandit Formation
(320 feet thick)

6	Limestone: skeletal; medium brownish grey; fine-grained indeterminate skeletal grains with abundant coarse-grained brachiopod fragments in spar cement; scattered fine, angular grains of chert, rare glauconite grains; beds 1 to 3 feet thick; weathers medium grey with yellowish and orange-brown patches; cliff-former; makes up 70 per cent of outcrop; interbedded with limestone as in unit 5 (GSC loc. 57250)	45	320

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
5	Limestone: skeletal, silty, slightly glauconitic, as in unit 4, but contains some coarse-grained bryozoan and brachiopod fragments; some beds with more abundant coarse-grained skeletal fragments - these beds make up 50 per cent of unit from 255 to 275 feet; numerous irregular lenses and discontinuous beds of dark grey chert 1 to 4 inches thick, spaced 1 to 5 feet apart (GSC locs. 56945, 56997)	145	275
4	Alternating 1- to 4-foot beds of: Limestone: skeletal, silty, slightly glauconitic; medium brownish grey; very fine- to fine-grained skeletal fragments (partly recrystallized), sparry calcite cement, abundant quartz and chert silt and very fine sand, rare glauconite grains; makes up 70 per cent of outcrop. Limestone: similar to limestone above, but more silt and very fine sand grains, grades to calcareous sandstone; makes up 20 per cent of outcrop. Ten per cent of outcrop consists of 6-inch to 1-foot thick beds of medium brown, coarse-grained limestone with brachiopods. Unit weathers dark brownish grey with yellowish brown stain; resistant cliff-former (GSC locs. 56984, 57277)	50	130
3	Sandstone, as in unit 1	34	80
2	Sandstone, grading to chert, as in unit 1, but non-calcareous	12	46
1	Sandstone: very siliceous, calcareous, grading to sandy, calcareous chert; dark grey; very fine- to fine-grained; angular quartz and chert grains and fine-grained indeterminate skeletal fragments in chert matrix, rare glauconite grains; 4-inch to 1 1/2-foot thick beds; weathers dark brownish grey; resistant (GSC loc. 57245)	34	34

NAHONI RANGE EAST SECTION (116G-5)

Located in eastern Nahoni Range, northern Ogilvie Mountains, approximately 12 miles west of Ogilvie River; 65°38 1/2'N, 138°34 1/2'W; aerial photograph A12291-436, center; base of section at photo co-ordinates X=+1.35, Y=+1.5; top of section at photo co-ordinates X=-3.0, Y=+1.9. Measured by E.W. Bamber and W.J.F. Clack, June, 1962, on west flank of anticline through upper Hart River Formation, Ettrain Formation, and lower Jungle Creek Formation.

LOWER PERMIAN [upper Asselian-lower Sakmarian (Wolfcampian)]
Jungle Creek Fm. 245 feet (incomplete)
(Disconformity)

UPPER CARBONIFEROUS [Moscovian-?Gzhelian (Desmoinesian-?Missourian), lower age limit unknown]
Ettrain Fm. ?636 feet (position of upper contact uncertain)
Hart River Fm. (undivided) 529 feet (incomplete)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER PERMIAN		
	Jungle Creek Formation (245 feet thick; incomplete)		
46	Sandstone: calcareous; medium grey; very fine-grained; mainly angular grains of quartz and (minor) chert with calcite cement, very calcareous in some beds; shows burrowing; weathers medium brownish grey with rusty brown patches; resistant. Interval from 1,351 to 1,359 feet - covered, with small outcrop of argillaceous sandstone at 1,355 feet (GSC locs. 53774, 53775, 53776) Interval from 1,400 to 1,403 feet - covered	72	1,410
45	Covered, recessive	173	1,338
	UPPER CARBONIFEROUS		
	Ettrain Formation (?636 feet thick; position of upper contact uncertain)		
44	Covered, resistant	78	1,165
43	Limestone: bryozoan-echinoderm; medium grey; medium- to coarse-grained, mainly bryozoan and echinoderm fragments with micrite fillings; some brachiopod fragments and rare foraminifers; sparry calcite cement with patches of micrite; weathers medium grey; rubbly outcrop (GSC loc. C-2700)	5	1,087

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
42	Covered	22	1,082
41	Limestone: skeletal-micritic; dark grey; very fine-grained echinoderm fragments and spines or spicules with other very fine-grained, indeterminate skeletal fragments in micritic matrix; some fragments silicified, abundant disseminated organic matter and pyrite; weathers medium yellowish brown to medium brownish grey; resistant	7	1,060
40	Covered	20	1,053
39	Mainly covered; appears to be unit of siltstone, calcareous; dark grey; weathers orange to rusty brown	13	1,033
38	Limestone: bryozoan-echinoderm; light to medium grey; medium-to coarse-grained; mainly bryozoan and echinoderm fragments with brachiopod fragments and rare foraminifers; some intraclasts of micritic limestone and scattered medium to coarse, rounded grains of chert and quartz (minor); sparry cement, micrite fillings in skeletal fragments; rubbly outcrop; weathers light brownish grey; resistant (GSC loc. C-2699)	5	1,020
37	Covered	14	1,015
36	Rubbly outcrop of limestone: as in unit 33	2	1,001
35	Rubbly outcrop of dark grey, silty dolomite, or dolomitic siltstone; weathers medium grey	3	999
34	Covered	10	996
33	Limestone: bryozoan-echinoderm; medium grey; medium- to coarse-grained; mainly bryozoan, echinoderm, and brachiopod fragments with sparry cement; skeletal fragments silicified in part: some beds almost entirely replaced by chert; weathers light brownish grey; resistant (GSC locs. 53772, 53773)	11	986
32	From 956 to 975 feet - Limestone: bryozoan-echinoderm; medium grey; medium- to coarse-grained; with rare 1- to 2-inch chert beds and lenses (some black, some grey); mainly bryozoan, echinoderm, and brachiopod fragments with rare micrite envelopes and foraminifers; abundant micrite fillings and rare micritic limestone intraclasts, sparry calcite cement; weathers light grey; resistant (GSC locs. 53771, C-2698)		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	From 945 to 956 feet - Limestone: micritic-skeletal, as from 905 to 928 feet From 938 to 945 feet - Limestone: skeletal-micritic, as from 884 to 905 feet From 928 to 938 feet - Covered From 905 to 928 feet - Limestone: micritic-skeletal; medium brownish grey; micritic matrix with disseminated organic matter and pyrite and numerous coarse-grained echinoderm, bryozoan and brachiopod fragments and rare foraminifers; weathers light grey; resistant From 884 to 905 feet - Limestone: skeletal-micritic; medium grey; medium- to coarse-grained; mainly echinoderm and bryozoan fragments with brachiopod fragments, rare foraminifers and rare quartz silt grains, in micritic matrix containing disseminated organic matter and pyrite; weathers light grey; resistant (GSC loc. 53770)	91	975
31	Interbedded dolomite and limestone. Dolomite: silty, slightly calcareous; microcrystalline; dark grey; mainly microcrystalline dolomite with very fine-grained, indeterminate skeletal fragments (calcite) and quartz silt grains, burrows present; beds 4 inches to 1 foot thick; weathers medium brownish grey; resistant. Limestone: micritic, ?dolomitic, silty, dark grey; with disseminated organic matter; beds 2 to 6 inches thick; weathers dark grey; recessive; grades to calcareous, silty dolomite and calcareous, dolomitic siltstone in part, with some shale partings	56	884
	Base of main resistant interval in section; overlain by light grey weathering limestone, and underlain by dark grey and brown-weathering, more recessive rocks		
30	Covered	44	828
29	Siltstone and silty dolomite, as in unit 23	3	784
28	Covered	5	781
27	Rubbly outcrop of siltstone and silty dolomite: as in unit 23	4	776
26	Covered	22	772
25	Siltstone and dolomite: as in unit 23, with no limestone	5	750

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
24	Covered	15	745
23	Siltstone, dolomitic, and silty dolomite with shale, as in unit 21; 2-foot thick bed of limestone, as in unit 17, at 727 feet	15	730
22	Covered	56	715
21	Siltstone: dolomitic, with shale partings and beds, as in unit 19; siltstone grades to silty, calcareous dolomite; some beds of limestone as in unit 17 (1-foot thick bed at 651 feet, 6-inch thick bed at 654 feet)	8	659
20	Covered	36	651
19	Siltstone: dolomitic?, slightly calcareous; medium grey; rare thin beds of silty shale; 1.5 feet of limestone (as in unit 17) at 597 feet and 1-inch thick bed at 582 feet; siltstone weathers dark grey; resistant; limestone weathers medium greyish brown and stands out	18	615
18	Covered	17	597
17	Limestone: skeletal-micritic, very fine-grained; dark grey; mainly partly silicified, very fine-grained brachiopod and other indeterminate skeletal fragments in micritic matrix with abundant disseminated organic matter and pyrite; upper 5 feet of unit contain beds up to 5 feet thick of siltstone, dolomitic, slightly calcareous, with disseminated organic matter; numerous burrows present in siltstone; 1- to 3-inch thick beds of silty, ?dolomitic shale are also present in upper 5 feet; limestone weathers medium greyish brown to rusty brown; resistant; siltstone and shale weather dark grey; recessive	14	580
16	Covered	16	566
15	Siltstone, calcareous, with (?)organic matter, dark grey, alternates with 2- to 4-inch thick beds of argillaceous siltstone with shale partings; unit weathers dark grey; resistant	10	550
14	Limestone: bryozoan-echinoderm; medium brownish grey; medium- to very coarse-grained; mainly bryozoan and echinoderm fragments with some brachiopod fragments and rare foraminifers; weathers medium grey with rusty brown patches; resistant (GSC loc. 53769)	11	540

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	UPPER CARBONIFEROUS AND OLDER		
	Hart River Formation (529 feet thick, incomplete)		
13	Limestone: as in unit 11	4	529
12	Covered	67	525
11	Limestone: micritic, very silty, siliceous; medium to dark grey; microcrystalline to very finely crystalline; abundant quartz and chert silt grains and very fine-grained, indeterminate skeletal fragments of calcite in matrix of clay-size quartz; abundant disseminated organic matter and pyrite; unit weathers medium brown and medium to dark grey; resistant	18	458
10	Covered	33	440
9	Limestone: skeletal, silty; very fine- to fine-grained; medium to dark grey; mainly very fine-grained brachiopod, echinoderm and other indeterminate skeletal fragments with sparry cement and abundant disseminated organic matter and pyrite; weathers medium to dark grey; resistant; unit contains covered interval from 370 to 375 feet; forms part of banded brown and dark grey interval beneath main light grey weathering Ettrain Formation (GSC loc. 53768)	60	407
8	Limestone: micritic-skeletal(?), slightly silty, dark grey, contains brachiopods, pelecypods, and gastropods; weathers rusty brown (GSC loc. 53767)	2	347
7	Covered	57	345
6	Siltstone: very calcareous, with organic matter, dark grey, 6-inch thick bed of very silty, calcareous shale at 258 feet; unit weathers dark grey with dark brown patches; slightly resistant	40	288
5	Covered	63	248
4	Mainly covered, some small outcrops of dolomite: very silty; dark grey; microcrystalline; with much disseminated organic matter and pyrite; weathers dark grey; slightly resistant	36	185

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
3	Limestone: micritic-skeletal, as in unit 1, with argillaceous, slightly calcareous, dolomitic siltstone from 135 to 137.5 feet and from 141 to 143 feet; unit weathers medium greyish brown; resistant	24	149
2	Covered	31	125
1	Interbedded limestone and dolomite: Limestone: micritic-skeletal, silty, medium to dark grey; brachiopod fragments and other very fine-grained, indeterminate skeletal fragments in micritic matrix; much disseminated organic matter and associated pyrite; scattered quartz silt grains; rare partings (1/2 to 1 inch thick) of slightly calcareous, silty shale; units weather medium greyish brown; recessive. Occurs at intervals: 1 to 2 feet; 18 to 30 feet; 39 to 41 feet; 63 to 66 feet; 79 to 80.5 feet; 86 to 88 feet. Dolomite: silty, calcareous; dark grey; microcrystalline; mainly microcrystalline dolomite with abundant, very fine-grained, indeterminate skeletal fragments of calcite, and numerous quartz silt grains; abundant disseminated organic matter with associated pyrite; weathers medium to dark grey; slightly recessive. Occurs at intervals: 2 to 18 feet; 30 to 39 feet; 41 to 63 feet; 66 to 79 feet; 80.5 to 86 feet; 88 to 94 feet	94	94

WHITESTONE RIVER SOUTH SECTION (116G-9A)

Located in eastern Nahoni Range, northern Ogilvie Mountains, approximately 10 miles east of Whitestone River; 65°47'N, 138°55'W; aerial photograph A14451-103, slightly south of center; base of section at photo co-ordinates X=-0.7, Y=-1.7; top of section at photo co-ordinates X=-2.65, Y=-2.3. Measured by E.W. Bamber and W.J.F. Clack, June, 1962, on west limb of anticline, from top of Middle Devonian Ogilvie Formation (Norris, 1968, p. 28) into lower part of Ettrain Formation; forms lower part of composite section 116G-9.

CARBONIFEROUS [Visean-Moscovian (Meramecian?-Middle Pennsylvanian)]
Ettrain Fm. 93 feet (incomplete)
Hart River Fm. 1,299 feet
(Contact arbitrarily placed at base of unit 4)

DEVONIAN AND LOWER CARBONIFEROUS (Middle Devonian-?Visean)
Unit 1 (=unnamed shale unit of A.W. Norris, 1968) 1,058 feet
Section underlain by Middle Devonian Ogilvie Formation.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	UPPER CARBONIFEROUS		
	Ettrain Formation (93 feet thick)		
10	Interbedded skeletal limestone, sandy limestone, and chert. Limestone: skeletal, slightly sandy; medium grey; medium- to coarse-grained; consists mainly of echinoderm and bryozoan fragments with rare brachiopod fragments and numerous foraminifers; sparry calcite cement; scattered fine quartz and chert grains; beds 6 inches to 1 foot thick; weathers light grey; makes up approximately 50 per cent of outcrop. Limestone: very sandy; dark grey; fine- to medium-grained echinoderm and indeterminate skeletal fragments in sparry calcite cement, with abundant fine-grained quartz and chert grains; beds 4 to 6 inches thick; weathers medium greyish brown; makes up approximately 40 per cent outcrop. Chert: dark grey; 1- to 2- inch thick beds of irregular thickness, changing laterally. Unit forms banded, prominent cliff near base of resistant limestone capping mountain	13	2,450
9	Limestone: skeletal-micritic, silty, cherty; dark grey; very fine-grained; abundant indeterminate skeletal fragments and angular silt grains of chert and quartz, micritic matrix with some sparry calcite; burrows present, marked by concentrations of organic matter; beds 6 inches to 1 foot thick; argillaceous, silty limestone in 1- to 2-inch thick beds makes up less than 10 per cent of outcrop; unit weathers light to medium grey; resistant (GSC loc. C-2702)	55	2,437
8	Limestone: skeletal, similar to that in unit 10, but sand grains very rare; interbedded with 1- to 3-inch thick beds of dark grey chert; unit weathers light to medium grey; resistant	25	2,382

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER AND UPPER CARBONIFEROUS		
	Hart River Formation (undivided) (1,299 feet thick)		
7	Limestone: skeletal-micritic, silty, with thin beds of argillaceous limestone, as in unit 9 (GSC loc. C-2701)	25	2,357
6	Interbedded limestone and shale: Limestone: micritic-skeletal, silty; dark grey; numerous very fine- to fine-grained spines or spicules and other unidentified skeletal fragments with scattered quartz silt grains, in micritic matrix; abundant organic matter concentrated in burrows and thin laminae; beds 2 inches to 1 foot thick; weathers medium brownish grey; resistant. Shale: silty; dark grey; beds 2 to 4 inches thick; weathers dark grey; recessive. Unit, as a whole, is resistant	53	2,332
5	From 1,247 to 2,279 feet - covered, recessive. From 1,083 to 1,247 feet - covered, resistant, forms part of rib containing unit 4	1,196	2,279
4	Limestone: skeletal-oolitic, silty, sandy; dark grey; medium- to coarse-grained; echinoderm fragments and oolites in sparry calcite cement, some brachiopod fragments, rare algae, foraminifers, and ostracods, fine-grained skeletal fragments form centres of oolites; abundant quartz and chert silt and fine sand grains (coarse sand in part), patches and irregular laminae of organic matter; rubble only, no bedding seen; weathers light grey; forms prominent rib in hillside; at 1,060 feet, rare plates of silty, very calcareous shale (GSC loc. 53784)	25	1,083
	DEVONIAN AND LOWER CARBONIFEROUS		
	Unit 1 (= unnamed shale unit of Norris, 1968) (1,058 feet thick)		
3	Covered	578	1,058
2	Shale: very silty, ?carbonaceous; dark grey to black; rubble and poor outcrop, no bedding seen; weathers dark grey; forms slight prominence	1	480
1	Covered, recessive	479	479

WHITESTONE RIVER NORTH SECTION (116G-9B)

Located in eastern Nahoni Range, northern Ogilvie Mountains, approximately 4 miles southeast of Whitestone River; 3 miles north of section 116G-9A; 65°49 1/2'N, 138°55'W; aerial photograph A14451-103, north and west of center; base of section at photo co-ordinates X=-2.5, Y=+4.3; top of section at photo co-ordinates X=-3.1, Y=+4.6. Measured by E.W. Bamber and W.J.F. Clack, June, 1962, on west limb of anticline, from upper part of Hart River Formation into the lower part of the Jungle Creek Formation; forms upper part of composite section 116G-9.

LOWER PERMIAN [?Asselian-Sakmarian (?Wolfcampian)]
Jungle Creek Fm. 45 feet (incomplete)
(Disconformity)

UPPER CARBONIFEROUS [Moscovian-?Gzhelian (Desmoinesian-?Missourian)]
Ettrain Fm. 855 feet
Hart River Fm. 195 feet (incomplete)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER PERMIAN		
	Jungle Creek Formation (45 feet thick; incomplete)		
43	Lower 10 feet are made up of limestone: bryozoan; medium to dark grey; medium- to coarse-grained; mainly rounded fragments of bryozoans with minor echinoderm and brachiopod fragments; some grains of micritic limestone and pore spaces in skeletal fragments filled with micrite; many coated grains, rare euhedral quartz grains; sparry calcite cement; 40 per cent of lower 10 feet and most of upper 35 feet are made up of conglomerate: chert-pebble, calcareous; medium to dark greyish brown (mottled with dark grey pebbles and grains); mainly rounded, light grey, pale green, and dark grey chert grains and pebbles up to 1/4 inch across, some coarse quartz grains; matrix of crystalline calcite and skeletal fragments; strongly crossbedded; rare beds, up to 2 feet thick, of medium- to coarse-grained, quartzose, cherty, calcareous sandstone; unit weathers medium greyish brown with rusty patches; forms cliff at top of section	45	1,095

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	UPPER CARBONIFEROUS		
	Ettrain Formation (855 feet thick)		
42	Covered	5	1,050
41	Limestone: skeletal; medium grey; very coarse-grained; abundant fragments of echinoderms, bryozoans and brachiopods; weathers yellowish brown to rusty brown; resistant (GSC loc. 53811)	3	1,045
40	Covered	7	1,042
39	Limestone: bryozoan-echinoderm, sandy; medium to dark grey; medium- to coarse-grained with some fine-grained fragments; mainly bryozoan fragments with echinoderm and brachiopod fragments and rare foraminifers, algae and micritic limestone intraclasts; fairly numerous fine to coarse, angular to subrounded grains of chert and quartz (rare); sparry cement; weathers medium brownish grey to yellowish brown; cliff-former (GSC loc. C-3223)	35	1,035
38	Covered	19	1,000
37	Limestone: skeletal, sandy; dark grey; fine- to medium-grained; echinoderm, bryozoan and other fossil fragments with quartz and chert grains; capped by 6 inches of ?skeletal-micritic limestone; weathers medium grey; forms top of cliff (GSC loc. 53810)	3	981
36	Sandstone: quartzose, cherty, calcareous; medium greyish brown; fine-grained; angular grains, mainly quartz with some chert; cement of finely crystalline calcite; crossbedded and cross-laminated; weathers medium to dark greyish brown; cliff-former	9	978
35	Limestone: bryozoan; medium to dark grey; medium- to coarse-grained; mainly bryozoan fragments in sparry cement with some brachiopod and and echinoderm fragments and foraminifers; weathers medium greyish brown; forms base of cliffs above recessive unit overlying light grey weathering limestone cliffs (GSC loc. 53809)	7	969
34	Covered	25	962

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
33	Sporadic outcrop, in recessive interval, of limestone: bryozoan-echinoderm; medium grey; fine- to medium-grained; cherty in part; mainly bryozoan fragments with echinoderm and brachiopod fragments and foraminifers in sparry cement. At 930 feet, there is a 1.5-inch thick bed of medium- to coarse-grained, bryozoan-echinoderm limestone with scattered fine to medium grains of chert and quartz; unit weathers medium greyish brown; recessive (GSC locs. 53807, 53808, C-2707)	25	937
32	Covered	10	912
31	Limestone: echinoderm-bryozoan; medium greyish brown; medium- to coarse-grained; mainly echinoderm and bryozoan fragments with brachiopod fragments and foraminifers in sparry calcite cement; skeletal fragments filled with micrite; in lower 7 feet, 40 per cent of outcrop consists of 1- to 2-inch thick beds of medium grey chert and siliceous limestone; unit weathers light brownish grey; cliff-former (GSC locs. 53806, C-2743)	13	902
30	Covered (GSC loc. 53805)	9	889
	(At 880 feet - base of relatively recessive, yellowish brown weathering interval capping the section)		
29	Limestone: skeletal; medium brownish grey; very coarse-grained; mainly echinoderm fragments and brachiopods; weathers light grey with light brown patches (GSC loc. 53804)	2	880
28	Limestone: (?)oolitic; light greyish brown; fine- to medium-grained; partly recrystallized, appears to be mainly oolites, pelletoid grains and unidentifiable skeletal fragments in (?)sparry cement; numerous pore spaces; weathers medium brownish grey; cliff-former	10	878
27	Limestone: echinoderm-bryozoan, sandy in part; medium grey; medium- to coarse-grained; echinoderm, bryozoan and brachiopod fragments with some foraminifers in sparry cement; some beds have numerous fine to coarse, rounded chert and quartz grains; lensing beds of medium brownish grey chert every 3 to 10 feet. From 799 to 807 feet and from 822 to 868 feet, there are numerous very coarse-grained echinoderm fragments and thin partings and beds of skeletal-micritic limestone; lens of silicified oolitic limestone at 811 feet; covered interval from 815 to 822 feet; unit weathers light grey; resistant (GSC locs. 53802, 53803, C-2742)	77	868

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
26	Covered	6	791
	(At 785 feet - top of main light grey weathering limestone cliffs)		
25	Limestone: echinoderm-bryozoan; medium brownish grey; medium- to coarse-grained; echinoderm and bryozoan fragments with pelletoid grains, oolites and brachiopod fragments; some intraclasts of micritic-skeletal limestone, and rare algal coatings on skeletal grains; sparry cement; weathers light to medium grey with rusty patches; cliff-former; every 10 to 15 feet there is a 2- to 6-inch thick lensing bed of light to medium grey chert (GSC locs. 53801, C-2706)	105	785
24	Limestone: skeletal; medium grey; medium- to coarse-grained; weathers medium grey; 40 per cent of outcrop is made up of medium to dark grey, skeletal-micritic limestone beds alternating with skeletal limestone and weathering dark grey; unit slightly recessive at base of cliff (GSC loc. 53800)	8	680
23	Covered	4	672
22	Limestone: skeletal, as in unit 13, but no chert	8	668
21	Limestone: skeletal, similar to that in unit 14; fine- to medium-grained; some pellets or oolites; weathers light to medium brownish grey; cliff-former (GSC loc. 53799); unit forms top of second cliff above base of section	27	660
20	Limestone: oolitic; light brownish grey; fine- to medium-grained with some coarse grains; mainly oolites and pelletoid grains with bryozoan, echinoderm and brachiopod fragments, some foraminifers; sparry cement; weathers light brownish grey; cliff-former (GSC loc. C-2705)	13	633
19	Limestone: skeletal, as in unit 14	5	620
18	Limestone: skeletal, with chert, as in unit 13, but from 590 to 615 feet, 30 per cent of outcrop is made up of 1- to 2-foot thick beds of fine-grained, dark grey, skeletal limestone that is partly recrystallized and has scattered quartz silt grains, numerous pelletoid grains, rare foraminifers and rare oolites; weathers light to medium grey; cliff-former (GSC loc. C-2704	35	615

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
17	Limestone: skeletal, as in unit 14	6	580
	Base of second main cliff		
16	Covered	21	574
15	Limestone: skeletal, with irregular chert beds, as in unit 13; 5-inch thick bed of fine-grained, medium grey, calcareous, quartzose sandstone at 549 feet (GSC loc. 53798)	48	553
14	Limestone: echinoderm-bryozoan; medium to dark grey; fine- to medium-grained with coarse-grained echinoderm fragments, numerous foraminifers and brachiopod fragments; sparry cement; scattered quartz and chert sand (fine- to medium-grained); weathers medium grey with slight brownish tinge; cliff-former (GSC locs. 53797, C-3225)	14	505
13	Limestone: bryozoan-echinoderm; light to medium brownish grey; fine- to medium-grained with some large fragments; mainly bryozoan fragments with echinoderm and brachiopod fragments, foraminifers and sparry cement; 2- to 6-inch thick lensing beds of dark grey chert every 5 to 10 feet; weathers light to medium grey with rusty patches; cliff-former, unit forms base of main light grey, massive cliff (GSC locs. 53794, 53795, 53796)	77	491
12	Covered	20	414
11	Limestone: bryozoan-echinoderm; medium to dark grey; coarse- to very coarse-grained; echinoderm and bryozoan fragments with foraminifers and brachiopod fragments; sparry cement; lenses and discontinuous beds of dark grey chert constitute up to 10 per cent of outcrop; unit weathers light to medium grey with dark grey chert beds; resistant	21	394
10	Covered	35	373
9	Limestone: skeletal; light grey to brownish grey; medium- to coarse-grained; coarse to very coarse, angular quartz and chert grains from 330 to 332 feet, rare lenses of medium grey chert up to 2 inches thick, weathers light grey; resistant (GSC loc. 53793)	8	338
8	Covered	15	330

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
7	Limestone: skeletal, as in unit 5; light grey weathering with rusty patches; cliff-former	8	315
6	Limestone: echinoderm; dark grey; coarse- to very coarse-grained; mainly echinoderm fragments with abundant foraminifers, algal fragments, and medium to coarse chert and quartz grains from 305 to 307 feet; much micrite as fillings and in matrix, sparry cement in part; weathers medium brownish grey; cliff-former (GSC loc. C-2703)	20	307
5	Limestone: echinoderm-bryozoan; light to medium grey and brownish grey; coarse-grained; sparry cement; fusulinaceans and small foraminifers; from 270 to 287 feet this limestone alternates with medium and dark grey, skeletal limestone and minor dark grey, silty, very fine-grained limestone; light grey with rusty patches; cliff-former (GSC locs. 53787, 53788, 53789, 53790, 53791, 53792)	30	287
4	Limestone: skeletal; light to medium grey; fine-grained; echinoderms, foraminifers, brachiopods, and other skeletal debris in sparry cement; weathers light grey with rusty patches; cliff-former; alternates with limestone: silty; very fine-grained; highly organic, numerous fine to very fine, indeterminate skeletal grains with abundant quartz silt, numerous worm burrows	62	257
	Hart River Formation (undivided) (195 feet thick; incomplete)		
3	Limestone: skeletal-micritic, silty; dark grey; very fine- to fine-grained; mainly indeterminate skeletal fragments with abundant quartz and chert silt grains in micritic matrix; abundant organic matter concentrated in burrows; beds 4 inches to 1.5 feet thick; weathers medium yellowish brown to medium brownish grey; alternates with 1- to 8-inch thick beds of silty, argillaceous limestone with silty, calcareous shale partings, weathering medium brownish grey to dark grey, slightly recessive, makes up about 40 per cent of outcrop; approximately 10 per cent of outcrop is made up of 1- to 6-inch thick beds of dark grey chert occurring at irregular intervals; unit relatively recessive (GSC loc. 53786)	65	195

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
2	Covered, slightly recessive	86	130
1	Interbedded micritic-skeletal and silty limestone. Limestone: micritic-skeletal, slightly silty; dark grey; very fine- to fine-grained skeletal fragments in micrite, scattered quartz silt grains, organic matter concentrated in burrows; 4-inch to 2-foot thick beds; rare laminae on weathered surface of more silty limestone; weathers medium greyish brown to orange-brown; resistant; makes up 40 per cent of outcrop from 0 to 24 feet above base of unit, and dominates interval from 24 to 39 feet above base. Limestone: very silty, argillaceous; dark grey; grades to calcareous siltstone in part; 2-inch to 1-foot thick beds; some calcareous, very silty shale partings; weathers medium brownish grey; slightly recessive; makes up 60 per cent of outcrop from 0 to 24 feet above base of unit, and dominates outcrop from 39 to 44 feet above base (GSC loc. 53785)	44	44

NAHONI RANGE WEST SECTION (116G-11)

Located in Nahoni Range, northern Ogilvie Mountains, approximately 6 miles east of Miner River; 65°41'N, 139°37'W; aerial photograph A13139-36, slightly southwest of center, base of section at photo co-ordinates X=-1.3, Y=-0.3, top of section at photo co-ordinates X=-1.4, Y=-0.8. Measured by E.W. Bamber and W.J.F. Clack, August, 1962, near axis of southwesterly plunging syncline, through upper Ettrain Formation and lower Jungle Creek Formation.

LOWER PERMIAN [?Asselian-Sakmarian (Wolfcampian)]
Jungle Creek Fm. 304 feet (incomplete)
(Disconformity)

UPPER CARBONIFEROUS [Bashkirian-Moscovian (?Atokan)]
Ettrain Fm. 1,600 feet (upper 630 feet described)
underlain by recessive, covered Hart River Fm.

LOWER PERMIAN

Jungle Creek Formation
(304 feet thick, incomplete)

(Section overlain by rubble and poor outcrop of:

Limestone: bryozoan-echinoderm; light greyish brown; coarse- to very coarse-grained; mainly bryozoan and echinoderm fragments with some brachiopod fragments in sparry cement, some fragments partly silicified; weathers light greyish brown with some yellowish brown patches; resistant)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	(Very similar to limestone at top of section 116G-9B)		
47	Dolomite: calcareous, silty, cherty; medium brownish grey; finely crystalline; contains rare lenses, up to 2 inches thick, containing medium-grained skeletal fragments; unit weathers medium orange-brown; resistant	4	934
46	Limestone: bryozoan-echinoderm; dark brownish grey; fine- to medium-grained; mainly bryozoan, echinoderm and brachiopod fragments with foraminifers in sparry cement, scattered quartz silt and fine sand, rare dark grey chert grains; unit weathers light brownish grey; resistant	6	930
45	Limestone: skeletal, as in unit overlying unit 47 (GSC loc. C-3224)	20	924
44	Limestone: skeletal, as in unit 46	2	904
43	Covered, non-recessive; rubble of limestone, as in unit 45	16	902
42	Dolomite: calcareous, as in unit 47	2	886
41	Limestone: skeletal (similar to unit 45) (GSC loc. 54002)	3	884
40	Covered, non-recessive	11	881
39	Limestone: silty; dark brownish grey; consists of alternating laminae of quartz and chert silt, and irregular laminae of recrystallized calcite - appears to be series of pellets, may be algal in origin; rare lenses of light brownish grey chert up to 1/2 inch thick; unit weathers light to medium brownish grey; resistant	7	870
38	Covered, non-recessive	10	863
37	Limestone: skeletal, as in unit 41	9	853
36	Covered, recessive	5	844
35	Limestone: skeletal, as in unit 41; weathers orange-brown (GSC loc. 54003)	1	839
34	Covered, recessive	3	838

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
33	Limestone: skeletal, silty; medium to dark grey; fine-grained; composed of bryozoan and brachiopod fragments, foraminifers and other indeterminate fossil fragments in sparry cement; numerous quartz and chert silt grains in laminae; carbonate partly recrystallized, resembles limestone in unit 39; unit weathers light to medium greyish brown; resistant (GSC loc. C-2729)	19	835
32	Covered, non-recessive	3	816
31	Sandstone: quartzose, cherty, calcareous; light brownish grey; very fine-grained; mainly very fine grains of quartz and minor chert, with finely crystalline calcite cement; weathers medium grey; resistant	3	813
30	Limestone: skeletal; fine- to medium-grained (coarse-grained in part); mainly echinoderm and brachiopod fragments; weathers orange-brown; resistant (GSC loc. 54004)	3	810
29	Covered, recessive	2.5	807
28	Limestone: skeletal, sandy, grades to calcareous sandstone in some beds; medium grey with orange flecks; fine- to medium-grained; mainly bryozoan and echinoderm fragments with some brachiopod fragments and foraminifers, and numerous fine to medium, angular (some coarse to very coarse) quartz and chert sand, sparry calcite cement; weathers medium brown; cross-laminated; resistant	5	804.5
27	Mainly covered, rubble similar to unit 28, but some rubble blocks contain dark grey chert pebbles up to 1/2-inch maximum diameter	13.5	799.5
26	Covered, non-recessive	38	786
25	Limestone: echinoderm-bryozoan, sandy; medium brownish grey with dark grey flecks; coarse-grained; mainly echinoderm and bryozoan fragments, sparry cement; numerous subrounded grains of light and dark grey chert, up to 1/8-inch maximum diameter; weathers light brownish grey; resistant	13	748
24	Covered, recessive	15	735

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
23	Limestone: skeletal, silty; medium brownish grey; fine-grained with some coarse grains, some beds have scattered light brown and dark grey chert grains up to 1/8-inch maximum diameter; weathers orange-brown; resistant	9	720
22	Covered, non-recessive	67	711
21	Limestone: bryozoan-echinoderm, slightly silty; medium brownish grey; medium- to coarse-grained; mainly bryozoan and echinoderm fragments, some foraminifers, sparry cement, rare quartz silt grains; weathers orange-brown; resistant (GSC loc. C-2730)	14	644
	UPPER CARBONIFEROUS		
	Ettrain Formation (1,600 feet thick, top 630 feet described)		
20	Covered, recessive	14	630
19	Limestone: echinoderm; dark grey mottled with light grey; coarse-grained; mainly echinoderm fragments with brachiopod fragments; weathers orange-brown; resistant (GSC loc. 54005)	3.5	616
18	Covered, recessive	18.5	612.5
17	Limestone, as in unit 19	9	594
16	Covered, slightly recessive	30	585
15	Covered, non-recessive	96	555
	Break between brown weathering above and cliff-forming light grey weathering below, at 555 feet		
14	Limestone: bryozoan-echinoderm; light brownish grey mottled with white; medium- to coarse-grained; mainly echinoderm and bryozoan fragments with rare foraminifers, sparry cement; weathers medium greyish brown; resistant; irregular lensing beds and nodules (up to 4 inches thick) of light greyish brown to medium grey chert make up less than 5 per cent of outcrop (GSC loc. C-2731)	31	459

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
13	Limestone: skeletal; medium grey with brown tinge; medium- to coarse-grained; bryozoan, brachiopod and echinoderm fragments with foraminifers; spar cement; rare lensing beds and nodules (up to 1 foot thick); unit weathers light brownish grey mottled with medium grey; resistant; chert weathers dark grey (GSC locs. 54006, 54007)	13	428
12	Limestone: bryozoan-echinoderm; medium brownish grey; coarse-grained; mainly bryozoan and echinoderm fragments with brachiopod fragments, foraminifers, and horn corals, sparry cement; lensing beds and nodules of medium grey chert (30 per cent of outcrop, 1- to 4-inch thick beds) from 528 to 535 feet; weathers light greyish brown mottled with medium grey; resistant (GSC locs. 54008, C-2758)	16	415
11	Limestone: skeletal, as in unit 14, very little chert	13	399
10	Limestone: skeletal, as in unit 12, no chert	13	386
9	Limestone: bryozoan-echinoderm; light brownish grey; medium- to coarse-grained; mainly bryozoan and echinoderm fragments with some brachiopod fragments, sparry cement and some micrite in matrix; at 10- to 20-foot intervals there are 1- to 2-foot thick beds of limestone similar to rest of unit, but with micritic matrix containing some sparry cement; unit weathers light grey; massive cliff-former	110	373
8	Limestone: pelletoid; medium to dark brownish grey; fine-grained; mainly pelletoid grains with foraminifers, ?oolites, and altered skeletal grains; matrix of finely crystalline calcite; whole rock recrystallized; weathers light grey mottled with light yellowish brown; massive cliff-former	18	263
7	Limestone: echinoderm-bryozoan; medium greyish brown; fine- to medium-grained with scattered coarse grains; mainly bryozoan and echinoderm fragments with some brachiopod fragments and foraminifers; sparry cement; 2- to 5-inch thick lenses and lensing beds of light brownish grey chert at 1- to 5-foot intervals; weathers light grey with brown mottling; cliff-former	51	245

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
6	Limestone: oolitic; dark brownish grey; medium- to coarse-grained; mainly oolites with centres of echinoderm fragments, foraminifers, and other indeterminate fossil fragments, many "micrite envelopes", mainly "superficial oolites", sparry matrix, partly recrystallized; weathers light grey with brown tinge; resistant (GSC loc. C-2732)	41	194
5	Limestone: skeletal-micritic; medium to dark brownish grey; fine-grained; echinoderm and brachiopod fragments with ostracods, foraminifers, and pelletoid grains, some micrite fillings; cement of sparry calcite, and some micrite matrix; weathers light grey; resistant (GSC loc. C-2733)	13	153
4	Limestone, as in unit 6, but numerous uncoated skeletal fragments and very abundant "micrite envelopes" (GSC locs. 54009, C-2734)	66	140
3	Limestone, as in unit 5	9	74
2	Limestone: bryozoan-foraminiferal; medium to dark brownish grey; fine- to medium-grained; partly light greyish brown and coarse- to very coarse-grained; mainly bryozoan fragments with very abundant foraminifers (fusilinaceans and others), also calcispheres, brachiopod fragments, ostracods, with some micrite fillings and sparry cement. Also very numerous, fine, indeterminate skeletal fragments; weathers light grey, cliff-former (GSC locs. 54010, C-2735)	41	65
1	Limestone: echinoderm-bryozoan; medium to dark brownish grey with white mottling; medium- to coarse-grained; mainly echinoderm and bryozoan fragments with abundant micrite envelopes and foraminifers; sparry cement; weathers light grey; cliff-former	24	24
	Base of section in Ettrain Formation -- measurement stopped because of snow		

PEEL RIVER WEST SECTION (116H-1A)

Located in southeastern Eagle Plain, on north and south banks of Peel River approximately 7 miles east of mouth of Hart River; 65°53'N, 136°08'W; aerial photograph A13137-68, east center, base of section at photo co-ordinates X=+5.4, Y=-0.7, top of section at photo co-ordinates X=+3.6, Y=-2.4 (Bamber and Waterhouse, 1971, p. 46, Figure 4). Measured by E.W. Bamber and D. Mayes, May, 1962, from fault in lower Ettrain Formation through east limb of syncline into lower Jungle Creek Formation; units 1-36 measured on north bank of river, units 37-46 measured on south bank.

The section is separated by a fault zone from beds in the core of the syncline to the west (sections 116H-1C and 116H-1D of Bamber and Waterhouse, 1971, p. 46, Figure 4). These beds are assigned to the upper Jungle Creek Formation and consist of silty, partly glauconitic, dark grey shale; angular quartz silt and fine sand, glauconite grains abundant in some beds, matrix of clay-size quartz, abundant organic matter and pyrite (disseminated and in irregular masses); 1- to 3-inch thick beds; weathers medium to dark brownish grey; recessive; microcrystalline dolomite, with both disseminated organic matter and pyrite, and scattered spicules; minimum thickness 500 feet, total thickness unknown; overlain unconformably by Cretaceous rocks, contact marked by 3- to 4-foot thick band of breccia.

Lower Permian ammonoids occur in the nodules high in this shale along with brachiopods which suggest that the shale is in part equivalent to the upper part of the Jungle Creek Formation in section 116H-1A.

CRETACEOUS
(Disconformity)

LOWER PERMIAN [Sakmarian and lower Artinskian (Wolfcampian - Leonardian)]
Jungle Creek Fm. — estimated thickness 500+ feet (incomplete)
(Fault zone)

LOWER PERMIAN [Sakmarian and lower Artinskian (Wolfcampian - Leonardian)]
Jungle Creek Fm. — 1,300 feet (incomplete)
(Disconformity)

UPPER CARBONIFEROUS [Moscovian (Middle Pennsylvanian)]
Ettrain Fm. — 698 feet (incomplete)
(Fault zone)

LOWER PERMIAN
Jungle Creek Fm. of section 116H-1B

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER PERMIAN		
	Jungle Creek Formation (1,300 feet; incomplete)		
46	Sandstone: as in unit 43, but finer grained, grading to sandy, calcareous dolomite in part	4	1,662
45	Siltstone: slightly calcareous, siliceous, dolomitic, grading to silty dolomite in part; medium grey; angular quartz silt and very fine sand in matrix of microcrystalline dolomite and clay-size quartz, abundant organic matter and pyrite disseminated and in irregular masses; microcrystalline dolomite dominant over silt in part; forms recessive, slumped unit, bedding not seen	13	1,658
44	Covered	40	1,645
43	Sandstone: dolomitic, slightly cherty, calcareous; medium grey; angular, very fine-grained quartz and (minor) chert sand with scattered, fine-grained, indeterminate skeletal fragments, abundant in some beds, in matrix of microcrystalline to very finely crystalline dolomite and clay-size quartz, abundant disseminated organic matter and pyrite, concentrated in irregular masses and indistinct laminae; beds 6 inches to 1 foot thick; weathers light to medium grey; *Zoophycos* abundant on bedding surfaces; abundant burrows present (GSC locs. 53718, 53719)	46	1,605
42	Sandstone, as in unit 37, but mainly quartz sand and part of matrix is microcrystalline dolomite. In the lower 32 feet of the unit, this sandstone alternates with limestone: skeletal, sandy; medium to dark grey; fine-grained, indeterminate skeletal fragments with abundant foraminifers and angular, very fine- to fine-grained quartz and chert sand; sparry calcite cement, organic matter and pyrite in small masses and disseminated throughout; beds 6 inches to 2 feet thick, forms slightly recessive intervals between sandstone beds, occurs in the intervals 9 to 10 feet, 15 to 18 feet, and 28 to 32 feet above base of unit. Unit as a whole weathers light to medium brownish grey with orange-brown patches. Covered intervals at: 18 to 22 feet, 47 to 57 feet, 68 to 79 feet, 89 to 98 feet, 103 to 121 feet, 132 to 142 feet, 157 to 174 feet, 180 to 194 feet, and 206 to 211 feet above base of unit (GSC locs. 53713 to 53717)	211	1,559

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
41	Covered	25	1,348
40	Sandstone: very calcareous, pyritic; medium grey; fine- to medium-grained, angular quartz and chert sand, with numerous brachiopod and echinoderm fragments and rare foraminifers in sparry calcite cement, abundant small masses of pyrite; lower 2 feet of unit are sandy limestone; beds 1 to 2 feet thick; strongly crossbedded in upper 2 feet; unit weathers medium brownish grey with orange-brown patches; resistant (GSC loc. 53712)	8	1,323
39	Sandstone, as in unit 37 (GSC loc. 53711)	5	1,315
38	Covered	8	1,310
37	Sandstone: calcareous; medium brownish grey; very fine- to fine-grained, angular quartz and chert sand with matrix of indeterminate skeletal fragments and sparry calcite cement, rare foraminifers, numerous small masses of organic matter and pyrite; beds 1 to 3 feet thick; *Zoophycos* abundant; weathers medium brownish grey to orange-brown; resistant (GSC loc. 53710)	12	1,302
36	Sandstone: calcareous, as in unit 30, but very fine- to fine-grained and contains numerous burrows in which organic matter is concentrated; abundant *Zoophycos* on bedding planes (GSC loc. 53709)	5	1,290
35	Covered	147	1,285
34	Sandstone: as in unit 30, but slightly coarser grained and more skeletal fragments, rare chert pebbles 1/4 to 1/2 inch in diameter throughout; some poorly defined cross-bedding, unit laminated in part; beds 1 to 3 feet thick; unit weathers medium brown to orange-brown; resistant	8	1,138
33	Covered	20	1,130
32	Sandstone: as in unit 30, but fine-grained, with rare lenses and thin beds of chert-pebble conglomerate as at 1,035 feet; basal 1 foot of unit is very coarse-grained, silty, skeletal limestone with some chert grains; unit weathers medium greyish brown with orange-brown patches; resistant (GSC locs. 53706, 53708)	5	1,110

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
31	Covered	70	1,105
30	Sandstone: calcareous; slightly glauconitic; medium greyish brown; fine- to medium-grained, angular to subrounded quartz and chert sand, chert grains light grey, dark grey, light brown, and orange-brown, numerous irregular masses and disseminated particles of organic matter and pyrite, rare glauconite grains, matrix of coarsely crystalline calcite cement and fine-grained skeletal fragments; one bed; weathers medium brown to orange-brown; resistant; at 1,035 feet there is a 2-inch thick bed of conglomerate, with rounded chert and quartz pebbles up to 1 inch in diameter, matrix of sandstone with skeletal fragments and calcite cement as in rest of unit; chert grains are light and dark grey, light green, light brown, and orange-brown; numerous coarse and very coarse chert and quartz grains present in matrix	5	1,035
29	Covered	12	1,030
28	Dolomite, as in unit 26	3	1,018
27	Covered	37	1,015
26	Dolomite: calcareous, very silty, grading to calcareous, dolomitic siltstone; medium brownish grey; microcrystalline to very finely crystalline dolomite, with abundant angular quartz and chert silt and very fine sand, which dominates in some intervals, also numerous fine-grained, indeterminate skeletal fragments, disseminated organic matter and pyrite, and rare glauconite grains; *Zoophycos* present on some bedding planes; unit weathers medium brownish grey with rare orange-brown patches; recessive (GSC loc. 53705)	43	978
25	Covered	35	935
24	Dolomite: very calcareous, grading to micritic limestone, slightly cherty, silty in part; medium brownish grey, microcrystalline dolomite with numerous very fine- to fine-grained, indeterminate skeletal fragments and spicules, many of which are replaced by chert; quartz silt in some beds, rare glauconite grains, much disseminated organic matter and pyrite; beds 6 inches to 5 feet thick; 20 per cent of unit is calcareous, very fine-grained sandstone and siltstone as in unit 22, in irregular beds and lenses; unit weathers light to medium greyish brown; moderately resistant (GSC loc. 53704)	40	900

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
23	Covered	20	860
22	Sandstone: calcareous, dolomitic; medium grey to medium brownish grey; angular quartz and (minor) chert grains in the very fine sand- and silt-size range, with numerous fine-grained, indeterminate skeletal fragments, in microcrystalline to very finely crystalline dolomite cement, scattered glauconite grains; beds 6 inches to 3 feet thick; light to medium brownish grey with orange-brown patches; resistant (GSC loc. 53703)	55	840
21	Siltstone: calcareous, dolomitic in lower 20 feet, grading upward into dolomite: silty calcareous; medium to dark grey; very finely crystalline to finely crystalline dolomite containing abundant fine- to coarse-grained brachiopod, echinoderm, and indeterminate skeletal fragments, and abundant quartz silt grains and organic matter, some glauconite grains, some beds of slightly silty, micritic-skeletal limestone in upper part of unit; beds 6 inches to 2 feet thick; *Zoophycos* on some bedding surfaces; unit weathers medium brownish grey to orange-brown (GSC locs. 53701, 53702)	52	785
20	Covered	35	733
	UPPER CARBONIFEROUS		
	Ettrain Formation (698 feet; incomplete)		
19	Limestone: echinoderm-bryozoan, slightly dolomitic; dark brownish grey; coarse- to very coarse-grained echinoderm, bryozoan, and brachiopod fragments, many with pore spaces filled with clay-size quartz(?) and very finely crystalline euhedral dolomite, rare glauconite grains, disseminated organic matter and pyrite, cement of sparry calcite and minor microcrystalline dolomite, rare quartz silt grains; 2-inch to 1-foot thick lensing beds; makes up 2/3 of outcrop and is interbedded with limestone: skeletal-micritic, cherty, slightly dolomitic; medium grey; coarse- to very coarse-grained brachiopod, echinoderm, and bryozoan fragments, with numerous foraminifers in micritic matrix containing minor microcrystalline dolomite; skeletal fragments and matrix partly replaced by chert; several 1- to 2-inch thick beds of dark grey, calcareous shale; unit weathers medium brownish grey; resistant (GSC locs. 53699, 53700)	8	698

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
18	Covered	40	690
17	Limestone: cherty, as in unit 15	5	650
16	Dolomite, calcareous, silty; dark grey; microcrystalline to very finely crystalline dolomite with abundant quartz silt, numerous medium- to very coarse-grained echinoderm and brachiopod fragments, abundant clay-size quartz(?), some fine glauconite grains, and disseminated organic matter and pyrite; beds 6 inches to 2 feet thick; very numerous brachiopods; partings and thin beds of calcareous shale between most beds; unit weathers medium grey with brown patches (GSC locs. 53697, 53698)	20	645
15	Limestone: skeletal-micritic, cherty, slightly glauconitic; medium grey to medium brownish grey; fine-grained echinoderm, brachiopod, bryozoan, coral and other indeterminate skeletal fragments with rare foraminifers and ostracods, and some coarse-grained echinoderm and brachiopod fragments, scattered fine glauconite grains, micrite matrix with minor disseminated organic matter and pyrite; skeletal fragments and matrix partly replaced by dark grey chert, which makes up more than 50 per cent of some beds; beds 6 inches to 1 foot thick; some partings and beds, up to 6 inches thick, of silty, dolomitic, micritic limestone containing fine-grained echinoderm and other indeterminate skeletal fragments, glauconite, grains and pyrite in a matrix of clay-size quartz with abundant organic matter; some silty, microcrystalline dolomite is also present; unit weathers medium to dark grey; resistant (GSC locs. 53693, 53694, 53695, 53696)	48	625
14	Limestone: echinoderm-bryozoan, slightly sandy and glauconitic; light to medium brownish grey; medium to very coarse-grained echinoderm, brachiopod, and bryozoan fragments, partly replaced by finely crystalline dolomite in some beds and many have glauconite fillings, rare foraminifers, scattered dark grey, rounded chert grains, sparry calcite cement, disseminated small pyrite crystals and dark organic matter; 2-inch to 1-foot thick beds lensing along strike. This limestone makes up about 60 per cent of unit, and alternates with limestone: echinoderm-brachiopod, very dolomitic, cherty; medium to dark grey; coarse- to very coarse-grained echinoderm, brachiopod, and bryozoan fragments in matrix of microcrystalline dolomite with scattered fine-grained, indeterminate skeletal fragments and disseminated		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	dark brown organic matter and pyrite, many brachiopod fragments replaced by chert; unit weathers light to medium brownish grey; resistant	42	577
13	Limestone: as in unit 12, but with glauconite fillings in fossil fragments, echinoderm and brachiopod fragments predominating over bryozoan fragments, and dolomite rare; lower 10 feet medium grey, upper 35 feet light brownish grey, with less organic matter; beds 6 inches to 2 feet thick, some lenses of medium to dark grey chert; weathers medium grey with orange-brown patches; resistant (GSC locs. 53691, 53692, C-2695)	45	535
12	Limestone: echinoderm-bryozoan, dolomitic; medium to dark brownish grey mottled with light brown echinoderm fragments; coarse- to very coarse-grained echinoderm, bryozoan and brachiopod fragments, sparry calcite cement, much dark grey organic matter in matrix and filling pores in skeletal fragments, fine crystals of dolomite replacing matrix and skeletal fragments in part, and forming partings on bedding planes; beds 6 inches to 2 feet thick; unit mainly rubble and slumped outcrop; weathers medium brownish grey (GSC locs. 53689, 53690)	85	490
11	Limestone: bryozoan-brachiopod, sandy, glauconitic; light to medium brownish grey; medium- to coarse-grained bryozoan, brachiopod, and echinoderm fragments, silicified in part, many filled with glauconite, abundant light and dark grey, medium- to very coarse-grained chert grains, sparry calcite cement; weathers medium brownish grey with orange-brown patches; cliff-former (GSC loc. 53688)	90	405
10	Covered	10	315
9	Limestone: brachiopod-bryozoan, slightly sandy; medium grey; medium- to coarse-grained brachiopod, bryozoan, and echinoderm fragments, some filled with pyrite, organic matter, and glauconite, rare fragments replaced by sparry calcite and outlined by dark micrite, some light and dark grey chert grains, sparry calcite matrix; beds 6 inches to 1 foot thick, some indistinctly laminated; unit weathers medium grey with brown patches; resistant; rare thin beds of sandy, echinoderm-brachiopod limestone, as in unit 6, make up 20 per cent of outcrop	30	305

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
8	Limestone: as in unit 6, but some beds (1/3 of outcrop) are medium grey and have very few chert grains; rare lenses of dark grey chert present	55	275
7	Covered, with rubble as in unit 6	15	220
6	Limestone: echinoderm-brachiopod, with chert grains, as in unit 2, but light to medium brownish grey and glauconite rare, also some skeletal fragments replaced by sparry calcite with relict forms outlined by dark, micritic material, rare foraminifers, bryozoans more abundant than in unit 2, some chert grains up to 3 mm in diameter (GSC locs. 53685, 53686, 53687)	45	205
5	Covered, with rubble of cherty, skeletal limestone, as in unit 4	45	160
4	Limestone: as in unit 2, but brachiopods and bryozoans dominant over echinoderms in skeletal fragments, and colour is medium brownish grey (GSC loc. 53684)	40	115
3	Covered	27	75
2	Limestone: echinoderm-brachiopod, glauconitic, sandy, as in unit 1, but coarser grained with more quartz and chert sand and no pyrite or chert lenses; also, echinoderms dominant over brachiopods in skeletal fragments (GSC loc. 53683)	33	48
1	Limestone: brachiopod-echinoderm, slightly cherty, glauconitic, sandy; dark grey; coarse- to very coarse-grained brachiopod, echinoderm, and (rare) bryozoan fragments with glauconite and pyrite fillings in sparry calcite cement, scattered medium to coarse, rounded grains of dark grey, light grey, and green chert, rare fine crystals of dolomite; rare dark grey chert lenses up to 4 inches thick; beds 1 to 4 inches thick; weathers light brownish grey and orange-brown; resistant (GSC loc. 53682)	15	15

PEEL RIVER EAST SECTION (116H-1B)

Located in southeastern Eagle Plain, on north and south banks of Peel River between approximately 8 and 10 miles east of mouth of Hart River; 65°53'N, 136°05 1/2'W; aerial photograph A14368-83, west, north of center; base of section at photo co-ordinates X=-3.2, Y=+4.6, top of section at photo co-ordinates X=-8.5, Y=+4.0 (Bamber and Waterhouse, 1971, Figure 5). Measured by E.W. Bamber and D. Mayes, May, 1962, in west-dipping beds immediately downstream from fault zone at base of section 116H-1A; units 1-3 measured on south bank of river and units 4-58 measured on north bank. Section includes type section of Hart River Formation (ibid., pp. 45, 46) and reference section for unit 2 of Bamber and Waterhouse (1971, pp. 51, 52); unit numbers from original description (ibid.) are included in parentheses with new numbers assigned to corresponding units here.

UPPER CARBONIFEROUS (Moscovian)
Ettrain Fm. of section 116H-1A
(Fault zone)

LOWER PERMIAN (lower Sakmarian)
Jungle Creek Fm. 170 feet (incomplete)
(Unconformity)

UPPER CARBONIFEROUS [Namurian?-Moscovian (Lower? and Middle Pennsylvanian)]
Eastern equivalents of Ettrain Fm. 1,082 feet
Unit 2 (reference section) 209 feet

LOWER CARBONIFEROUS [Middle and Upper Visean (Meramecian and Chesteran)]
Hart River Fm. (type section) 794 feet
Canoe River Mbr. 311 feet
Birch Mbr. 483 feet
Unit 1 approximately 1,300 feet
Unnamed Visean sandstone and shale unit 30 feet (incomplete)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER PERMIAN		
	Jungle Creek Formation (170 feet thick)		
58	Sandstone: calcareous, grading to calcareous, sandy mudstone; medium brownish grey; very fine, angular grains of quartz with minor chert and glauconite in matrix of clay-size quartz and silt-size to very fine-grained, indeterminate calcite skeletal fragments; dark brown organic matter with some pyrite in small masses and disseminated in matrix; *Zoophycos* present on bedding surfaces and burrows present; beds 1 to 2 feet thick; unit weathers medium to light greyish brown, resistant	8	3,585

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
57	Covered	17	3,577
56	Limestone: silty to sandy; medium to dark grey; very fine- to fine-grained; spicules and indeterminate skeletal fragments, silicified in part; abundant quartz silt and very fine-grained quartz sand; matrix clay-size quartz; scattered masses of dark brown organic matter and pyrite, and rare glauconite grains; numerous burrows and *Zoophycos;* beds 6 inches to 2 feet thick; weathers orange-brown and light brownish grey; resistant; forms 70 per cent of unit and alternates with 1- to 5-foot intervals of limestone that is similar but contains more silt; from 6 to 7 feet below top of unit is sandstone: glauconitic, slightly calcareous, slightly dolomitic; medium greenish grey; mainly fine to medium, angular quartz grains with some chert grains and many rounded glauconite grains and some fine-grained, indeterminate calcite skeletal fragments; matrix of clay-size quartz; from 2 to 5 feet below top of unit is sandstone: slightly calcareous; light to medium grey; very fine- to fine-grained, angular quartz sand with some very fine-grained skeletal fragments in matrix of clay-size quartz; 6-inch to 1-foot beds; weathers orange-brown; resistant (GSC locs. 53720, 53721, 53722)	55	3,560
55	Covered	35	3,505
54	Siltstone: siliceous, calcareous; light brownish grey; mainly quartz silt and very fine-grained to silt-size skeletal fragments of calcite in matrix of clay-size quartz, numerous dark brown masses of organic material and pyrite; rare 2- to 6-inch thick beds of more calcareous siltstone; beds 1 to 3 feet thick; from 5 to 9 feet below top of unit is very calcareous, very fine-grained sandstone that weathers orange-brown; rest of unit weathers light to medium greyish brown; moderately resistant; brachiopods and *Zoophycos* present (GSC loc. 53723)	20	3,470
53	Covered	9	3,450
52	Siltstone: as in unit 54, with sandstone from 6 feet to 11 feet below top of unit, similar to that in unit 54 (GSC loc. 53724)	26	3,441

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	UPPER CARBONIFEROUS		
	Eastern Equivalents of Ettrain Formation (1,082 feet thick)		
51	Alternating siltstone and limestone in approximately equal proportions. Siltstone, as in unit 54, recessive. Limestone: micritic-skeletal, silty; medium to dark grey; very fine- to fine-grained indeterminate skeletal fragments and quartz silt grains in micritic matrix; scattered glauconite grains and coarse-grained brachiopod fragments and numerous small masses of dark brown organic matter and pyrite; 1- to 3-foot beds; weathers orange-brown; resistant (GSC locs. 53725, 53726)	85	3,415
50	Appears to be alternating siltstone and limestone, as in unit 51, but not sampled because of cliff and high water	75	3,330
49	Siltstone: calcareous, cherty; medium grey; mainly quartz silt and very fine-grained, indeterminate skeletal fragments; contains irregular lenses and beds of dark grey chert constituting up to 1/2 of some beds; rare 1/2- to 2-inch thick beds of claystone nodules between siltstone beds; some 1- to 6-inch thick recessive beds of silty limestone and silty shale with abundant brachiopods; siltstone beds 2 inches to 1 foot thick; unit weathers medium brownish grey with orange-brown patches; resistant. From 17 to 20 feet below top of unit there is a 3-foot thick interval of limestone, skeletal-micritic, cherty, glauconitic; medium grey; coarse- to very coarse-grained echinoderm and brachiopod fragments with rare bryozoan fragments and foraminifers, scattered chert grains and glauconite grains, micritic matrix; echinoderm fragments and matrix partly replaced by glauconite and pyrite; beds 1 foot thick; weathers orange-brown; resistant (GSC loc. 53727)	25	3,255
48	Covered	30	3,230
47	Limestone: echinoderm-brachiopod, cherty, pyritic; light to medium brownish grey; coarse- to very coarse-grained echinoderm and brachiopod fragments, partly silicified, in chert matrix; scattered light brown and dark grey, medium to very coarse, rounded chert grains; numerous irregular pyrite masses; beds 6 inches to 2 feet thick; weathers medium grey to orange-brown; resistant.		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	From 5 to 11 feet below top of unit is dolomite: very silty, calcareous, pyritic; dark brownish grey, with organic material; microcrystalline; recessive	30	3,200
46	Covered	30	3,170
45	Alternating limestone (25%) and mudstone (75%): Limestone: brachiopod-echinoderm, silty, with matrix of microdolomite; medium brownish grey; coarse- to very coarse-grained, partly silicified brachiopod and echinoderm fragments in matrix of microdolomite with very fine-grained, indeterminate calcite skeletal grains and much quartz silt; rare coarse chert grains and scattered masses of organic matter and pyrite present; beds 6 inches to 1 foot thick; weathers light brownish grey to orange-brown; resistant; occurs in 1- to 2-foot intervals. Mudstone: silty, siliceous, calcareous, glauconitic in part; medium grey to dark brownish grey; matrix of clay-size quartz with some very fine-grained calcite skeletal fragments; much dark brown organic matter with some pyrite; abundant quartz silt throughout unit; some beds contain numerous medium to coarse, rounded grains of glauconite, and abundant medium- to coarse-grained, partly silicified brachiopod and other indeterminate skeletal fragments; weathers medium to dark grey; forms recessive units 3 to 6 feet thick between limestone beds; lower 25 feet of interval are entirely mudstone (GSC loc. 53728)	55	3,140
44	Covered	25	3,085
43	Limestone: echinoderm-brachiopod, sandy, light greyish brown; coarse- to very coarse-grained, partly silicified echinoderm, brachiopod, and bryozoan fragments, with scattered medium to coarse, light grey, light brown, and dark grey, rounded chert grains and minor glauconite as grains and infillings in skeletal fragments; sparry calcite cement; glauconite and chert make up to 25 per cent of rock in some intervals; beds 2 to 3 feet thick; unit weathers medium brown to orange-brown; resistant	7	3,060
42	Covered, with some rubble of microcrystalline to finely crystalline dolomite, as in unit 45	168	3,053

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
41	Limestone: brachiopod-echinoderm, sandy; light to medium grey; mainly medium- to very coarse-grained brachiopod fragments with numerous ostracods and fragments of echinoderms and bryozoans; some fine to medium grains of glauconite, and scattered fine to medium quartz and chert grains; sparry calcite cement; scattered organic matter and pyrite; beds 6 inches to 3 feet thick; weathers medium brownish grey to orange-brown; resistant (GSC loc. 53729)	25	2,885
40	Dolomite, silty, calcareous; medium to dark grey; microcrystalline dolomite with numerous, very fine- to fine-grained, indeterminate calcite skeletal fragments and quartz silt throughout; numerous irregular, small masses of organic matter and pyrite; slumped outcrop; weathers light grey; recessive. At 41 feet below top of unit there is a 2-foot thick bed of medium brownish grey, slightly silty, skeletal-micritic limestone that weathers orange-brown and is resistant	80	2,860
39	Covered	20	2,780
38	Dolomite, silty, calcareous as in unit 40, but with fewer skeletal fragments; 1 foot below top of unit is a bed of skeletal-micritic, dolomitic, silty limestone, with echinoderm, brachiopod, and bryozoan fragments, fine grains of dark grey chert and glauconite, and numerous small masses of organic matter and pyrite in a matrix of micritic calcite and microcrystalline dolomite; also, several 1- to 2-inch thick beds of medium grey, calcareous siltstone occur (GSC loc. 53730)	15	2,760
37	Covered	30	2,745
36	Limestone: brachiopod-echinoderm, dolomitic, silty, glauconitic; medium brownish grey; coarse- to very coarse-grained brachiopod, echinoderm, and bryozoan fragments, silicified in part, in matrix of microcrystalline dolomite with abundant fine-grained, indeterminate skeletal fragments, quartz silt and fine sand, glauconite grains and fillings, rare chert grains, and abundant organic matter with pyrite; beds 6 inches to 2 feet thick; weathers orange-brown; resistant	10	2,715

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
35	Siltstone: dolomitic, slightly calcareous, grading to silty, slightly calcareous dolomite, dark grey; mainly microcrystalline dolomite and quartz silt with some fine-grained, indeterminate skeletal fragments and dark organic matter; beds 2 to 6 inches thick; some dark grey chert lenses; weathers orange-brown to medium greyish brown; resistant	30	2,705
34	Dolomite: very silty, slightly calcareous; dark grey; mainly microcrystalline dolomite and clay-size quartz with abundant quartz silt grains, and scattered, very fine-grained, indeterminate calcite skeletal fragments, also disseminated dark brown organic matter and pyrite; at 925 feet there is a 2-foot thick bed of very calcareous siltstone that stands out and weathers orange-brown; unit, as a whole is rubble-covered, recessive, and weathers light to medium grey	25	2,675
33	Covered	57	2,650
32	Upper 2 feet of unit are made up of siltstone: dolomitic, calcareous; medium grey; quartz silt and very fine-grained sand with many fine-grained, indeterminate skeletal grains in matrix of microcrystalline dolomite, containing small masses of dark brown organic matter; beds 6 inches thick; weathers medium brown to orange-brown; resistant. Lower 3 feet of unit are made up of dolomite: very silty, calcareous, similar to siltstone above, except for proportions of silt and microcrystalline dolomite; medium to dark brownish grey; weathers dark grey; recessive (GSC loc. 53731)	5	2,593
31	Covered	231	2,588
30	Limestone: echinoderm-bryozoan, sandy, medium brownish grey; medium- to very coarse-grained echinoderm, brachiopod, and rare bryozoan fragments with numerous foraminifers and scattered fine to very coarse quartz and chert grains (with some up to 1/8 inch in diameter), sparry calcite cement; skeletal fragments contain dark brown organic matter; weathers medium grey, rubble only; rubble also contains fragments of calcareous, dolomitic siltstone, with quartz silt, fine-grained, indeterminate skeletal fragments, and scattered, fine, euhedral dolomite crystals in micrite matrix (GSC locs. 53732, C-2696)	2	2,357

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
29	Covered	22	2,355
	Unit 2 of Bamber and Waterhouse (1971) (reference section - 209 feet thick)		
28(1)	Conglomerate: chert and quartz pebble, dolomitic; light brownish grey with light grey, dark grey, yellowish brown, and green pebbles; pebbles rounded, composed mainly of chert with some quartz pebbles and rare fine-grained, calcareous sandstone pebbles, size ranges from very coarse sand to pebbles 1 inch in diameter; matrix coarsely crystalline dolomite with rare, fine-grained skeletal fragments; 2- to 3-foot thick, irregular, lensing beds; weathers orange-brown; resistant	8	2,333
27(2)	Sandstone: dolomitic, cherty; medium reddish brown; fine- to medium-grained, angular to subrounded grains of quartz (60%) and chert (40%) in cement of finely crystalline to medium crystalline, reddish brown dolomite; beds 2 inches to 1 foot thick; rare thin beds and lenses of conglomerate similar to that in unit 1, but finer grained; conglomerate forms 2-foot thick bed 30 feet above base of unit; unit weathers orange-brown; resistant	60	2,325
26(3)	Covered	72	2,265
25(4)	Conglomerate: as in unit 1, with calcareous matrix in part, containing skeletal fragments; 30 per cent of outcrop is sandstone, as in unit 27, but very coarse-grained in part, forms beds within conglomerate and occurs in a 4-foot thick bed at base, shows some weakly developed cross-bedding and contains pyrite nodules (GSC loc. 53733)	25	2,193
24(5)	Covered	29	2,168
23(6)	Conglomerate, as in unit 25, crossbedded	15	2,139

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER CARBONIFEROUS		
	Hart River Formation (type section - 794 feet thick)		
	Canoe River Member (311 feet thick)		
22(1)	Covered, recessive	75	2,124
21(2)	Shale: silty, dolomitic, dark grey	1	2,049
20(3)	Covered	49	2,048
19(4)	Shale: silty, dolomitic, dark grey; contains nodules of dolomite, silty; medium greyish brown; microcrystalline; contains scattered skeletal fragments, disseminated pyrite and fracture fillings of pyrite and calcite; nodules weather orange-brown	1	1,999
18(5)	Covered	49	1,998
17(6)	Shale: silty, calcareous; dark grey; contains nodules of dolomite, silty; medium greyish brown; with pyrite as masses and disseminated particles, numerous skeletal fragments of mollusks and brachiopods; nodules weather orange-brown	2	1,949
16(7)	Covered	23	1,947
15(8)	Limestone: silty, medium to dark grey; micritic; contains scattered skeletal fragments and numerous brachiopod and pelecypod shells; abundant disseminated pyrite and dark brown organic matter	5	1,924
14(9)	Covered	106	1,919
	Birch Member (483 feet thick)		
13(10)	Dolomite: silty to sandy, calcareous in part; dark grey; mainly microcrystalline dolomite with abundant angular quartz and chert silt and very fine-grained sand, abundant dark brown organic matter and pyrite (disseminated and in small masses), some beds contain numerous brachiopod, echinoderm, and indeterminate skeletal fragments; pelletoid grains and oolites present 55 feet below top of unit;		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	beds 2 to 5 feet thick; weathers light to medium grey, recessive, fissile to platy; contains rare oval nodules of silty limestone containing brachiopods, ammonoids, pelecypods, and gastropods; dolomite makes up 90 per cent of outcrop in upper 1/3 of unit, and 50 per cent of outcrop in lower 2/3; alternates with 6-inch to 2-foot thick beds of limestone: micritic-skeletal, silty, dolomitic in part; medium grey to dark brownish grey; mainly micrite with very fine- to fine-grained skeletal fragments and scattered angular grains of quartz and chert silt grading to very fine sand in some beds; dark brown organic matter and pyrite scattered throughout; some beds contain coarse-grained echinoderm and brachiopod fragments, and others contain microcrystalline dolomite and very abundant skeletal material; weathers light grey, forms prominent ribs between beds of dolomite (GSC locs. 53734 to 53737)	143	1,813
12(11)	Limestone: micritic-skeletal, dolomitic to very dolomitic, slightly silty in part; mainly medium brown, dark brownish grey in lower 10 feet; fine- to coarse-grained echinoderm and brachiopod fragments in micritic matrix with some microcrystalline dolomite which dominates matrix in some beds; rare angular quartz silt grains in some beds, scattered dark brown organic matter and pyrite throughout; weathers light to medium brownish grey; resistant (GSC locs. 53738, 53739)	30	1,670
11(12)	Covered	70	1,640
10(13)	Limestone: micritic-skeletal, silty; dark grey; fine-grained echinoderm and brachiopod fragments in micritic matrix with microcrystalline dolomite and scattered organic matter and pyrite, rare quartz silt grains; weathers orange-brown; resistant	4	1,570
9(14)	Covered	53	1,566
8(15)	Limestone, as in unit 10 [GSC locs. 53740, 53741 (talus)]	8	1,513
7(16)	Limestone: micritic-skeletal, silty in part; medium to dark grey; scattered fine-grained and very coarse-grained echinoderm and brachiopod fragments in micritic matrix with abundant disseminated organic matter and pyrite; rare		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	skeletal fragments are partly replaced by chert; quartz and chert silt present in some beds; beds 2 inches to 1 foot thick; weathers light grey, forms prominent ribs 1 to 3 feet thick making up 35 to 40 per cent of outcrop and alternating regularly with 4- to 10-foot recessive intervals of dolomite: very silty, slightly calcareous to very calcareous, grades to siltstone and limestone in part; abundant angular quartz and chert silt (dominant in some beds); disseminated organic matter and pyrite throughout; some beds with coarse echinoderm and brachiopod fragments and numerous fine-grained, indeterminate skeletal fragments (dominant in some beds); matrix of microcrystalline dolomite; dolomite contains nodules of dark grey, silty, micritic limestone with brachiopods, pelecypods, and gastropods; weathers medium to dark grey; fissile to platy (GSC locs. 53742 to 53745)	113	1,505
6(17)	Covered	47	1,392
5(18)	Limestone: skeletal, dolomitic, silty to very silty; medium to dark grey; fine- to medium-grained, indeterminate skeletal fragments with some coarse-grained echinoderm and brachiopod fragments, in matrix of microcrystalline dolomite with abundant dark brown organic matter and pyrite, abundant angular quartz silt; weathers light grey; resistant (GSC loc. 53746)	15	1,345

Along the north bank of the Peel River, where the type section of the Hart River Formation was measured, the base of the formation is not exposed (Bamber and Waterhouse, 1971, pp. 46, 47, Fig. 5, point E). Exposures immediately downstream are stratigraphically higher than the base of the section because of the curvature of the Peel River. From measurements through these exposures and from tracing the base of the type section along strike it appears that the lowest beds (unit 5) in the measured type section correlate with those lying immediately above the top of Unit 1 (ibid., point B). The contact with Unit 1 apparently is sharp, but could not be studied because of the high water level in the Peel River. Because of the uncertainty concerning relationships at the base of the type section, the total thickness given above for the Hart River Formation may be slightly less than the true thickness.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Unit 1 of Bamber and Waterhouse (1971) (1,300 feet thick)		
4	This unit outcrops on the south bank of the Peel River, but could not be sampled or studied by the author in the field because of high water level in the river. Its thickness was measured by tape along the north bank. Data from several samples provided by Shell Canada Ltd. indicate that the interval consists mainly of dark grey, non-calcareous, silty shale with abundant orange-weathering nodules of dark grey, slightly silty, pyritic, microcrystalline dolomite. Medium grey, laminated, calcareous siltstone occurs 170 feet above the base of the unit, and the shale in a sample 30 feet below the top is calcareous. Goniatitic ammonoids occur in nodules of microcrystalline dolomite approximately 425 feet below the top of the unit (GSC loc. 68601) and in large nodules of dark grey, micritic, silty, spicular limestone approximately 100 feet below the top (GSC loc. 68600)	1,170	1,330
3	Shale: silty; dark grey; mainly quartz, with kaolinite, illite, metabentonite and abundant organic matter, lesser amounts of anhydrite and siderite (mineralogy by X-ray diffraction); contains bands of nodules consisting of dolomite: slightly silty; medium grey; microcrystalline; contains small flecks of organic matter, and pyrite as small masses or disseminated particles; weathers orange-brown.	125	160
2	Dolomite: slightly silty, pyritic; dark grey; microcrystalline; occurs as nodular beds; weathers orange	5	35
	Unnamed Visean sandstone and shale unit (30 feet thick, incomplete)		
1	Sandstone: quartzose; light grey; fine-grained, mainly quartz grains with some chert grains; beds 2 inches to 2 feet thick; thin partings and beds of dark grey, silty, fissile shale; unit weathers light to medium brownish grey; resistant	30	30

UPPER PEEL RIVER SECTION (116H-17)

Located in southern Eagle Plain on north bank of Peel River, approximately 5 miles southwest of the mouth of Hart River; 65°49 1/2'N, 136°32 1/2'W; aerial photograph A13137-145, right of center; base of section at photo co-ordinates X=+2.9, Y=+0.6; top of section at photo co-ordinates X=+2.6, Y=+0.9. Measured by E.W. Bamber and D. Wetter, June, 1962, through part of the upper Jungle Creek Formation.

LOWER PERMIAN [Lower Artinskian (lower Leonardian)]
Jungle Creek Fm. (upper part) 618 feet (incomplete)
(Fault)

LOWER PERMIAN [Upper Artinskian (upper Leonardian)]
Jungle Creek Fm. (upper part) thickness unknown

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER PERMIAN		
	Jungle Creek Formation (618 feet thick; incomplete)		
12	Mudstone: as in unit 11, with irregular masses of pyrite; beds 2 to 3 feet thick; resistant (GSC loc. 58318)	30	618
11	Interbedded mudstone, limestone, and shale. Mudstone: silty, siliceous, calcareous; dark grey; abundant quartz silt and fine-grained indeterminate skeletal fragments and spicules in matrix of clay-size quartz; scattered glauconite grains and small masses of organic matter; beds 4 inches to 1 foot thick; contains irregular masses and discontinuous beds of dark grey to black chert; mudstone weathers dark brownish grey; resistant; occurs at intervals: 386 to 389 feet; 394 to 399 feet; 416 to 425 feet; 449 to 453 feet; 463 to 467.5 feet; 468 to 487 feet; 489.5 to 491 feet; 491.5 to 495 feet; 495.4 to 506 feet; 507 to 533 feet; 543 to 552 feet; and 575 to 588 feet. Limestone: spicular, silty, siliceous; dark grey; composition similar to that of the mudstone described above, but dominated by irregular laminae and masses of calcite spicules and fine-grained, indeterminate skeletal fragments; beds 1 to 2 feet thick; weathers medium brownish grey with rusty brown patches; resistant; occurs at intervals: 382 to 386 feet; 393 to 394 feet; 403 to 405.5 feet; 487 to 489.5 feet; 491 to 491.5 feet; and 533 to 543 feet. Shale: silty, siliceous; dark grey; weathers dark grey with dark reddish brown stain; recessive, assumed to completely underlie		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	partly covered intervals between mudstone and limestone; occurs at intervals: 389 to 393 feet; 399 to 403 feet; 405.5 to 409 feet; 413 to 416 feet; 462 to 463 feet; 467.5 to 468 feet; 495 to 495.4 feet; 506 to 507 feet. Covered intervals at: 409 to 413 feet; 425 to 449 feet; 453 to 462 feet; and 552 to 575 feet; (GSC loc. 58317)	206	588
10	Discontinuous outcrop of mudstone, as in unit 6: appears to alternate with poorly exposed intervals of dark grey, silty, siliceous mudstone and shale; weathers dark grey and dark reddish brown; recessive. Covered intervals at: 285 to 290 feet; 294 to 300 feet; 307 to 313 feet; 318 to 321 feet, 326 to 327 feet; 334 to 339 feet; 346 to 354 feet; 359 to 371 feet; and 377 to 382 feet (GSC loc. 53816)	99	382
9	Covered	31	283
8	Siltstone: very calcareous; dark grey; contains rare, coarse-grained skeletal fragments; one 2-foot thick bed; weathers medium brownish grey; slightly resistant	2	252
7	Covered	99	250
6	Mudstone, similar to unit 5, but with less silt	10	151
5	Mudstone: siliceous, very silty; dark grey; abundant quartz silt with rare glauconite grains and scattered small masses of pyrite and organic matter in matrix of clay-size quartz; numerous irregular masses and laminae composed of calcite ?spicules or spines; burrows common; beds 6 inches to 3 feet thick; weathers medium brownish grey; resistant; covered interval from 132 to 134 feet	13	141
4	Covered	5	128
3	Mudstone: very silty, cherty; dark grey; silt grains in cherty matrix, grades to chert and contains irregular masses of dark grey chert, scattered, small masses of pyrite, disseminated organic matter; weathers medium brownish grey; resistant	16	123
2	Covered. The possible presence of a fault at this point in the section is indicated by a difference between the attitudes of the beds on either side of this covered interval	50	107

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
1	Interbedded siltstone, shale and siltstone. Siltstone: calcareous; medium to dark grey; quartz and chert silt with fine-grained skeletal fragments in calcareous matrix; scattered small pyrite masses; disseminated organic matter; beds 6 inches to 2 feet thick; weathers medium brownish grey; recessive; occurs at intervals: 0 to 7 feet; 12 to 14.5 feet; 25 to 26 feet; 29 to 36 feet; and 47 to 57 feet. Shale: silty; dark brownish grey; disseminated organic matter weathers dark grey with many dark reddish brown intervals; recessive; occurs at intervals: 7 to 12 feet; 14.5 to 23 feet; 26 to 29 feet; 36 to 39.5 feet and 41.5 to 47 feet. Siltstone: similar to siltstone described above, but only slightly calcareous; 1-foot thick beds; weathers rusty brown; resistant; occurs at intervals: 23 to 25 feet; and 39.5 to 41.5 feet (GSC locs. 53812, 53813, 53814, 53815)	57	57

EAGLE RIVER WEST SECTION (116I-6)

Located in eastern Eagle Plain on west side of Eagle River, approximately 10 miles southwest of Moose Lake; 66°09'N, 136°47 1/2'W; aerial photograph A12105-284, south, center; section consists of three parts -- 116I-6A, B, and C, in ascending order; base of 116I-6A at photo co-ordinates X=+2.3, Y=-2.15; top of 116I-6A at photo co-ordinates X=+2.1, Y=-2.2; base of 116I-6B at photo co-ordinates X=+1.3, Y=-2.4, top of 116I-6B at photo co-ordinates X=+0.6, Y=-2.25; base of 116I-6C at photo co-ordinates X=-0.2, Y=-5.8; top of 116I-6C at photo co-ordinates X=-0.5, Y=-6.05. Measured by E.W. Bamber and W.J.F. Clack, June, 1962, through the upper Hart River Formation (?Canoe River Member of Martin, in press). Section overlain by sandstone and conglomerate (probably Upper Carboniferous-Unit 2).

CARBONIFEROUS [late Visean-early Namurian (Chesteran)]
Hart River Fm. (?Canoe River Member) 1,062 feet (incomplete; thickness uncertain because intervals between partial sections estimated)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER AND UPPER CARBONIFEROUS		
	Hart River Formation (?Canoe River Member) (1,062 feet thick, incomplete)		
	Section 116I-6C		
3	Limestone: silty, dolomitic, as in unit 1	55	1,062
2	Covered, outcrop along strike appears same as in unit 1	30	1,007
1	Limestone: skeletal-micritic, slightly dolomitic, very slightly silty; light greyish brown to medium brownish grey; fine-grained skeletal fragments (mainly spines or spicules) in micritic matrix; some quartz and chert silt grains, some microcrystalline dolomite in matrix, concentrated in irregular laminae; beds 2 inches to 1 foot thick (GSC locs. 53759 to 53762, 53763, talus)	190	977
	Covered interval between base of section 116I-6C and top of section 116I-6B estimated to be 150 feet.		
	Section 116I-6B		
10	Limestone, as in unit 9	30	637
9	Limestone: skeletal-micritic, dolomitic, slightly silty; fine-grained skeletal fragments (spines or spicules) in micritic matrix with much microcrystalline dolomite and rare quartz and chert silt grains, rare skeletal fragments silicified; silt abundant in some beds	10	607
8	Recessive, covered with rubble of dolomitic, medium to dark grey silty limestone	20	457
7	Limestone: skeletal-micritic, silty, dolomitic; medium greyish brown; laminated, cross-laminated, laminae marked by concentration of microcrystalline dolomite and organic matter (GSC loc. 53758)	15	437
6	Limestone silty, slightly dolomitic, as in unit 4, interbedded with dark brownish grey, calcareous, dolomitic siltstone and silty calcareous dolomite (GSC loc. 53757, talus)	95	422
5	Limestone silty, grading to siltstone, as in unit 4	51	327

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
4	Limestone: silty, slightly dolomitic, grading to calcareous siltstone as in unit 1, but less microcrystalline dolomite; beds 4 inches to 1 foot thick; strongly laminated in part, with cross-laminae; lamination marked by high silt content in some laminae, which stand out on weathered surface (GSC loc. 53756)	50	276
3	Covered	14	226
2	Dolomite: calcareous, silty, as in laminae of unit 1, mainly microcrystalline dolomite, with quartz and chert silt, disseminated organic matter, and fine-grained skeletal fragments of calcite; numerous laminae of silty limestone grading to calcareous siltstone as in unit 1 (GSC locs. 53754, 53755)	10	212
1	Limestone: skeletal-micritic, very silty, grading to calcareous siltstone, dolomitic; fine-grained skeletal fragments in micritic matrix with abundant quartz and chert silt; numerous laminae dominated by microcrystalline dolomite; organic matter disseminated throughout, concentrated in dolomitic laminae; beds 6 inches to 1 1/2 feet thick; some carbonaceous ?plant fragments on bedding planes (GSC loc. 53753, talus)	50	202
	Covered interval between base of section 116I-6B and top of section 116I-6A estimated to be 100 feet		
	Section 116I-6A		
5	Dolomite: calcareous, silty; light to medium grey; microcrystalline dolomite with disseminated organic matter and pyrite; contains numerous laminations of very silty to sandy, fine-grained skeletal limestone with little organic material; this limestone dominates part of the unit	9	52
4	Limestone: micritic?, silty, with some 2- to 4-inch nodules of silty limestone	2	43
3	Limestone: as in unit 1, with 1- to 2-inch thick beds relatively rich in dolomite (GSC loc. 53752)	9	41
2	Covered	2	32

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
1	Limestone skeletal-micritic, very silty, dolomitic, fine-grained skeletal fragments with abundant angular quartz and chert silt and fine sand grains in micritic matrix, irregular laminae with abundant microcrystalline dolomite in matrix; scattered organic matter and pyrite, burrows; 4-inch to 1-foot thick laminated beds	30	30

EAGLE RIVER EAST SECTION (116I-7)

Located in eastern Eagle Plain on east bank of Eagle River approximately 5 miles west-southwest of Moose Lake; 66°11 1/2'N, 136°38'W; aerial photograph A11975-86, northeast of center; base of section at photo co-ordinates X=+8.5, Y=+7.5; top of section at photo co-ordinates X=+7.7, Y=+6.0. Measured by E.W. Bamber and W.J.F. Clack, June 1962, through uppermost part of unit 1 of Bamber and Waterhouse (1971, p. 43) and lower Hart River Formation (?Birch Member of Martin, in press).

LOWER CARBONIFEROUS [Upper Visean (upper Meramecian - Chesteran)]
Hart River Fm. (?Birch Member) 224 feet (incomplete)
Unit 1 105 feet (incomplete)

LOWER CARBONIFEROUS

Hart River Formation (?Birch Member)
(224 feet thick; incomplete)

10	Limestone: skeletal, silty; fine-grained skeletal fragments and angular quartz and chert silt and fine sand grains with abundant organic matter and pyrite concentrated in laminae; contact gradational between units 9 and 10	5	329
9	Mainly covered, some outcrops of limestone, as in unit 10, and shale: calcareous, silty; dark grey; mainly composed of clay-size quartz, micrite and very fine-grained calcite skeletal fragments, and a very high content of organic matter with pyrite; quartz silt scattered throughout	20	324
8	Upper 10 feet form cliff of limestone, as in unit 10, interbedded with shale, as in unit 9, grading to micritic limestone in some intervals with variation in carbonate content; some 1/2- to 4-inch thick beds and lenses of medium grey, slightly silty, micritic limestone	77	304
7	Covered (GSC loc. 53764, talus)	30	227

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
6	Shale: silty, dolomitic; composed mainly of clay-size quartz with quartz silt grains and micro-crystalline dolomite; scattered gypsum; 1- to 4-inch thick beds with 1/2- to 4-inch thick interbeds of red gypsiferous carbonate; in lower 2 feet of unit, shale has very high dolomite content, grading to dolomite; abundant disseminated gypsum. Contact with underlying unit is irregular, bears ochre material. Small angular discordance apparent between units 5 and 6	4	197
5	Limestone: micritic, pelletoid, dolomitic, silty; medium grey; mainly micrite with some pelletoid grains, angular chert and quartz grains through-out, contains laminae of microcrystalline dolo-mite with fine-grained skeletal fragments of calcite, abundant small masses of organic matter with pyrite, some clay-size quartz in matrix	6	193
4	Shale: light greenish grey, silty, very dolomitic, slightly calcareous; matrix of clay-size quartz with abundant microcrystalline dolomite and scattered quartz silt grains and hematite grains, some fine-grained calcite ?skeletal fragments, fissile in part	2	187
3	Limestone: skeletal, silty, with very high organic content, grading to calcareous shale in large part; much of unit is dominated by fine-grained skeletal fragments and finely crystalline to medium crystalline calcite, with abundant organic matter and some clay-size quartz in the matrix; scattered quartz silt grains; unit contains numerous thin beds of shale, which is very high in organic content, and contains clay-size quartz, quartz silt and skeletal grains	20	185
2	Interbedded: Limestone: skeletal, dolomitic, silty; medium grey; mainly fine-grained skeletal frag-ments (brachiopod fragments, spicules or spines) with microcrystalline dolomite matrix and numerous quartz and chert silt and fine sand grains, organic matter with pyrite, both finely disseminated and in small masses; beds 3 to 5 feet thick; occurs at intervals: 5 to 8 feet; 9 to 12 feet; 35 to 48 feet; and 60 to 65 feet Limestone: with calcareous shale, as in unit 3; occurs at intervals: 8 to 9 feet; 12 to 35 feet; 48 to 60 feet At 11 feet, 1- to 2-foot thick bed of medium grey, silty limestone nodules	60	165

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Unit 1 (105 feet thick; incomplete)		
1	Shale: silty, calcareous in part; dark grey; contains minor amount of gypsum and anhydrite; upper 10 feet contain nodules up to 6 inches thick and 2 feet across, of limestone, micritic, very slightly silty, contains goniatitic ammonoids and brachiopods; no bedding apparent in shale; unit weathers medium brownish grey with yellow and orange stain (GSC locs. 53765, 53766)	105	105

CATHEDRAL ROCKS SECTION (116J-4)

Located on western margin of Eagle Plain, at north end of Cathedral Rocks anticline in prominent, light and dark grey banded cliffs adjacent to east side of Miner River; 66°09'N, 138°50 1/2'W; aerial photograph A14451-96, north and left of center; base of section at photo co-ordinates X=-4.45, Y=+9.4; top of section at photo co-ordinates X=-4.05, Y=+9.4; measured by E.W. Bamber and A. Jenik, August, 1962, through cliff-forming carbonates of Hart River Formation (?Canoe River Member of Martin, in press).

LOWER CARBONIFEROUS [Visean (Chesteran)]		
Hart River Fm. (?Canoe River Mbr.) Unit 1	600 feet (incomplete) not measured (poorly exposed)	
LOWER CARBONIFEROUS		
Hart River Formation (?Canoe River Member) (600 feet thick; incomplete)		
11 Interbedded limestone, chert, and dolomite. Limestone: skeletal, silty, cherty; medium brownish grey; fine-grained skeletal fragments in sparry calcite cement, fragments dolomitized in part, silicified in part, disseminated organic matter; cement and skeletal fragments partly replaced by chert; limestone makes up 75 per cent of outcrop. Chert: lenses and discontinuous beds; dark grey; up to 6 inches thick; mainly 1/2 to 2 inches thick; makes up 20 per cent of outcrop. Dolomite: calcareous, silty; dark grey; microcrystalline dolomite with numerous fine-grained skeletal fragments, chert and quartz silt, and fine sand grains, very abundant dark organic matter throughout, marking fine laminae; occurs in intervals up to 1 foot thick; makes up 5 per cent of outcrop; contains chert lenses and beds (GSC locs. 53911, 53912, 53913)	40	600

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
10	Covered	128	560
9	Limestone: micritic-skeletal, cherty, slightly silty; dark grey; very fine-grained skeletal fragments in micritic matrix with rare chert and quartz silt grains, and abundant organic matter and pyrite marking strong laminae; partly replaced by chert in some beds with rare 1/2- to 2-inch thick lenses and irregular beds of chert	67	432
8	Dolomite: silty, slightly cherty, slightly calcareous, strongly laminated; microcrystalline dolomite with numerous fine-grained skeletal fragments, numerous quartz and chert silt grains concentrated in some laminae, minor replacement by chert, very abundant organic matter which is disseminated and marks laminae	71	365
7	Dolomite: as in unit 8, but contains rare chert beds and lenses up to 4 inches thick	22	294
6	Alternating limestone, dolomite, and chert. Limestone: skeletal, cherty, very slightly silty, laminated; medium grey with brown tinge; fine-grained skeletal fragments (spines or spicules) in sparry calcite cement; rare quartz silt grains, much chert replacement, organic matter concentrated in laminae; beds 6 inches to 1 foot thick; rare 1/4- to 1/2-inch thick lenses of dark grey chert. Dolomite: calcareous, slightly silty, cherty; dark grey with light grey laminae; microcrystalline dolomite with abundant fine-grained skeletal fragments and finely crystalline calcite; scattered quartz silt grains, some beds show replacement by chert; beds 4 inches to 2 feet thick; some cross-laminae, much disseminated organic matter. Chert: dark grey; laminated in part; contains much organic matter concentrated in laminae; beds up to 1.5 feet thick, mainly 1 to 4 inches thick, change radically in thickness along strike, chert beds spaced at 1- to 2-foot intervals, stand out from limestone and dolomite. Unit weathers light yellowish grey with dark bands (chert), cliff-former. From 212 to 272 feet - 60 per cent dolomite, 20 per cent limestone, 20 per cent chert From 192 to 212 feet - 10 per cent dolomite, 70 per cent limestone, 20 per cent chert		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	From 150 to 192 feet - 40 per cent dolomite, 40 per cent limestone, 20 per cent chert From 115 to 150 feet - 5 per cent dolomite, 70 per cent limestone, 25 per cent chert From 87 to 115 feet - 70 per cent dolomite, 10 per cent limestone, 20 per cent chert Grades downward into unit 5, with 1- to 2-inch thick shale beds starting at 87 feet	185	272
5	Limestone: cherty, as in unit 6, makes up 70 per cent of outcrop; interbedded with dolomite: very calcareous, silty; dark grey; micro-crystalline with abundant calcite skeletal fragments and angular quartz and chert silt grains; grades to dolomitic, silty, skeletal-micritic limestone; abundant disseminated organic matter and pyrite outlining laminae; beds 2 to 6 inches thick; recessive (GSC locs. 53914, 53915-talus)	17	87
4	Limestone: skeletal-micritic, dolomitic; dark grey; very fine- to fine-grained skeletal fragments (mainly spines or spicules) in matrix of microcrystalline dolomite and micrite, many of the skeletal fragments silicified; abundant disseminated organic matter and pyrite concentrated in laminae; rare thin beds of dolomite, as in unit 5. At 55 feet, a 3-foot thick bed of skeletal-micritic, dolomitic limestone, with large, partly silicified echinoderm fragments and brachiopods	35	70
3	Limestone: as in unit 4, but dolomitic, with thin beds of calcareous dolomite and rare beds, up to 6 inches thick, of skeletal limestone as at 55 feet in unit 4	3	35
2	Limestone, as in unit 5, in lensing beds up to 5 feet thick showing cross-laminae	9	32
1	Limestone and dolomite, as in unit 3, with a lens (4 feet maximum thickness) of silty, micritic limestone at 18 feet	23	23
	Talus covered below unit 1; appears to be underlain by recessive ?shale unit (Unit 1 of Bamber and Waterhouse, 1971, p. 43)		

CATHEDRAL ROCKS SOUTH SECTION (116J-4A)

Located near western margin of Eagle Plain on west limb of Cathedral Rocks anticline, approximately 9 1/2 miles south of section 116J-4; 66°01'N, 138°50 1/2'W; aerial photograph A14451-97, south of center; base of section at photo co-ordinates X=+0.3, Y=-5.0; top of section at photo co-ordinates X=-0.9, Y=-6.1. Measured by E.W. Bamber and A. Jenik, August, 1962, through upper Hart River Formation (?Canoe River Member of Martin, in press), Unit 2 of Bamber and Waterhouse (1971, p. 51), and lower Ettrain Formation.

UPPER CARBONIFEROUS [upper Bashkirian-Moscovian (Morrowan-Atokan)]
Ettrain Fm. 42 feet (incomplete)
Unit 2 528 feet

LOWER CARBONIFEROUS [Visean (Chesteran)]
Hart River Fm. (?Canoe River Mbr.) 805 feet

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	UPPER CARBONIFEROUS		
	Ettrain Formation (42 feet thick; incomplete)		
17	Limestone: echinoderm-brachiopod, slightly sandy; light to medium brownish grey, dark grey in part; mainly medium- to coarse-grained echinoderm and brachiopod fragments with rare pelletoid grains, bryozoan fragments and foraminifers; rare fine quartz and chert sand grains; sparry calcite cement, some glauconite fillings; 6-inch thick bed of dark grey chert at 1,375 feet, limestone beds 1 to 5 feet thick. From 1,360 to 1,375 feet - limestone: micritic-skeletal, dolomitic; medium to dark grey; mainly pelletoid micrite with scattered echinoderm and bryozoan fragments and euhedral quartz crystals, partly replaced by dolomite with some (?)glauconite, some patches of sparry calcite (GSC locs. 53926, 53927, C-2714)	42	1,375
	Unit 2 (528 feet thick)		
16	Covered	8	1,333
15	Sandstone: as in unit 13, but more skeletal grains and coarsely crystalline calcite in matrix, chert grains abundant, grades to sandy limestone in part; conglomerate beds present, as in unit 13 (GSC loc. C-2713)	8	1,325
14	Covered	25	1,317

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
13	Sandstone: calcareous, slightly dolomitic; light brownish grey; mainly fine to medium, angular quartz grains with some chert, rare glauconite grains and patches of dark organic matter and pyrite; cement of finely to medium crystalline calcite; some microcrystalline dolomite, and rare skeletal grains; beds 6 inches to 2 feet thick; rare conglomerate beds with dark grey chert pebbles, well-rounded, up to 1/4-inch maximum diameter; matrix of calcareous sandstone as in rest of unit; unit is cliff-former	21	1,292
12	Covered, recessive	309	1,271
11	Limestone: skeletal, very slightly silty; medium grey; mainly medium- to coarse-grained brachiopod fragments with some echinoderm and bryozoan fragments; rare quartz silt grains; matrix of sparry calcite and some micrite with fine-grained skeletal fragments; one bed; resistant (GSC loc. C-2712)	7	962
10	Mainly covered, some rubble of micritic, silty limestone; upper 8 feet have rubble of sandstone: calcareous; medium grey; fine to medium, angular to subrounded chert and quartz grains with some coarse grains; sparry calcite cement with fine-grained skeletal fragments (echinoderm, brachiopod), grades to sandy limestone in part (GSC loc. 53925)	48	955
9	Rubble of silty, micritic limestone (GSC loc. 53924)	20	907
8	Covered, resistant; talus of micritic limestone (GSC loc. 53923)	62	887
7	Limestone: skeletal, sandy; abundant fine to medium, angular grains of chert and quartz; rare lensing beds of medium grey chert up to 1 foot thick; unit is resistant	20	825

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER CARBONIFEROUS		
	Hart River Formation (?Canoe River Member) (805 feet thick)		
6	Mainly covered, with both resistant and recessive intervals; rubble of micritic limestone; outcrop 2 feet thick at 430 feet, of limestone: dark grey, silty, dolomitic?, high in organic matter; fine-grained skeletal fragments with numerous angular quartz silt grains and very abundant dark organic matter and ?microcrystalline dolomite concretions in irregular laminae; 1- to 3-foot beds; weathers dark grey to black; recessive. Some rubble of limestone, as in unit 1, at 785 feet (GSC locs. 53920, 53921, 53922)	555	805
5	Limestone: as in unit 1, but fewer chert and quartz grains, some medium crystalline dolomite in matrix, interval from 242 to 246 feet consists of similar limestone but grades to fine- to medium-grained calcareous sandstone; beds 6 inches to 2 feet thick; unit resistant	10	250
4	Mainly rubble, with outcrop 3 feet thick at 203 to 206 feet, of limestone: micritic-skeletal, very slightly silty; dark grey to dark brownish grey, laminated; mainly micrite with some very fine-grained skeletal fragments, rare quartz silt grains and minor replacement of micrite by chert; abundant dark organic matter with pyrite concretions in some laminae; recessive (GSC loc. C-2711)	105	240
3	Limestone: sandy, as in unit 1, but coarser grained skeletal fragments, some bryozoan fragments present	55	135
2	Covered (GSC loc. 53919)	45	80
1	Limestone: skeletal, sandy; medium brownish grey; fine- to medium-grained skeletal fragments (brachiopods, echinoderms) with sparry calcite cement; abundant fine to coarse, angular to subrounded quartz and chert grains, rare very coarse grains and pebbles; beds up to 2 feet thick; grades to calcareous sandstone in part; weathers light to medium grey; resistant (GSC locs. 53917, 53918)	35	35

SCHO CREEK SECTION (116P-1)

Located in northern Richardson Mountains, in headwaters of Scho Creek; 67°58 1/2'N, 136°08 1/2'W; aerial photograph A14361-61, east and slightly north of center; base of section at photo co-ordinates X=+8.6, Y=+1.2, top of section at photo co-ordinates X=+6.75, Y=+2.1. Measured by E.W. Bamber and W. Kisluk, July, 1962, measured in east limb of syncline through unnamed Permian sandstone unit and uppermost part of unnamed Permian shale unit.

JURASSIC (Bug Creek Fm.)
(Disconformity)

MIDDLE PERMIAN [Ufimian?-Kazanian (Guadalupian)]
Sandstone unit (unnamed) 1,610 feet
Shale unit (unnamed) 75 feet (incomplete)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	MIDDLE PERMIAN		
	Unnamed sandstone unit (1,610 feet thick)		
21	Covered, recessive; at 135 feet above base of unit there is a 6-foot outcrop of brownish grey, silty shale with 2- to 6-inch thick beds of dark grey, argillaceous siltstone; unit weathers dark grey	195	1,685
20	Sandstone: quartzose, glauconitic, slightly cherty; medium to dark grey with green tinge; very fine- to fine-grained; mainly angular quartz grains with scattered dark grey chert grains and numerous glauconite grains; beds 1 to 2 feet thick; *Zoophycos* poorly developed; weathers medium greenish grey with abundant dark reddish brown stain; resistant except in interval 18 to 28 feet above base of unit, where sandstone slightly recessive, more glauconitic, and contains numerous oblong siltstone nodules up to 1 inch maximum diameter; covered interval 11 to 18 feet above base of unit	35	1,490
19	Sandstone: quartzose, glauconitic, calcareous in part; mainly medium greyish brown with dark green flecks, about 30 per cent of unit laminated - dark green alternating with medium brown; fine-grained; mainly quartz grains with glauconite, which is most abundant in laminated intervals; unit calcareous from 6 to 10 feet above base; weathers orange-brown with some greyish green intervals; resistant; *Zoophycos* abundant	15	1,455

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
18	Sandstone: glauconitic, as in interval from 18 to 28 feet above base of unit 20; *Zoophycos* and worm tubes abundant; covered interval from 9 to 35 feet above base of unit	51	1,440
17	Sandstone: similar to that in unit 18, but very highly glauconitic; contains geodes filled with chalcedony and quartz; irregular laminae of organic matter; inarticulate brachiopods throughout; resistant (GSC loc. 53871)	22	1,389
16	Sandstone: quartzose, slightly cherty; medium grey; fine-grained; mainly angular quartz grains with scattered dark grey chert grains; films of organic matter common, associated with *Zoophycos* and worm tubes; weathers light grey with dark orange-brown stain, resistant	13	1,367
15	Covered	57	1,354
14	Sandstone, as in unit 16	5	1,297
13	Covered	14	1,292
12	Sandstone: quartzose, slightly cherty, as in unit 16, but more numerous films of organic matter, worm tubes, and *Zoophycos;* 6-inch thick bed of silty shale 27 feet above base of unit, covered interval 116 to 124 feet above base; 40 per cent of basal 19 feet covered	155	1,278
11	Covered	17	1,123
10	Sandstone: quartzose, slightly cherty, as in unit 16, interbedded with 5- to 8-foot intervals of sandstone: quartzose, very slightly cherty, dolomitic; light brownish grey; fine-grained; mainly angular quartz grains with rare chert grains and numerous small masses of coarsely crystalline dolomite; beds 1 to 1.5 feet thick; weathers orange-brown; makes up approximately 60 per cent of unit; unit resistant	35	1,106
9	Covered	55	1,071
8	Limestone: skeletal, silty; medium brownish grey; fine-grained; mainly indeterminate skeletal fragments with rare, very coarse-grained brachiopod and pelecypod fragments, abundant angular quartz silt; rare lensing beds of dark grey chert up to 3 feet thick; limestone, slightly argillaceous, from 41 to 111 feet above base		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	of unit, contains fibrous calcite plates (probably pelecypods); beds 6 inches to 3 feet thick; weathers medium to dark brownish grey with extensive orange-brown areas; resistant ledge former; contains abundant silicified brachiopods locally, *Zoophycos* abundant; covered interval from 39 to 41 feet above base; below covered interval, more silt present - approaches calcareous siltstone (GSC locs. 53872 to 53875)	146	1,016
7	Covered, recessive	123	870
6	Sandstone: quartzose, slightly calcareous; light grey; very fine- to fine-grained; mainly angular quartz grains with some sparry calcite cement and numerous irregular laminae of organic matter; beds 6 inches to 2 feet thick; numerous fossiliferous nodules, up to 6 inches thick and 1 foot long, of dark grey siltstone, weathering dark reddish brown; unit weathers medium brownish grey with much dark reddish brown stain; resistant (GSC loc. 53876)	20	747
5	Covered	55	727
4	Limestone: slightly argillaceous, as from 41 to 111 feet above base of unit 8	8	672
3	Siltstone, as in unit 6, with no nodules	15	664
2	Covered, with small outcrop, from 378 to 385 feet above base, of sandstone as in unit 6	579	649
	PERMIAN (Ufimian?)		
	Unnamed shale unit (75 feet thick, incomplete)		
1	Siltstone: calcareous; medium grey; mainly quartz grains with sparry calcite cement; many irregular laminae of organic matter, numerous *Zoophycos;* beds 1 to 3 feet thick; weathers medium brownish grey to orange-brown, resistant (GSC loc. 53877)	75	75

RAT RIVER SECTION (116P-3)

Located in northern Richardson Mountains, approximately 8 miles north of Rat River (Yukon); 67°27 1/2'N, 136°25'W; aerial photograph A14368-19, south of center; base of section at photo co-ordinates X=+1.1, Y=-6.55; top of section at photo co-ordinates X=+1.2, Y=-6.95. Measured by A.W. Norris and D.L. Jordan, July, 1962, through unnamed ?Permian clastic rocks (Norris, 1967, pp. 283, 284; section 34).

JURASSIC (Bug Creek Fm.)
(Disconformity)

PERMIAN?
Unnamed clastic rocks 220 feet
(Angular unconformity)

UPPER DEVONIAN (Imperial Fm.)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	PERMIAN?		
	Unnamed clastic rocks (220 feet thick)		
10	Grass- and talus-covered interval occupying saddle of ridge. Blocks of sandstone: conglomeratic; matrix light grey, flecks of red hematite; occasional small pebbles of black chert; probably medium to thin, irregular beds; weathers medium grey	32.5	220
9	Sandstone: conglomeratic; matrix light olive-green, flecks of red, medium- to coarse-grained hematite; angular to slightly rounded pebbles of medium greenish grey chert, black chert and milky white quartz; medium irregular beds very poorly exposed; weathers light grey with dark grey lichen	25	187.5
8	Conglomerate: matrix olive-green, highly ferruginous, fine- to coarse-grained, angular to slightly rounded pebbles of dark grey chert, light brownish grey chert, and medium green sandstone; medium to thick rubbly beds; slightly recessive, slightly friable; in places oxidized to medium orange colour; unit weathers orange-brown	40	162.5
7	Talus of large angular blocks of sandstone: dark olive-green; fine-grained; weathers light grey; apparently interbedded with conglomeratic sandstone and conglomerate; apparently medium to thick irregular beds; coated with dark grey to black lichen	30	122.5

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
6	Conglomerate: matrix medium olive-green, fine-grained; pebbles of light greenish grey sandstone, light grey chert, angular to slightly rounded; thick, irregular beds	11	92.5
5	Sandstone: medium olive-green, fine- to coarse-grained; in part conglomeratic; forms massive vertical scarp; weathers medium grey, but covered with black, yellow, and orange lichen	22	81.5
4	Sandstone: olive-green; medium-grained, contains granules of light grey and black chert up to 2 mm in diameter; thin irregular beds; recessive	4	59.5
3	Conglomerate, similar to unit 2, but thick-bedded to massive and more resistant	24	55.5
2	Conglomerate: medium olive-green matrix, fine-grained; pebbles of green shale, dark grey and black chert, slightly rounded to angular; unit weathers medium grey; covered with black, yellow, and orange lichen	11.5	31.5
1	Conglomerate: medium olive-green, matrix fine- to coarse-grained; contains angular to slightly rounded pebbles of black and medium grey chert, olive-green sandstone; medium irregular beds; weathers light grey but coated with black and orange lichen	20	20

WHITE MOUNTAINS EAST SECTION (116P-6)

Located in northern Richardson Mountains in headwaters of Fish Creek, immediately east of White Mountains, approximately 3 miles northeast of section 116P-7; 67°58 1/2'N, 136°24 1/2'W; aerial photograph A14361-14, south of center; base of section at photo co-ordinates X=-0.55, Y=-5.2; top of section at photo co-ordinates X=+1.9, Y=-4.1. Measured by E.W. Mountjoy, July, 1962, in west limb of syncline, through uppermost part of shale unit and sandstone unit (Permian, unnamed). Section stratigraphically above section 116P-7 (Bamber and Waterhouse, 1971, p. 84, Fig. 10).

JURASSIC (Bug Creek Fm.)
(Disconformity)

MIDDLE PERMIAN [Ufimian-Kazanian (Guadalupian)]
Unnamed sandstone unit 2,408 feet

MIDDLE PERMIAN [Ufimian (Guadalupian)]
Unnamed shale unit 200 feet (incomplete)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	MIDDLE PERMIAN		
	Unnamed sandstone unit (2,408 feet thick)		
35	Sandstone: quartzose; light grey; fine- to medium-grained; fine laminations and cross-bedding; beds 1 to 2 feet thick, separated by 1- to 3-foot thick beds of dark red weathering, glauconitic, fine-grained sandstone; weathers light grey to yellow-grey, green in part; unit forms prominent red-banded cliff; *Lingula* observed about 75 feet above base	195	2,608
34	Sandstone: quartzose; light to medium grey; fine-grained; fine laminations and cross-bedding; 2- to 12-inch thick beds separated by 1/2- to 2-inch thick, recessive beds of shale and silty shale; weathers yellow-grey, in part light greenish red; unit moderately resistant	35	2,413
33	Covered	40	2,378
32	Sandstone: light grey; fine-grained; 1- to 2-inch thick beds of siltstone, occasional ironstone concretions (some fossiliferous); beds 1 to 12 inches thick; unit weathers light brownish grey; in upper 15 feet, sandstone beds become fine-grained, with fine laminations, crossbedding, weathers greenish grey	50	2,338
31	Covered	85	2,288
30	Mostly covered; appears to be predominantly shale; dark grey to black, slightly silty, weathers dark grey, very recessive with dark red weathering concretionary layer in basal 5 to 10 feet; a few pelecypods from talus of this layer	105	2,203
29	Siltstone: calcareous; medium grey; beds 1 to 4 inches thick; weathers light brown to reddish brown; slightly less resistant than underlying unit; forms top of light yellowish grey weathering carbonate-siltstone unit; abundant *Zoophycos*, large productid brachiopods collected 2 feet above base (GSC loc. 52710)	15	2,098
	(Section shifted along strike north to next gully - measuring up section)		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
28	Covered in part; 30 to 50 per cent outcrop of siltstone: calcareous, in part concretionary and argillaceous; light grey; fossils in concretion layer at top	50	2,083
27	Siltstone: very calcareous grading to silty limestone; light grey; trace of fine laminations; poorly preserved brachiopod fragments; weathers light yellowish grey; resistant and cliff-forming	65	2,033
26	Siltstone: very calcareous; light to medium grey; fine laminations, beds 1 to 5 feet thick, lower 10 feet argillaceous; weathers light brown; rare brachiopods, *Zoophycos;* from 22 to 28 feet above base of unit, limestone: silty, light grey, fine laminations, weathers light grey, forms resistant cliff, in upper 5 feet there are two prominent yellow-weathering cliffs about 1 foot thick; 1- to 3-inch thick bed of light grey chert beneath lowest yellow-weathering bed	44	1,968
25	Sandstone: slightly calcareous; very fine-grained; becomes more calcareous toward top of unit; traces of laminations, beds 1 to 4 feet thick; rare brachiopods and abundant *Zoophycos*, with the latter very abundant in upper 5 feet	35	1,924
24	Sandstone: medium grey; very fine-grained; rare concretions; weathers light grey; resistant, cliff-forming; *Zoophycos* in talus from cliff	42	1,889
23	Siltstone: medium grey; one bed; weathers reddish brown, moderately resistant	15	1,847
22	Siltstone: argillaceous in part; light grey; finely laminated; beds 1/2 to 12 inches thick; weathers reddish brown to yellow; recessive; basal 20 feet partly covered	105	1,832
21	Covered	80	1,727
20	Sandstone: calcareous; medium grey; very fine-grained; finely laminated; rare dark-weathering beds of concretions; unit weathers light grey to brown and forms a resistant cliff; very fossiliferous (GSC loc. 52702)	17	1,647

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
19	Mainly covered; approximately 30 per cent is outcrop of sandstone: very fine-grained, grading to siltstone, medium grey; forms prominent recessive interval beneath overlying marker unit; abundant *Zoophycos*	69	1,630
18	Sandstone: medium grey; very fine-grained; traces of laminations, beds 1 to 6 inches thick; contains several 1- to 3-foot thick, argillaceous siltstone and silty shale beds; weathers light brownish grey to reddish brown; forms a series of 1- to 5-foot cliffs; rare brachiopods; abundant *Zoophycos*	76	1,561
17	Sandstone: light to medium grey; very fine-grained; beds 3 inches to 2 feet thick; weathers light brown, grey, and reddish brown; resistant; abundant *Zoophycos*	125	1,485
16	Mainly covered; 50 per cent is outcrop of sandstone, as in unit 15	25	1,360
15	Sandstone: medium grey; very fine-grained; poorly developed laminations, beds 1 to 12 inches thick; weathers brown; moderately resistant; partly covered; *Zoophycos* and brachiopods present	20	1,335
14	Covered	41	1,315
	(Cross-fault of small throw - west side up about 400 feet; continued measuring up section in next creek north, beginning at top of moderately resistant sandstone with abundant *Zoophycos*)		
13	Sandstone: light brownish grey; very fine-grained; rare ironstone concretions; traces of laminations; very thick beds with 1- to 12-inch partings; weathers medium grey to reddish brown; forms series of 10- to 20-foot cliffs	135	1,274
12	Covered, with some 5- to 10-foot outcrops of sandstone: as in unit 11	83	1,139
11	Sandstone: similar to that in unit 10; quartzose; light to medium grey; very fine-grained; abundant poorly developed laminations, partings every 1 to 6 inches; rare ironstone concretions; weathers greenish grey; cliff-former; abundant *Zoophycos*	44	1,056
10	Covered	35	1,012

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
9	Sandstone: medium grey; very fine-grained; rare ironstone concretion with fossils, 5 to 15 feet apart; abundant, poorly developed laminations; weathers greenish grey to medium grey; cliff-former; *Zoophycos* abundant; covered intervals (recessive) 30 to 85 feet, 115 to 144 feet, and 168 to 191 feet above base of unit	244	977
8	Covered	67	733
7	Sandstone: quartzose; light to medium grey; very fine-grained; abundant poorly developed laminations; massive, with 1- to 4-inch partings; weathers greenish brown to reddish brown; cliff-former; *Zoophycos* present, brachiopods from concretions that weather dark red and occur in lenses 4 to 8 inches thick (GSC locs. 52703, 52704)	223	666
6	Siltstone: slightly calcareous; medium grey; beds 1 to 12 inches thick; weathers medium grey to brown, recessive, 50 to 60 per cent covered	80	443
5	Covered	46	363
4	Sandstone: slightly calcareous; medium grey; very fine-grained; indistinct beds 2 to 12 inches thick; weathers light brownish grey; moderately resistant; abundant worm trails, very fossiliferous, with brachiopod coquinas, one ammonoid observed (GSC loc. 52706)	17	317
3	Covered	35	300
2	Sandstone: quartzose, slightly calcareous; medium brownish grey; very fine-grained; trace of fine laminations; weathers brown to slightly reddish brown; very resistant; brachiopod coquinas (GSC loc. 52709)	65	265
	Unnamed shale unit (200 feet thick, incomplete)		
1	Siltstone: slightly calcareous; medium to dark grey; traces of lamination, beds 2 inches to 2 feet thick; rare beds of light to medium grey, calcareous, fine-grained sandstone, weathers medium brownish grey to brown; resistant; brachiopods and worm trails (GSC loc. 52707)	200	200

WHITE MOUNTAINS WEST SECTION (116P-7)

Located in headwaters of Fish Creek on east flank of White Mountains (northern Richardson Mountains), at head of steep, west-flowing minor creek that enters Fish Creek 1 mile above Vunta Creek; 67°57 1/2'N, 136°31'W; aerial photograph A14361-14, southwest of center; base of section at photo co-ordinates X=-7.25, Y=-6.7, base of section at photo co-ordinates X=-7.0, Y=-6.7. Measured by B.S. Norford and N.L. Ball, July, 1962, through unnamed upper Carboniferous and Permian carbonates (upper part of section 23, Fish Creek Section, Norford, 1964, p. 111). Section separated by fault and thick covered interval from overlying section 116P-6 (Bamber and Waterhouse, 1971, Fig. 10, p. 84).

LOWER PERMIAN [Asselian-lower Sakmarian (Wolfcampian)]
Unnamed carbonate unit — 150 feet (incomplete)
(Disconformity)

UPPER CARBONIFEROUS [Moscovian (Desmoinesian)]
Unnamed carbonate unit — 202 feet
(Disconformity)

MIDDLE DEVONIAN
Ogilvie Formation

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER PERMIAN		
	Unnamed carbonate unit (150 feet thick, incomplete)		
4	Limestone: echinoderm, cherty; medium grey; medium- to very coarse-grained; mainly echinoderm fragments with lesser amounts of brachiopod and bryozoan fragments, bryozoans abundant in some beds; sparry calcite cement; some silicification of skeletal fragments; beds 1/2 to 2 feet thick; abundant chert nodules (locally 10 to 20 per cent of outcrop), in places forming discontinuous layers within limestone beds; weathers medium grey and yellowish grey; relatively recessive compared to underlying unit; corals and brachiopods (GSC loc. 53223)	27	352
3	Limestone: skeletal, cherty in part; light to medium grey; medium- to coarse-grained; echinoderm, brachiopod, bryozoan, and coral fragments in sparry calcite cement; bedding 5 feet to massive; large chert nodules common, chert weathers light and dark grey, nodules occur mainly in rare layers where they make up as much as 10 per cent of outcrop; unit weathers light to medium grey with light brown stain; resistant	123	325

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	UPPER CARBONIFEROUS		
	Unnamed carbonate unit (202 feet thick)		
2	Limestone: echinoderm-bryozoan, cherty; light to medium grey; medium- to coarse-grained; echinoderm, brachiopod, and bryozoan fragments and foraminifers in sparry calcite cement; beds 1 to 6 feet thick with rare chert nodules that weather dark grey; unit weathers medium grey and yellowish grey; moderately resistant; covered intervals 15 to 17 feet and 80 to 82 feet above base (GSC loc. 53221)	120	202
1	Limestone: echinoderm-bryozoan, cherty; medium grey; coarse-grained; contains foraminifers, and brachiopod and coral fragments; sparry calcite cement; quartz sand present in basal beds; rare chert nodules in upper beds; 5 per cent of outcrop is dark brown, calcareous shale occurring in the upper part of the unit; beds 1/4 to 3 feet thick; unit weathers yellowish orange and grey; recessive; covered intervals 5 to 12 feet and 17 to 52 feet above base; minor fault 76 feet above base (GSC loc. 53220)	82	82
	Contact between unit 1 and underlying Middle Devonian limestone is a disconformity with abrupt lithological change and an erosion surface cut 2 inches deep.		

McDOUGALL PASS NORTH SECTION (116P-9)

Located in northern Richardson Mountains approximately 4 miles north of Rat River (Northwest Territories) and 4 miles east of Scho Creek; 67°47 1/2'N, 136°01 1/2'W; aerial photograph A14363-14, north of center; base of section at photo co-ordinates X=-0.7, Y=+5.3, top of section at photo co-ordinates X=-1.4, Y=+6.3. Measured by E.W. Bamber and D.L. Jordan, July, 1962, through an unnamed Permian succession (mainly clastic rocks).

JURASSIC (Bug Creek Fm.)
(Disconformity)

MIDDLE PERMIAN [Ufimian?-Kazanian (Guadalupian)]
Unnamed sandstone, shale and limestone 1,648 feet (incomplete)
(probable fault at base)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	PERMIAN		
	Unnamed sandstone, shale and limestone (1,648 feet thick, incomplete)		
22	Sandstone: calcareous, quartzose; medium greyish brown; fine-grained; contains skeletal fragments in part; bedding not seen because of rubbly outcrop; weathers medium grey with black lichen; moderately resistant (GSC loc. 53821)	20	1,648
21	Covered, with rubble of sandstone: quartzose; medium brown to medium greyish brown; fine-grained	261	1,628
20	Sandstone: quartzose; medium brown, very fine- to fine-grained; angular quartz grains, ?chert cement; abundant pyrite in small masses and irregular partings; bedding not seen because of rubbly outcrop; weathers medium grey	6	1,367
19	Covered	24	1,361
18	Sandstone: as in unit 20; very well indurated; *Zoophycos* on bedding surfaces, worm tubes, numerous carbonaceous markings - possibly poorly preserved, flattened stems; beds 1 to 3 feet thick; weathers medium brown with dark grey and green lichen; cliff-former; covered interval from 50 to 60 feet above base of unit; sandstone has a dark grey fresh surface in lower 42 feet of unit	239	1,337
17	Sandstone: quartzose, similar to that in unit 20; light to medium brown; fine-grained; *Zoophycos* present; beds 1 to 3 feet thick; weathers medium brown to orange-brown; resistant	64	1,098
16	Covered, with rubble of fine-grained, medium brown, quartzose sandstone	367	1,034
15	Sandstone, as in unit 17	61	667
14	Covered	5	606
13	Sandstone, as in unit 17, but slightly calcareous, becoming more calcareous toward base of unit; 20 per cent of outcrop non-calcareous	55	601

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
12	Alternating sandstone and limestone: Sandstone: quartzose, fine-grained as in unit 17, but calcareous, containing skeletal fragments; occurs in intervals 1 to 8 feet thick; makes up approximately 50 per cent of outcrop. Limestone: skeletal, sandy; dark brownish grey; fine-grained skeletal fragments in sparry calcite cement, numerous fine quartz sand grains; large, silicified brachiopod fragments common; beds 6 inches to 2 feet thick; occurs in intervals 6 inches to 8 feet thick; makes up approximately 50 per cent of outcrop (GSC locs. 53822 to 53826)	30	546
11	Alternating limestone and sandstone, as in unit 12, but sandstone is medium grey and very calcareous; at 95 feet above base of unit this sandstone grades to dark grey, very calcareous siltstone, which occurs in 6-inch to 1-foot thick beds and lenses making up 30 per cent of outcrop as far as 60 feet above the base; 2-inch to 1-foot thick recessive beds of dark grey, calcareous, argillaceous siltstone begin at 40 feet above base; in lower 40 feet of unit, limestone absent and section dominated by calcareous siltstone; unit weathers dark grey and medium brownish grey to orange-brown; generally resistant (GSC locs. 53827 to 53831)	110	516
10	Covered	35	406
9	Sandstone: quartzose, cherty; medium to dark grey; very fine- to fine-grained; angular quartz and chert grains, chert cement; abundant dark brownish grey flecks of pyrite and ?carbonaceous matter; beds 4 inches to 2 feet thick; rare beds with dark grey and light grey laminae up to 1/10 inch thick; *Zoophycos* present; rare 2- to 6-inch breaks of argillaceous sandstone; lower 9 feet of unit contain 4-inch to 1-foot thick beds of dark grey, silty, recessive shale; unit weathers medium grey; resistant; covered interval from 34 to 59 feet above base of unit	106	371
8	Shale: slightly silty; dark grey; 2-inch to 2-foot thick beds separated by 1/2- to 2-inch thick beds of medium brown carbonate nodules that weather orange-brown; from 87 to 100 feet above base of unit, 40 per cent of outcrop is fine-grained sandstone, as in unit 9, in 1-inch to 8-inch thick beds	150	265

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
7	Sandstone: quartzose, cherty; medium grey; fine-grained; mainly angular quartz grains with some chert grains in chert matrix; beds 1 to 3 feet thick; rare beds, from 1 inch to 1 foot thick, of well rounded, dark grey chert pebbles up to 1 inch in diameter in matrix of sandstone as in rest of unit; unit resistant; weathers orange-brown, with a light greyish yellow bed of fine-grained argillaceous, quartzose sandstone from 17 to 20 feet above base of unit; some covered intervals in lower part of unit	34	115
6	Covered	10	81
5	Siltstone: light grey with thin yellow partings; weathers yellowish grey, partly covered	5	71
4	Siltstone: carbonaceous; medium grey; contains plant fragments; beds 1 to 2 inches thick; interbedded with silty shale; siltstone weathers yellowish grey, shale beds weather orange	6	66
3	Shale: grading to siltstone in lower part of unit; yellowish grey, soft and clay-like in part; weathers yellowish orange, recessive	10	60
2	Conglomerate: chert-pebble; light to medium reddish brown; pebbles angular to subrounded, up to 1 inch maximum diameter (average 1/4 to 1/2 inch); makes up 80 to 90 per cent of rock; very fine-grained sandstone matrix; unit weathers brownish red; resistant	8	50
1	Interbedded sandstone and shale. Sandstone: quartzose; light to medium grey with green tinge and dark red partings; fine- to medium-grained; beds 1 to 6 inches thick; weathers reddish brown; resistant. Shale: light to medium greyish brown; occurs in 6-inch to 2-foot thick units; top 2 feet are silty; weathers greyish brown in recessive units between sandstone beds	42	42

BELL RIVER SECTION (116P-10)

Located on west flank of Richardson Mountains, approximately 4 miles east of Bell River and 13 miles south of Summit Lake; 67°31'N, 136°32' 1/2'W; aerial photograph A14368-19, west of center; base of section at photo co-ordinates X=-5.4, Y=+0.9; top of section at photo co-ordinates X=-5.4, Y=+0.3. Measured by E.W. Bamber and W.J.F. Clack, July, 1962, through Permian basal sandstone and unnamed carbonate unit.

JURASSIC (Bug Creek Fm.)
(Disconformity - position of contact uncertain)

LOWER PERMIAN [?late Asselian-Sakmarian (Wolfcampian)]
Unnamed carbonate unit ?345 feet
Unnamed basal sandstone unit 135 feet
(Angular unconformity)

UPPER DEVONIAN (Imperial Fm.)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER PERMIAN		
	Unnamed carbonate unit (?345 feet thick - position of contact with Jurassic uncertain)		
9	Siltstone: slightly argillaceous; dark grey; grades to very fine-grained sandstone; beds 2 to 6 inches thick; worm tubes perpendicular to bedding, weathers medium to dark grey; resistant; upper contact sharp	8	480
8	Covered, recessive	61	472
7	Alternating sandstone and limestone. Sandstone: quartzose, very calcareous; dark grey; very fine- to fine-grained; mainly angular quartz grains, minor chert grains, chert in matrix; abundant skeletal fragments; laminae and small irregular masses of pyrite and organic matter; burrows; grades to sandy limestone; beds, up to 3 feet thick, change thickness laterally; weathers dark grey to dark reddish brown, resistant; makes up approximately 60 per cent of outcrop; rare 3-inch to 1-foot thick beds that are argillaceous and weather dark grey, recessive. Limestone: skeletal-micritic; sandy; dark grey; fine-grained skeletal fragments; abundant micrite and calcite cement; very fine- to fine-grained chert and quartz grains, weathers orange-brown, resistant; makes up approximately 40 per cent of outcrop. Covered intervals at 8 to 28 feet; 31 to 36 feet; 55 to 64 feet; 114 to 138 feet; and 151 to 169 feet above base of unit (GSC locs 53859 to 53862)	201	411

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
6	Interbedded: Sandstone: very cherty, quartzose, calcareous; medium to dark grey; very fine-grained; mainly angular chert grains with less abundant quartz grains and calcite cement; numerous irregular, small masses of pyrite; beds 6 inches to 1 foot thick; weathers dark brownish grey, resistant; occurs in intervals: 0 to 10 feet; 14 to 38 feet; 40 to 46 feet; 48 to 51 feet; 54 to 61 feet and 65 to 75 feet above base of unit. Sandstone: very calcareous, slightly cherty; medium grey to dark grey; very fine-grained; angular quartz grains and minor chert grains in matrix of very fine-grained bryozoan and other unidentified calcite skeletal fragments; grades to sandy and silty limestone in some beds; beds 6 inches to 2 feet thick; weathers dark brownish grey; resistant; occurs in intervals: 39 to 40 feet; 51 to 54 feet; and 63 to 67 feet above base of unit. Sandstone: similar to non-argillaceous sandstone in unit 15; occurs in intervals: 10 to 14 feet, and 46 to 48 feet above base of unit (GSC locs. 53855 to 53858)	75	210
	Unnamed basal sandstone unit (135 feet thick)		
5	Sandstone: quartzose, cherty, calcareous; medium grey with rusty brown specks; fine-grained; mainly angular quartz grains in sparry calcite cement, chert grains present but less common than quartz; beds 4 inches to 1 foot thick; weathers medium greyish brown to orange-brown interbedded with several 1- to 6-inch thick beds (thickness irregular) of dark grey, argillaceous, fine-grained sandstone containing sandy shale breaks; these weather dark grey and are recessive; unit as a whole is recessive	13	135
4	Sandstone: quartzose, cherty; medium brownish grey; fine-grained; angular quartz and chert grains with chert cement; no apparent bedding, forms massive cliff with faint lamination showing on weathered surface; weathers medium grey with brown patches	80	122

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
3	Sandstone: quartzose, cherty; light grey with black, carbonaceous films; fine- to medium-grained with some granular lenses and beds; poorly sorted angular to rounded quartz and chert grains; ?chert cement; beds 6 inches to 1 foot thick, minor crossbedding; *Zoophycos* and numerous worm burrows; weathers medium to dark grey with medium brown patches; forms base of massive cliff	32	42
2	Sandstone: cherty, quartzose; medium grey with dark grey partings; fine- to medium-grained; numerous fine- to medium-grained, angular to subrounded chert grains; with abundant fine-grained angular quartz grains and chert matrix; one 4-foot thick bed; numerous *Zoophycos* with carbonaceous films and worm tubes perpendicular to bedding; carbonaceous partings present; weathers medium grey with slight brown tinge; slightly recessive	4	10
1	Sandstone: quartzose, cherty, dolomitic; medium brownish grey; fine-grained; approximately equal proportions of quartz and dark grey chert as angular, poorly sorted grains in finely crystalline dolomite cement, numerous small, irregular masses and laminae of pyrite; beds 1 to 3 feet thick; thin worm burrows perpendicular to bedding, most abundant from 4.5 to 6 feet above base of unit, where sandstone is very fine-grained and *Zoophycos* is present; sandstone weathers medium reddish to orange-brown, unit resistant; at 4 feet there is a 6-inch to 1-foot thick variable bed of conglomerate containing pebbles of medium to dark grey chert, mainly 1/4 inch to 1/2 inch but ranging to 1 inch in diameter, well rounded; matrix is composed of light and dark grey chert granules cemented by rusty brown ?carbonate; bed weathers medium brownish grey (GSC loc. 54011, talus from base of Permian)	6	6

McDOUGALL PASS SOUTH SECTION (116P-11)

Located in northern Richardson Mountains, approximately 3 miles southwest of Symmetry Mountain; 67°41'N, 136°19'W; aerial photograph A14361-68, west and slightly north of center; base of section at photo co-ordinates X=-3.9, Y=-0.1, top of section at photo co-ordinates X=-4.0, Y=+2.3. Measured by E.W. Bamber and W.J.F. Clack, July, 1962, through unnamed sequence of Permian clastic rocks lying with angular unconformity on Upper Devonian Imperial Formation.

JURASSIC (Bug Creek Fm.)
(Disconformity)

MIDDLE PERMIAN [?Ufimian-Kazanian (Guadalupian)]
Unnamed sandstone unit 1,368 feet

PERMIAN (undivided)
Unnamed shale unit 1,339 feet
Unnamed basal sandstone and conglomerate 551 feet
(Angular unconformity)

UPPER DEVONIAN (Imperial Fm.)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	MIDDLE PERMIAN		
	Unnamed sandstone unit (1,368 feet thick)		
51	Sandstone: quartzose, slightly cherty, with organic matter associated with *Zoophycos* as in lower part of unit 48; beds 6 inches to 1 foot thick with very irregular and undulating bedding planes; depressions in top of bed 14 feet above base of unit are filled with reddish brown weathering microcrystalline dolomite containing numerous silicified ovoid bodies of unknown origin	15	3,258
50	Covered	10	3,243
49	Sandstone: quartzose, dolomitic; light to medium brownish grey; fine-grained; mainly angular quartz grains with minor dolomite cement; numerous small (?)carbonaceous fragments; beds 6 inches to 1 foot thick; at top of unit there is a 6-inch thick bed of conglomerate containing rounded chert and quartz pebbles up to 1 inch maximum diameter, with matrix of ferruginous, fine-grained quartz sandstone; unit weathers medium to dark grey with orange-brown patches; resistant	16	3,233

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
48	Sandstone: quartzose, slightly cherty, dark grey; very fine-grained; mainly angular quartz grains with scattered chert grains, numerous partings and films of organic matter associated with *Zoophycos*, which is very abundant; beds 2 to 4 inches thick, very irregular bedding surfaces; in upper 27 feet of unit, sandstone has more organic matter and bedding almost indistinguishable; unit weathers dark orange-brown; slightly recessive	80	3,217
47	Covered	55	3,137
46	Sandstone: quartzose, calcareous in part; medium to dark grey with light grey laminae; very fine- to fine-grained; dominantly angular quartz grains with abundant sparry calcite cement in lower part of unit; beds 1 to 5 feet thick; most of unit shows 1/16- to 1/8-inch thick laminae of alternating light and dark grey colour; from 130 feet above base to top of unit, sandstone is light to medium grey with scattered black chert grains, non-calcareous, beds up to 8 feet thick; unit weathers medium grey, with some reddish brown weathering beds containing silicified brachiopods; resistant cliff former; numerous *Zoophycos* on bedding planes up to 2 feet below top of unit; covered intervals from 95 to 133 feet, and from 505 to 510 feet above base of unit (GSC locs. 53849 to 53852)	567	3,082
45	Covered	18	2,515
44	Interbedded limestone and sandstone. Limestone: as in unit 42; beds discontinuous, up to 2 feet thick, intervals from 1 to 15 feet thick; contains silicified brachiopods; makes up approximately 30 per cent of outcrop. Sandstone: quartzose, calcareous, medium grey; very fine- to fine-grained; numerous irregular masses and laminae of dark grey organic matter; beds 1 to 5 feet thick; some beds laminated, showing cross-laminae; *Zoophycos* abundant; weathers medium brownish grey with many yellow, orange, and grey lichen patches; resistant; cliff-former. In upper 42 feet of unit, limestone becomes less abundant (15 per cent of outcrop) and sandstone strongly laminated (GSC locs. 53844 to 53848)	192	2,497
43	Covered	40	2,305

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
42	Alternating siltstone and limestone. Siltstone: calcareous to very calcareous; medium to dark grey; beds 6 inches to 2 feet thick; resistant; makes up approximately 40 per cent of outcrop. Limestone: silty; medium to dark grey; micritic; beds 6 inches to 2 feet thick; weathers medium to dark grey with orange-brown patches; less resistant than siltstone. Unit resistant, forms small cliffs and ledges (GSC loc. 53843)	81	2,265
41	Covered	37	2,184
40	Siltstone: calcareous; medium to dark grey; beds 6 inches to 2 feet thick; contains rare 1- to 6-inch thick beds of dark grey, silty shale in lower 15 feet of unit; rare beds of dark grey, silty limestone also present; weathers medium to dark brownish grey with yellowish brown and orange-brown beds, resistant. Siltstone: contains rare concretions of medium grey, silty limestone, maximum diameter of 3 feet. Covered interval from 47 to 55 feet above base of unit. Several 2- to 4-inch thick beds of soft, black, recessive shale from 95 to 100 feet above base of unit. Siltstone becomes more calcareous and limestone increases to 50 per cent of outcrop from 90 to 112 feet above base of unit (GSC locs. 53841, 53842)	112	2,147
39	Interbedded sandstone and shale. Sandstone: quartzose, calcareous; dark grey; very fine-grained; abundant quartz grains and indeterminate skeletal fragments with calcite cement; organic matter present, concentrated in irregular lenses and stringers (burrows?); beds 4 inches to 2 feet thick; weathers medium greyish brown to orange-brown; resistant. Shale: as in unit 38, 1- to 6-inch thick recessive beds; shale becomes siltier and calcareous, grading to calcareous, argillaceous siltstone in upper 25 feet of unit, where rare beds of dark grey, silty, micritic limestone are also present (GSC locs. 53839, 53840)	145	2,035

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	PERMIAN (undivided)		
	Unnamed shale unit (1,339 feet thick)		
	(Estimated 100-foot gap in section between units 38 and 39 is inaccessible because of cliff)		
38	Shale: silty; dark grey; 5- to 15-foot thick beds separated by 1- to 8-inch thick beds of silty dolomite in nodules weathering orange-brown; shale weathers dark grey; rare 1/2- to 3-inch thick beds, throughout interval, of dark to medium grey, argillaceous siltstone with medium and dark grey laminae; above 242 feet from base of unit, dolomite nodules absent, sequence consists of shale, as below, in 1- to 5-foot units interbedded with siltstone: argillaceous, calcareous, dark grey, beds 4 inches to 1 foot thick; makes up 40 per cent of outcrop; weathers orange-brown to dark brownish grey; unit is recessive (GSC locs. 53837, 53838, both talus)	482	1,790
37	Sandstone: quartzose, cherty, calcareous, as in unit 34, beds 1 to 2 feet thick, with 1- to 2-inch thick interbeds of argillaceous sandstone, as in unit 35	8	1,308
36	Sandstone: argillaceous, similar to that in unit 32, beds 2 inches to 1 foot thick; recessive	20	1,300
35	Sandstone: as in unit 34, making up about 80 per cent of outcrop in 5- to 20-foot intervals; alternates with 1- to 5-foot intervals of dark grey, argillaceous sandstone as in unit 32, recessive (GSC loc. 53836)	55	1,280
34	Sandstone: quartzose, cherty, calcareous, medium brownish grey; fine-grained; grains angular, mainly quartz, with scattered dark grey chert grains and sparry calcite cement; weathers medium brownish grey with orange patches and beds; cliff-former	43	1,225
33	Sandstone: argillaceous, as in unit 32, but much less argillaceous; forms base of overlying resistant interval	4	1,182

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
32	Mainly covered in lower 15 feet of unit, with some outcrops of silty, dark grey shale in 6-inch to 1-foot thick beds; weathers dark grey; recessive; contains 2- to 6-inch thick beds of sandstone: quartzose, argillaceous, very fine-grained, with rare dark grey chert nodules, showing light and medium grey laminae, weathers orange-brown and medium brownish grey, resistant. Unit is well exposed from 15 to 45 feet above base of unit; shale makes up 50 per cent of outcrop and argillaceous sandstone makes up 40 per cent; 10 per cent of outcrop consists of rare 2-inch to 1-foot thick beds of sandstone, quartzose, cherty, calcareous, pyritic, medium to dark grey, very fine-grained, mainly quartz grains with scattered dark grey chert grains and small pyrite masses, weathers orange-brown, resistant. From 45 to 73 feet above base of unit, argillaceous sandstone makes up 80 per cent of outcrop, calcareous sandstone makes up 20 per cent, and shale occurs as several 1- to 2-inch thick beds in the lower 5 feet (GSC loc. 53835)	73	1,178
31	Covered, recessive; probably shale	380	1,105
30	Covered, resistant; covered with talus blocks of same sandstone as in unit 28, and small outcrop of this sandstone 60 feet above base of unit, bearing *Zoophycos* on bedding planes (GSC loc. 53834, talus)	90	725
29	Covered	84	635
	Unnamed basal sandstone and conglomerate (551 feet thick)		
28	Sandstone: quartzose, calcareous, cherty, medium grey; coarse- to very coarse-grained; sub-rounded quartz and chert grains with calcite cement; scattered granules and pebbles up to 3/16-inch diameter in some beds; beds 6 inches to 1 foot thick; some well-developed cross-bedding; weathers medium brownish grey to dark orange-brown; grains stand out on surface in laminae; resistant	7	551
27	Covered	9	544

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
26	Sandstone: quartzose, slightly cherty; light grey; fine-grained; mainly angular grains of quartz with rare dark grey chert grains; quartz cement; rubble only, forms resistant rib in hillside	10	535
25	Covered	3	525
24	Rubbly outcrop of sandstone, as in unit 17	5	522
23	Sandstone: quartzose, cherty; mottled light and dark grey; medium- to coarse-grained; chert abundant; quartz cement; beds 1 to 5 feet thick; weathers dark reddish brown, resistant	7	517
22	Covered, with blocks of sandstone, as in unit 10	22	510
21	Sandstone: quartzose, cherty, as in unit 10, laminated, no crossbedding seen	8	488
20	Sandstone: as in unit 17, with rare 1- to 2-inch thick beds containing pebbles up to 1/4-inch maximum diameter, well-rounded	9	480
19	Covered, recessive	15	471
18	Rubble of sandstone: as in unit 17, but large bedding plane exposed in middle of unit 18 composed of sandstone as in unit 10	13	456
17	Sandstone: quartzose, cherty, calcareous; medium brownish grey; fine- to medium-grained; grains angular, quartz dominant over chert; calcite cement; some beds coarse-grained with scattered granules; beds 6 inches to 1 foot thick, very poorly developed crossbedding; unit weathers medium to dark brownish grey with large orange-brown areas; resistant	10	443
16	Covered with rubble of sandstone similar to that in units10 and 14	63	433
15	Rubbly outcrop of sandstone and conglomerate similar to that in unit 8, but less conglomerate present; crossbedding evident in some talus slabs	20	370
14	Sandstone: as in unit 10, but no lamination present	5	350
13	Conglomerate and sandstone: as in unit 8, but more rounded pebbles and grains; crossbedding present	17	345

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
12	Sandstone: as in unit 10, but medium grey, with subrounded grains	15	328
11	Covered, non-recessive	41	313
10	Sandstone: quartzose, cherty; light grey; fine- to medium-grained; angular grains, quartz dominant over chert, rare granules up to 1/8-inch maximum diameter; beds 8 inches to 6 feet thick; laminated medium and dark grey in part, rare cross-lamination; weathers light to medium grey with dark grey and yellowish grey lichen; resistant	26	272
9	Covered	35	246
8	Sandstone and conglomerate: quartzose, cherty; medium grey; poorly sorted, size ranges from coarse grains to pebbles, subrounded to rounded grains, chert and quartz present in approximately equal proportions; beds from 6 inches to 3 feet thick; crossbedding common, with sets commonly 6 inches to 1 foot thick, one 3-foot unit with torrential crossbedding; conglomerate occurs in rare lensing beds containing pebbles up to 1/4-inch maximum diameter with matrix of coarse-grained sandstone; unit weathers grey to dark grey with orange-brown and yellow patches; massive; unit resistant	26	211
7	Covered	5	185
6	Sandstone: as in unit 4, but grains are subrounded; in upper 5 feet of unit this sandstone becomes coarse-grained, poorly sorted, and contains both rounded and angular grains	13	180
5	Covered, non-recessive	49	167
4	Sandstone, as in unit 2, but fine- to medium-grained, poorly sorted	8	118
3	Covered, non-recessive, appears to be resistant across valley	36	110
2	Sandstone: quartzose, cherty; fine-grained; medium grey; grains angular, quartz dominant over chert; beds 2 feet thick; weathers medium grey with dark grey and orange lichen; resistant; covered interval from 13 to 26 feet above base of unit	40	74

Unit	Lithology	Thickness (feet)	Height Above BAse (feet)
1	Sandstone: quartzose, cherty, conglomeratic; medium greenish grey to light grey; composed of poorly sorted, angular to subrounded, fine-grained to granule-size quartz and chert grains with quartz cement; numerous pebbles up to 1/4-inch maximum diameter; beds 1 to 3 feet thick, contacts between beds are wavy; weathers medium to dark reddish brown; resistant	34	34

CACHE CREEK WEST SECTION (117A-5)

Located in northern Richardson Mountains on ridge between Cache Creek and Fish River, approximately 2 miles west of Yukon-Northwest Territories boundary; 68°17'N, 136°31'W; aerial photograph A14361-22, slightly south of center; base of section at photo co-ordinates X=+1.3, Y=-8.65; top of section at photo co-ordinates X=+0.65, Y=-8.3. Measured by R.M. Proctor, July, 1962, through unnamed Permian sandstone unit of Bamber and Waterhouse (1971, p. 87).

JURASSIC (Bug Creek Fm.)
(Disconformity)

MIDDLE PERMIAN [?Ufimian-Kazanian (?Guadalupian)]
Unnamed sandstone unit 305 feet
(Underlain by unnamed Permian shale unit - not exposed)

MIDDLE PERMIAN

Unnamed sandstone unit
(305 feet thick)

2	Sandstone: quartzose, ?dolomitic; medium brown; very fine-grained; ?dolomite cement; carbonaceous flecks and irregular laminae; mainly rubble; weathers orange-grey and brownish grey; appears to be in part shale; contains brachiopod and *Zoophycos* (GSC loc. C-7220)	235	305
1	Sandstone: quartzose, calcareous, slightly glauconitic; medium grey; very fine-grained; well-sorted; mainly quartz grains with scattered glauconite grains and carbonaceous flecks and laminae, calcite cement; very thin bedding; weathers yellow and orange-grey; forms low knob at base of section; contains *Zoophycos* and an indistinct brachiopod	70	70

LOWER TRAIL RIVER SECTION (117A-13)

Located in eastern Buckland Mountains on east side of Trail River, approximately 8 miles west of Trout Lake; 68°51 1/2'N, 138°58'W; aerial photograph A13470-127, slightly southwest of center; base of section at photo co-ordinates X=-2.3, Y=-3.7; top of section at photo co-ordinates X=+0.9, Y=-5.0. Measured by E.W. Bamber and D. McAuslin, August, 1962, through Kayak Formation and Lisburne Group.

UPPER TRIASSIC (Shublik Fm.)
(Disconformity)

LOWER CARBONIFEROUS [Upper Visean (upper Meramecian-Chesteran) - age limits not precisely established]
Lisburne Gp. (?Alapah Fm.) 2,140 feet
Kayak Fm. 720 feet
(Angular Unconformity)

LOWER DEVONIAN OR OLDER (Neruokpuk Fm.)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER CARBONIFEROUS		
	LISBURNE GROUP (?Alapah Formation) (2,140 feet thick)		
27	Rubble with rare slumped outcrop of limestone: cherty; light to medium grey; micritic, with scattered fine- to medium-grained skeletal fragments; beds 4 inches to 1 foot thick; many irregular, discontinuous beds and nodules of light to medium grey chert that weathers dark grey; limestone partly replaced by chert in numerous lenses and laminae; unit weathers medium to light grey (GSC loc. 53907)	175	2,822
26	Covered	314	2,647
25	Rubble of limestone: micritic-skeletal, cherty in part; medium to dark grey; fine-grained; abundant fine-grained skeletal fragments in micritic matrix; weathers medium grey; resistant	104	2,333
24	Covered	186	2,229
23	Limestone: cherty; dark grey, as in unit 25, but dolomitic, with small medium grey chert nodules and lenses up to 1/2 inch thick and much chert replacement in limestone	92	2,043

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
22	Rubble of dolomite: light yellowish brown and medium grey alternating; medium to coarsely crystalline; grey- and orange-weathering laminae stand out on weathered surface; weathers light yellowish brown. From 1,943 to 1,973 feet, rubble of limestone: cherty; medium grey; fine-grained; weathers medium grey; contains silicified brachiopods (GSC loc. 53908)	322	1,951
21	Limestone: cherty; dark grey; fine- to medium-grained; beds 1 to 3 feet thick; approximately 20 per cent of outcrop is composed of lenses and irregular beds of dark grey chert up to 4 inches thick; numerous laminae and stringers of cherty limestone, up to 1/2 inch thick, showing cross-lamination; unit weathers light grey with slight yellowish brown tinge; resistant; abundant fine- to medium-grained skeletal fragments in ?micritic matrix, partly replaced by chert; covered interval from 15 to 38 feet above base of unit	84	1,629
20	Unit 21 becomes very silty in lower 6 inches and grades downward to unit 20, which is sandstone: quartzose, slightly calcareous; medium brownish grey; very fine-grained; beds 6 inches to 1 foot thick; grades to non-calcareous, dark grey siltstone in part; weathers orange-brown to medium greyish brown; resistant	13	1,545
19	Covered	33	1,532
18	Limestone: cherty; dark grey; fine-grained; brecciated; one bed 17 feet thick; appears to be breccia, partly replaced by light grey chert which forms 40 per cent of rock; weathers light grey; massive	17	1,499
17	Mainly covered, recessive; rare outcrop of shale, carbonaceous?; very dark grey	97	1,482
16	Rubble of breccia, as in unit 18, with some poor, slumped outcrop; appears to be skeletal-micritic limestone replaced by chert and dolomite	90	1,385
15	Mainly dolomite: cherty; light greyish brown; finely crystalline; massive; grades to chert with dolomite crystals in about 20 per cent of outcrop; unit weathers light grey with orange-brown and medium brown areas; cliff-former	96	1,295

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
14	Covered	30	1,199
13	Appears to be replacement of a carbonate unit by very coarsely crystalline white calcite showing ghosts of bedding; weathers medium brownish grey to light yellowish brown; resistant	31	1,169
12	Dolomite: silty, calcareous; light to medium grey; finely crystalline to medium crystalline; beds 6 inches to 2 feet thick; silty laminae and lenses stand out on weathered surface and show poorly developed cross-lamination; weathers medium grey with yellowish brown stain; resistant	72	1,138
11	Carbonate? unit, replaced as in unit 13	22	1,066
10	Dolomite: as in unit 12, containing lenses of light to medium grey chert	127	1,044
9	Covered, non-recessive	70	917
8	Dolomite: cherty; medium grey; medium crystalline; beds 2 to 8 feet thick; 1/2- to 4-inch thick lenses of dark grey chert make up 10 per cent of outcrop; weathers light brownish grey	30	847
7	Dolomite, as in unit 8 from 810 to 817 feet, but no chert or quartz grains; from 803 to 810 feet, dolomite: dark grey, medium crystalline; from 770 to 803 feet, dolomite: slightly silty, light to medium grey, coarsely crystalline, one bed, rare lenses of chert up to 1 inch thick; unit is cliff-former; weathers medium grey; from 770 to 790 feet, lenses of dark grey chert, up to 2 inches thick, make up 40 per cent of outcrop	47	817
6	Covered, resistant	50	770
	Kayak Formation (720 feet thick)		
5	Covered, recessive; at 578 feet there is a 5-foot outcrop of limestone: micritic, dark grey, high in organic matter, beds 2 to 6 inches thick, weathers dark grey; covered interval appears to be underlain mainly by dark grey shale, judging by talus on slope (GSC locs. 53909, 53910 - talus)	405	720

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
4	Shale: silty; dark grey; weathers dark grey; recessive	5	315
3	Lensing bed, up to 5 feet thick, of conglomerate: quartz-pebble; medium grey, mottled with white; pebbles very angular, composed of white quartz, 1/8- to 1/2-inch maximum diameter; matrix of very coarse, angular quartz grains, cemented by silica; weathers light grey with orange stain; resistant	5	310
2	Shale: as in unit 4, with 1- to 6-inch thick beds of sandstone: quartzitic; medium grey; fine-grained; orange-brown weathering; resistant; makes up 10 per cent or less of outcrop, except from 273 to 281 feet, and from 187 to 207 feet, where it makes up 90 per cent of outcrop (coarse- to very coarse-grained from 187 to 207 feet; covered from 207 to 250 feet, and from 117 to 187 feet)	188	305
1	Sandstone: quartzitic; dark grey; coarse- to medium-grained; beds 6 inches to 3 feet thick; from 0 to 15 feet, very coarse-grained with scattered quartzite pebbles up to 2 inches maximum diameter; unit weathers medium to dark orange-brown; resistant; possibly represents Kekiktuk Fm.	117	117
	Unit 1 underlain with angular unconformity by quartzite, phyllite, and recrystallized limestone of Neruokpuk Formation; contact covered		

BARN MOUNTAINS SECTION (117A-15)

Located on southwest flank of Barn Mountains in headwaters of Black Fox Creek; 68°28 1/2'N, 138°25'W; aerial photograph A14406-33, west, south of center; section reconstructed from traverse, beginning at photo co-ordinates X=-4.9, Y=+7.3; and ending at photo co-ordinates X=-8.95, Y=+4.2. Measured by E.W. Bamber and W. Kisluk, July, 1962, through the Kayak Formation and Lisburne Group; covered intervals estimated in the field and measured from aerial photograph.

CARBONIFEROUS [Upper Visean-?lower Moscovian (upper Meramecian to ?Atokan)]

Lisburn Gp. (undivided) — (?)1,302 feet (incomplete and faulted)

Kayak Fm. — (?)1,299 feet (estimated in part)

(Angular unconformity)

(?)LOWER DEVONIAN AND OLDER

Neruokpuk Fm.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER AND UPPER CARBONIFEROUS		
	LISBURNE GROUP (undivided) (?1,302 feet thick, faulted)		
18	Limestone: skeletal-micritic and micritic-skeletal, dolomitic in part; chert lenses common; some dolomite beds present; interval weathers light grey; resistant; thickness estimated. Probable fault repeating section between units 17 and 18	400	3,001
17	Limestone: skeletal; dark grey; fine-grained; skeletal fragments and foraminifers in sparry cement and minor micrite matrix; beds 2 to 5 feet thick; abundant chert nodules and layers from 2,561 to 2,574 feet; unit weathers light to medium grey; resistant	40	2,601
16	Limestone: skeletal-micritic; medium grey; fine- to medium-grained; echinoderm, bryozoan and other skeletal fragments in micritic matrix; beds 6 inches to 3 feet thick, numerous lenses of medium grey chert up to 3 inches thick; weathers light grey; resistant	75	2,561
15	Covered, probably contains fault repeating section	1,182	2,486
14	Rubble of limestone: micritic-skeletal, dolomitic; light to medium grey; medium- to coarse-grained echinoderm and bryozoan fragments in micritic matrix with abundant finely crystalline to medium crystalline dolomite rhombs; thickness estimated	5	1,304
	LOWER CARBONIFEROUS		
	Kayak Formation (?1,299 feet thick, estimated in part)		
13	Covered	250	1,299
12	Mainly covered with some poor outcrops of dark grey, slightly silty shale	75	1,049
11	Sandstone, as in unit 9, with rare carbonaceous partings	7	974
10	Covered	350	967
9	Sandstone, as in unit 7; beds 2 inches to 1 foot thick; weathers dark grey with rusty brown patches; resistant	20	617

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
8	Covered	378	597
7	Rubble of sandstone: quartzose, slightly carbonaceous; light grey; fine-grained: rare carbonaceous partings; weathers light grey; resistant; thickness estimated	5	219
6	Covered	72	214
5	Sandstone: quartzose, carbonaceous; light grey with dark grey to black partings; fine-grained; beds 2 inches to 1 foot thick, separated by and containing abundant carbonaceous and argillaceous partings which make up 50 per cent of outcrop in lower 15 feet, and decrease upward to make up less than 5 per cent of outcrop in upper 20 feet; unit weathers medium to light grey; cliff-former	35	142
4	Covered, thickness estimated	50	107
3	Partly slumped outcrop of siltstone, grading to fine-grained sandstone: carbonaceous; dark grey; beds 2 to 4 inches thick; contains fossil ferns and lycopods; weathers dark brownish grey with dark reddish brown stain; resistant (GSC loc. 53878); contact with unit 2 not exposed	7	57
2	Mainly rubble-covered, only 3 feet of poorly exposed conglomerate: chert-pebble; light, medium and dark grey and light yellowish brown, angular to subrounded chert and quartz pebbles in clear quartz matrix; maximum diameter of pebbles up to 1 inch; unit weathers medium grey with orange-brown stain	40	50
1	Rubble of sandstone: carbonaceous; dark grey with white, irregular laminae; fine-grained, angular quartz and chert grains with abundant carbonaceous laminae; weathers medium grey; lower contact not exposed; thickness estimated	10	10

FIRTH RIVER SECTION (117B-3)

Located in British Mountains, on east side of Firth River, approximately 6 miles downstream from Yukon-Alaska boundary; 68°42'N, 140°50'W; aerial photograph A13138-137, west of center; base of section at photo co-ordinates X=-2.7, Y=+0.6; top of section at photo co-ordinates X=-2.4, Y=+0.2. Measured by A.W. Norris and D.L. Jordan, July, 1962, beginning with Kayak Formation at anticline axis at river level and extending into lower Lisburne Group (Alapah Formation).

LOWER CARBONIFEROUS [Middle-Upper Visean (Meramecian)]
Lisburne Gp. (Alapah Fm.) 756.1 feet (incomplete)
Kayak Fm. 640.8 feet (incomplete)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	LOWER CARBONIFEROUS		
	LISBURNE GROUP (Alapah Formation) (756.1 feet thick, incomplete)		
45	Limestone: skeletal-micritic, high in organic matter; fine- to medium-grained; echinoderm and other skeletal fragments in micritic matrix; beds thick; weathers light orange-brown; resistant (GSC loc. 54965)	22	1,396.9
44	Covered, recessive; possible fault at base of unit (GSC locs. 54961-talus, 54962, 54963, 54964)	221	1,374.9
43	Limestone: skeletal-micritic to micritic-skeletal, cherty; resistant; similar to that in unit 29 (GSC loc. 54959)	28	1,153.9
42	Limestone: skeletal-micritic to micritic-skeletal, cherty; similar to that in unit 29, but recessive, possibly with more organic matter; some dark grey, calcareous shale beds present	15	1,125.9
41	Limestone: micritic-skeletal; similar to that in unit 29, but more recessive, possibly with more organic matter	16	1,110.9
40	Limestone: micritic-skeletal to skeletal-micritic, similar to that in unit 29 (GSC locs. 54956, 54957, 54958)	50	1,094.9
39	Covered (GSC loc. 54955, talus)	22	1,044.9
38	Limestone: micritic-skeletal to skeletal-micritic, similar to that in unit 29 (GSC loc. 54683)	41	1,022.9
37	Shale: dark grey, poorly exposed	32	981.9

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
36	Limestone: micritic-skeletal to skeletal-micritic, similar to that in unit 29	4.5	949.9
35	Shale: very calcareous, grading to micritic limestone; dark grey; contains one bed of limestone: micritic skeletal, dark grey; recessive (GSC loc. 54677)	9.5	945.4
34	Limestone: micritic-skeletal to skeletal-micritic, similar to that in unit 29; interbedded with dark grey, calcareous shale	22.6	935.9
33	Shale: very calcareous; dark grey; contains rugose corals and bryozoans (GSC locs. 54953, 54954)	1.5	913.3
32	Limestone: micritic-skeletal to skeletal-micritic, similar to that in unit 29; lower 100 feet of unit contain thin beds of dark grey shale (GSC locs. 54951, 54952, 54680)	113.5	911.8
31	Shale: calcareous; dark grey; contains abundant organic matter; rare beds of medium brownish grey, micritic-skeletal limestone; poorly exposed (GSC loc. 54678)	22	798.3
30	Limestone: micritic, cherty; very dark grey; contains abundant disseminated organic matter and clay-size quartz; beds up to 4 feet thick; weathers very dark grey; interbedded with poorly exposed, dark grey, calcareous shale	6.5	776.3
29	Limestone: skeletal-micritic to micritic-skeletal, cherty; dark grey; medium- to coarse-grained; echinoderm, bryozoan, and brachiopod fragments in micritic matrix with organic matter disseminated and concentrated in irregular laminae; scattered silt grains; much chert replacement of fragments and matrix; some calcareous, dark grey shale beds that weather dark grey; limestone weathers pale orange; unit is cliff-former (GSC locs. 54292, 54975-talus, 54682-talus, 54684-talus, 54676, 54681)	129	769.8
	Kayak Formation (640.8 feet thick, incomplete)		
28	Covered, recessive	35	640.8
27	Shale: calcareous, high in organic matter; dark grey; thin irregular beds of micritic limestone; unit contains brachiopods, corals, bryozoans, and very numerous spiny echinoderm ossicles (GSC loc. 54295)	40	605.8

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
26	Shale: with thin beds of limestone, as in unit 27, but no spiny ossicles (GSC loc. 54294)	35	565.8
25	Shale: calcareous, high in organic matter; dark grey; contains thin, irregular beds of micritic, cherty limestone with abundant organic matter, clay-size quartz, and fossils (brachiopods, bryozoans, and echinoderm fragments) (GSC locs. 54297, 54293)	39	530.8
24	Shale: highly calcareous grading to micritic limestone, high in organic matter; dark grey; weathers dark grey (GSC loc. 54298)	9	491.8
23	Shale: calcareous, high in organic matter; dark grey; beds up to 4 feet thick; thin intervals of dark grey, micritic, cherty limestone	13	482.8
22	Interbedded shale and limestone, as in unit 25, in approximately equal proportions; moderately resistant	24	469.8
21	Shale: calcareous, high in organic matter; dark grey; contains thin beds of dark grey, micritic, cherty limestone, up to 4 inches thick; unit weathers dark grey; moderately resistant (GSC loc. 54302)	57	445.8
20	Mainly talus-covered; appears to be dark grey, calcareous shale high in organic matter, with thin beds of limestone similar to that in unit 19 (GSC loc. 54301)	22	388.8
19	Limestone: micritic, cherty; very dark grey; contains abundant disseminated organic matter and clay-size quartz; beds up to 4 feet thick; weathers very dark grey; interbeds of shale, calcareous, high in organic matter, black; shale recessive, weathers dark grey (GSC locs. 54299, 54300)	36.5	366.8
18	Interbedded limestone: skeletal-micritic, dark brownish grey; fine-grained; weathers dark grey; and shale: calcareous, high in organic matter; dark grey; weathers dark grey, recessive	28	330.3
17	Limestone: micritic-skeletal, cherty; dark grey; medium- to coarse-grained; bryozoan, brachiopod, and echinoderm fragments in micritic matrix with abundant organic matter; beds 4 to 5 feet thick; weathers dark grey; resistant (GSC loc. 54303)	9	302.3

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
16	Shale: calcareous, high in organic matter; dark grey; interbedded with skeletal-micritic limestone similar to that in unit 15, most abundant in lower 10 feet of unit; shale makes up most of unit	32	293.3
15	Limestone: skeletal-micritic; dark grey; abundant organic matter; weathers dark grey; resistant	5.5	261.3
14	Shale: very calcareous; dark grey; recessive	2.8	255.8
13	Shale: very calcareous; dark grey; weathers dark grey; moderately resistant	10	253
12	Shale: calcareous; dark grey; high in organic matter; weathers dark grey; from 50 to 70 feet above base of unit there are beds of very slightly calcareous shale, as in unit 11	78	243
11	Shale: very slightly calcareous; dark grey; high in organic matter; weathers dark grey	9	165
10	Shale: calcareous; dark grey; high in organic matter; weathers dark grey; recessive	10	156
9	Limestone: micritic-skeletal; dark grey; abundant organic matter; weathers dark grey; resistant	2.3	146
8	Shale: calcareous, as in unit 10	22.5	143.7
7	Shale: as in unit 10, in beds up to 4 feet thick; interbedded with dark grey; skeletal-micritic limestone, containing abundant organic matter (GSC loc. 54305)	40	121.2
6	Shale: calcareous; dark grey; high in organic matter; interbedded with dark grey, silty shale; unit weathers dark grey	33	81.3
5	Shale: calcareous; dark grey; high in organic matter; weathers dark grey	5.1	48.3
4	Limestone: micritic-skeletal; very dark grey; abundant organic matter; weathers dark grey	1.5	43.2
3	Shale: calcareous; dark grey; high in organic matter; weathers dark grey; recessive	3.2	41.7
2	Limestone, as in unit 4, possibly slumped from above	1.5	38.5
1	Covered, recessive (GSC loc. 54304, talus)	37	37

MALCOLM RIVER SECTION (117C-2)

Located in British Mountains, approximately 6 miles north of Malcolm River and 10 miles east of Yukon-Alaska boundary; 69°22 1/2'N, 140°36'W; aerial photograph A13231-63, south, east of center; base of section at photo co-ordinates X=+2.55, Y=-6.5; top of section at photo co-ordinates X=+3.15, Y=-6.7. Measured by E.W. Bamber and W.J.F. Clack, July, 1962, through uppermost Lisburne Group (upper Wahoo Formation) into lowermost undifferentiated ?Permian rocks (?Sadlerochit Formation).

?LOWER PERMIAN
Undifferentiated sandstone (?Sadlerochit Fm.) 10 feet (incomplete)
(Disconformity)

UPPER CARBONIFEROUS [upper Bashkirian-lower Moscovian (Atokan)]
Lisburne Gp. (Wahoo Fm.) 330 feet (incomplete)

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	PERMIAN		
	?Sadlerochit Formation (10 feet thick, incomplete)		
3	Rubble only of sandstone: quartzose; fine-grained; angular quartz grains with matrix of ?dolomite or ankerite; weathers orange-brown; basal contact covered	10	340
	UPPER CARBONIFEROUS		
	LISBURNE GROUP (Wahoo Formation) (330 feet thick; incomplete)		
2	Limestone: oolitic; medium grey; fine- to medium-grained skeletal fragments forming centers of oolites, numerous foraminifers, sparry cement; beds 1 to 3 feet thick; weathers light grey to light yellowish grey; resistant (GSC locs. 53898, 53899, C-2708)	20	330
1	Limestone: echinoderm-bryozoan; light to medium brownish grey; medium- to coarse-grained echinoderm, bryozoan and other skeletal fragments in sparry cement with numerous foraminifers; some beds contain euhedral quartz crystals; rare micritic fillings in skeletal fragments; numerous 2- to 5-foot thick beds of oolitic and skeletal-oolitic limestone present, chert lenses and irregular beds from 60 to 70 feet; beds 6 inches to 3 feet thick; unit weathers light brownish grey; resistant (GSC locs. 53900, 53901, 53902, 53903, C-2744, C-2709, C-2710)	310	310

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