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S.A. Gouwy, A.E.H. Pedder, T.T. Uyeno, and W.S. MacKenzie

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ABSTRACT

Five Devonian sections are described based on fieldwork in the northern part of the Mackenzie Mountains and Franklin Mountains by A.E.H. Pedder, T.T. Uyeno and W.S. MacKenzie in the early 1970's. The descriptions provide detailed information about the lithology and fossil content of Hume River section, Gayna River Gorge section, Powell Creek tributary section, Powell Creek (main) section and Prohibition Creek section.

RÉSUMÉ

Cinq sections du Dévonien sont décrites á base de travail de terrain par A.E.H. Pedder, T.T. Uyeno et W.S. MacKenzie dans la partie nord des Monts Mackenzie et Franklin au début des années 1970. Les descriptions fournissent des informations détaillées sur la lithologie et la teneur en fossiles des sections de Hume River, Gayna River Gorge, Powell Creek Tributaire, Powell Creek (principale) et Prohibition Creek.

Cover image: Helicopter view of Powell Creek, photo by A.E.H. Pedder; NRCan Photo DB 2021-027.

INTRODUCTION

In the late 1960's and early 1970's, the Geological Survey of Canada organized large field work campaigns in northern Canada. One of those campaigns in the region of the Mackenzie and Franklin Mountains of the Northwest Territories was Operation Norman (1968-1971) (Aitken et al., 1968, 1969). Researchers were in the field for several months during the summer to study and sample large areas of terrain, often in difficult circumstances. A small team working on Devonian deposits in the northern Mackenzie Mountains and the Mackenzie Plain consisting of W. MacKenzie (sedimentology) and A. Pedder (corals and brachiopods) was joined in the 1970's by T. Uyeno (conodonts). These researchers described and sampled dozens of sections. In those days, researchers carrying a firearm and ammunition to defend against wildlife, lived in small field camps moving from section to section by helicopter and located themselves by topographic map or air photos. Unfortunately, detailed descriptions of these Devonian sections were never published and most of the fieldnotes by MacKenzie are lost. Descriptions of five sections were preserved as paper copies in prepared manuscripts and although paleontological data was published on those sections, the detailed section descriptions never were. They are now made available to the public in a GSC Open File. Several publications were released in the past about these five sections. Conodont biostratigraphy of the two Powell Creek sections was initially discussed in an early paper by Uyeno (1978), extended in Muir (1988) and mentioned in McLean & Klapper (1998). A fieldexcursion guidebook (Lenz & Pedder, 1972) included the lithostratigraphic column of the Powell Creek main section based on MacKenzie's original section work. The Powell Creek sections were described from more recent observations in several NTGS Open Reports (Pyle & Gal, 2007, 2012; Pyle et al. 2011, 2014) and a GSC Open File (Kabanov et al., 2016). The biostratigraphy of the Hume type section was the topic of two more recent papers by Pedder (2017) and by Uyeno et al. (2017). The lithology of the Hume section, Gayna River Gorge and Prohibition Creek sections were described NTGS Open Reports by Pyle & Gal (2007, 2012, 2013) and Pyle et al. (2011, 2014), and partly in Kabanov et al. (2019).

GEOLOGICAL SETTING AND LOCATION OF THE SECTIONS

The described sections are situated at the northern margin of the Mackenzie Mountains (Hume, Gayna River Gorge and Powell Creek sections) and the western margin of the Franklin Mountains (Prohibition Creek) (Figure 1). This area was part of a shallow-water shelf sytem called the Mackenzie Platform that persisted from the Cambrian-Early Ordovician until the Eifelian (Middle Devonian) when the calcareous

Hume platform was drowned and covered by the mainly siliceous deposits of the Hare Indian Formation (Morrow, 2012, 2018). In the Middle Devonian, this Mackenzie Platform was part of the continental margin of western Canada and situated in the Northern Hemisphere, close to the equator (Figure 1C, red star).

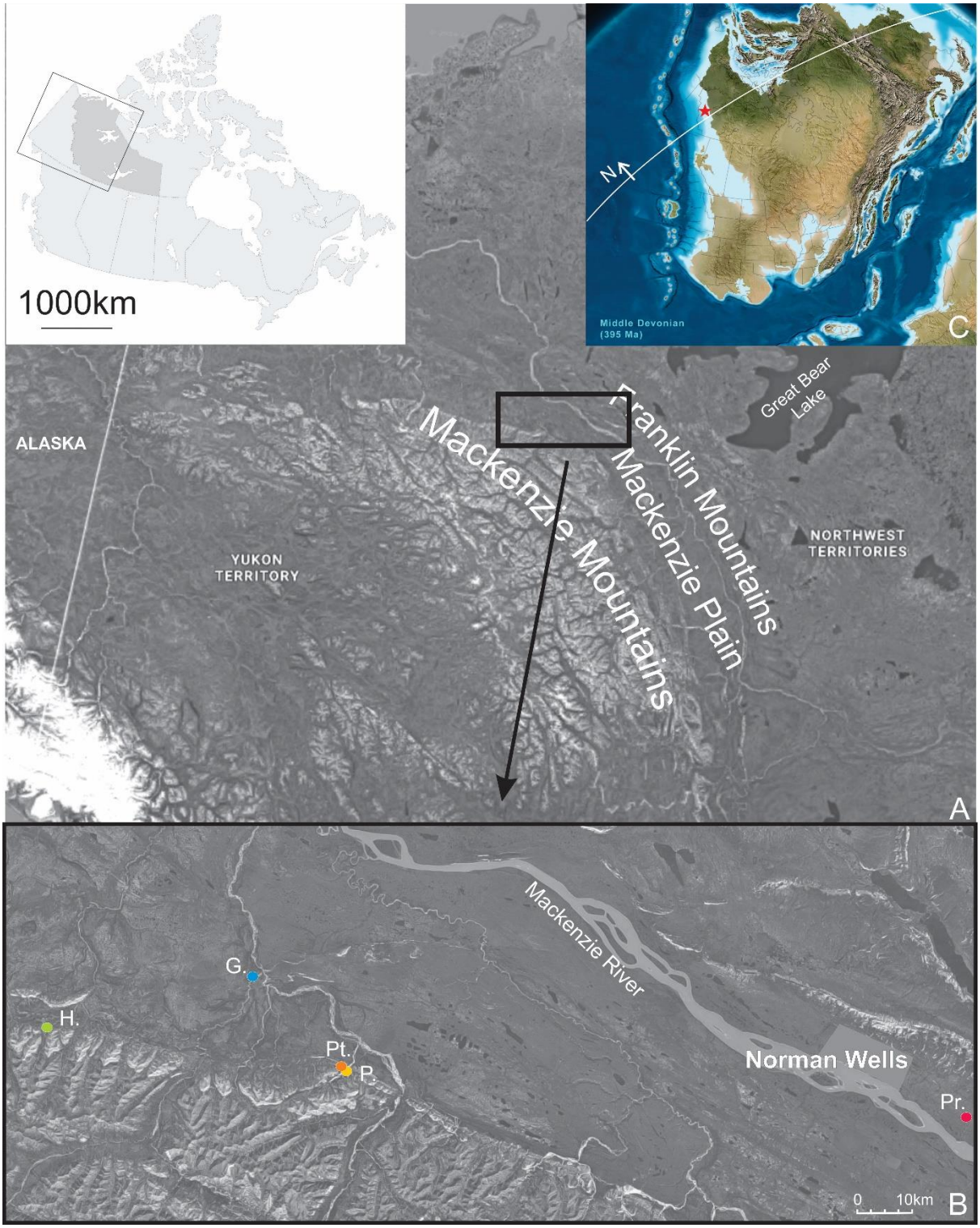


Figure 1. A: Location of the study area (black rectangle) in the Mackenzie Mountains and Franklin Mountains in the northwestern part of Canada (inset shows the area covered by A in the black square), modified from Google Maps; B: Location of the five sections in the study area modified from Google maps; C: location of the study area in a Middle Devonian paleogeographic reconstruction of North America, red star indicates study area; white line is the equator (courtesy of Colora do Plateau Geosystems Inc.) Abbreviations: H.: Hume River section; G.: Gayna River Gorge section; Pt: Powell Creek Tributary section; P.: Powell Creek section; Pr.: Prohibition Creek section.

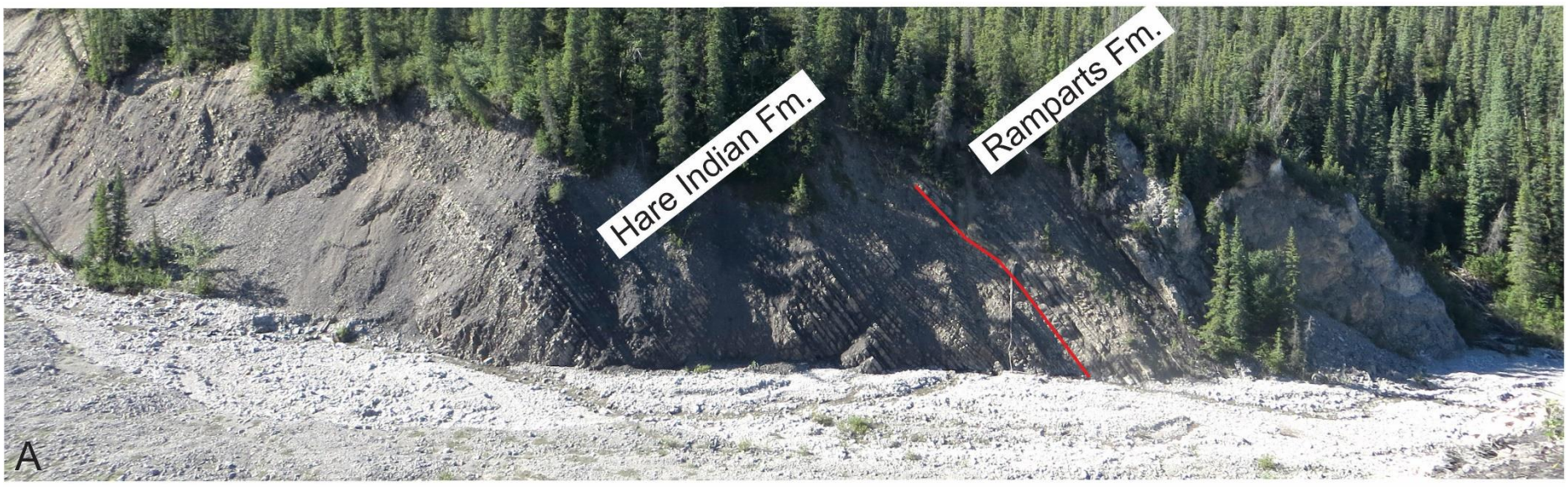
Four of the sections (Hume type section, Powell Creek main section, Gayna River Gorge and Prohibition Creek section) cut through the entire Hume Formation and also show its contact with the overlying Hare Indian Formation (Figs. 2D-2F, 3C). The Powell Creek Tributary section (Figs 2A, 2C) is situated west of the main section and exposes the top of the Hume Formation, the entire Hare Indian Formation (exept for a small covered interval) and the lower part of the Ramparts Formation. The Powell Creek main section (Figs. 2B, 3A, 3B, 3D) is an almost continuous rock exposure from the lower part of the Early Devonian Bear Rock Formation up to the lower half of the Late Devonian Imperial Formation (Imperial part not completely shown in Figure 4).

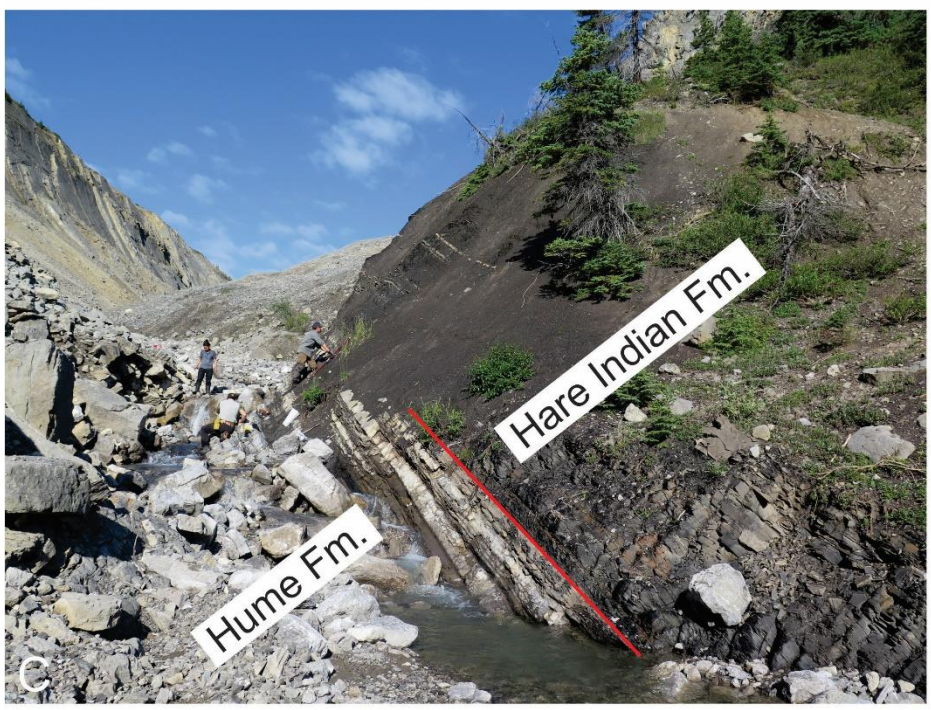
DESCRIPTION OF THE SECTIONS

The following section descriptions contain the unaltered text written by W. MacKenzie based on his field notes. Publication of these original observations allows the research community access to what was used as a basis of many of MacKenzie's, Pedder's and Uyeno's later publications and puts their fossil collections and biostratigraphic data into a stratigraphic context. Original megafossil identifications were by A.E.H. Pedder, conodont identifications were by T.T. Uyeno. In the Powell Creek sections, thin section descriptions (T.S.) were done by W. MacKenzie. Some fossil identifications remain as they were in descriptions composed in late 1968 and the 1970's. However many of the megafossils are updated in light of publications by Caldwell (1968), Johnson & Norris (1972), Gratsianova (1974), McLean (1976), Copper (1978) (especially important for revised names of *Atrypa*-like brachiopods) Sartenaer (1987) (important for many of the *Leiorhynchus* to *Eliorhynchus* changes), Pedder (2017, 2019). Conodont identifications were updated by S. Gouwy to the current taxonomy, partly based on publications by Uyeno (1978, 1991) and Uyeno & Mason (1975) that include samples from these sections.

Some of the formation names used in the original text are now obsolete or no longer used in the study area (e.g. Gossage Formation, Ronning Formation), but are shown next to the current formation names in Figure 4, that shows the lithological columns based on the provided descriptions. The Gossage Formation is here replaced by the Landry and/or Arnica formations. Strata from the Ronning Formation have been reassigned to the Mount Kindle Formation in the Powell Creek section. In the description of the Powell Creek tributary section, the "spore bearing member" is mentioned. This spore-bearing member (Tassonyi, 1969) was a black calcareous shale unit with calcareous nodules, fibrous calcite beds and an abundance of algal spore cases (MacKenzie, 1974). This unit was later named the Bluefish Member. In the original MacKenzie description of the Powell Creek section, the "Allochthonous beds" are not included in the Ramparts or Canol formations but form a separate unit. Although most authors now consider those as part of the Ramparts Formation, a discussion on whether those beds best belong in the Ramparts or Canol formations is still ongoing (Kabanov and Gouwy, 2021).

In some of the sections, formational contacts were reinterpreted/moved in recent publications (right column of the formation names). The term Bear Rock Formation is used here instead of Bear Rock Assemblage (Gouwy et al. 2017), following the terminology in the used literature and the clear distinction that can be made in these sections between the Bear Rock and Landry Formations; although in the Powell Creek main section there seems to be uncertainty on where to put the top of the Bear Rock Formation (Figure 4) based on brecciated zones within the brownish-grey dolostone.





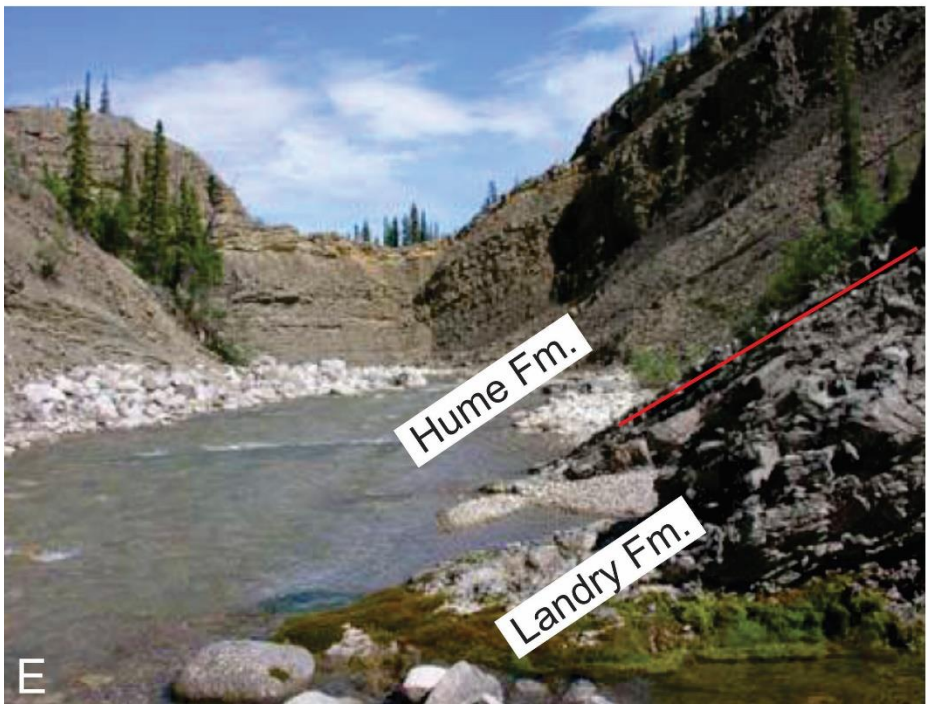
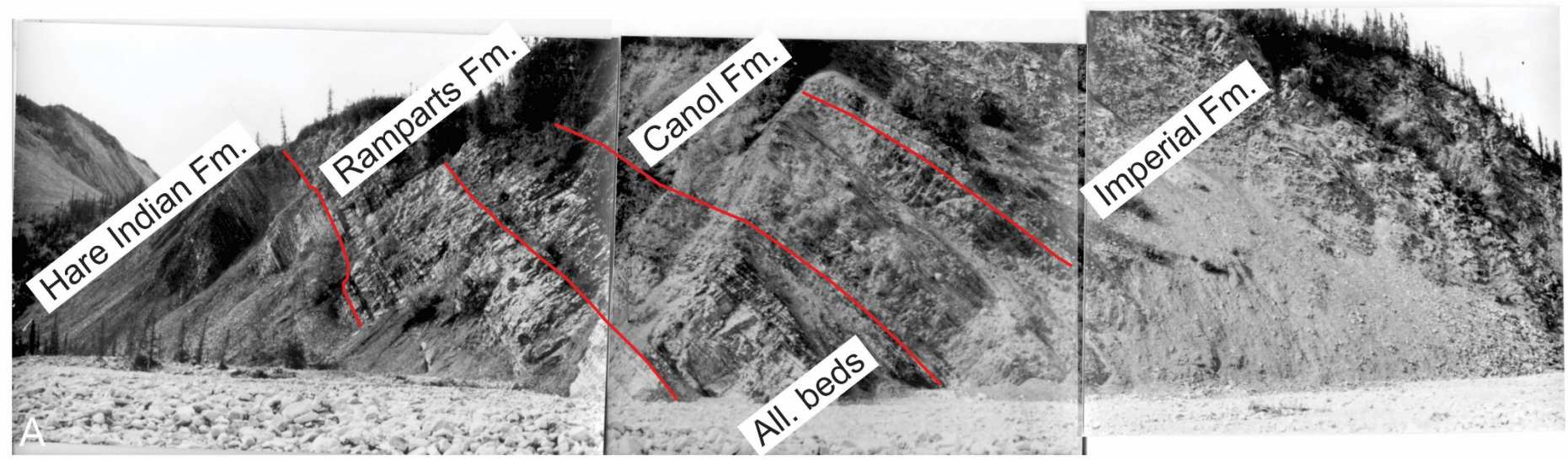
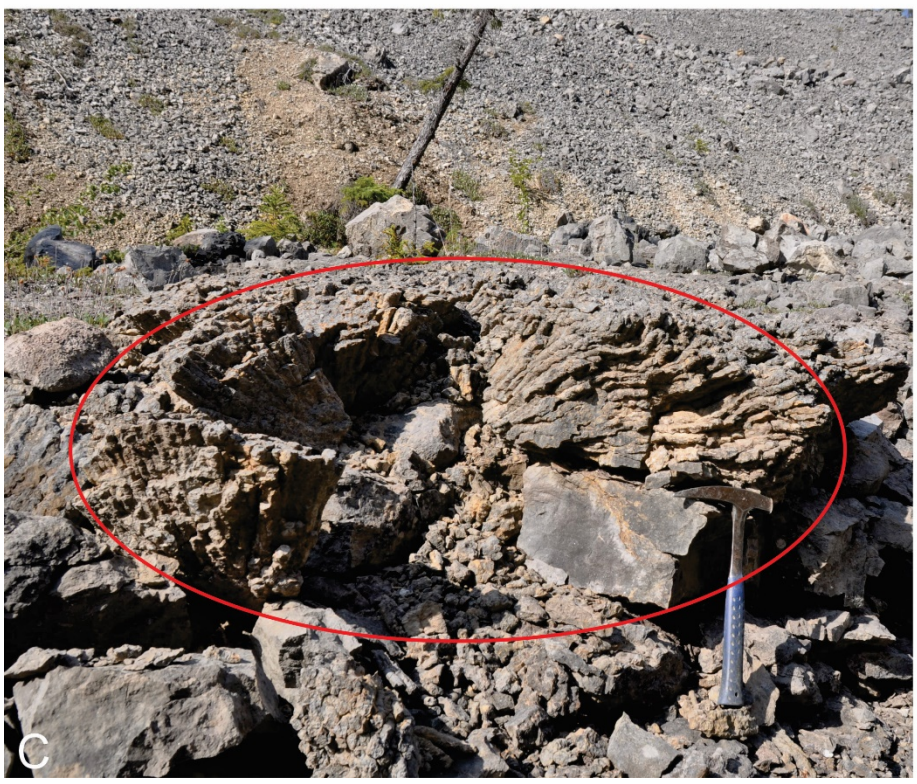


Figure 2. Illustrations of the described sections. A: Powell Creek Tributary section at the Hare Indian-Ramparts formational contact (photo courtesy of P. Kabanov), NRCan Photo DB 2021-028; B: detail of the Bear Rock breccia at Powell Creek (photo A.E.H. Pedder), hammer for scale, NRCan Photo DB 2021-029; C: Powell Creek Tributary section at the Hume-Hare Indian formational contact (photo S. Gouwy), NRCan Photo DB 2021-030; D: Prohibition Creek section showing the thick-bedded limestone cliffs on top of thin-bedded limestone (arrow) at the rapids at about60 m below the top of the Hume Formation (photo S. Gouwy) NRCan Photo DB 2021-031; E: Hume type section showing the top of the Landry Formation and lower part of the Hume Formation (photo L. Pyle, NTGS permission to reproduce); F: Hume type section showing the upper 50 m of the Hume Formation (photo L. Pyle, NTGS permission to reproduce).





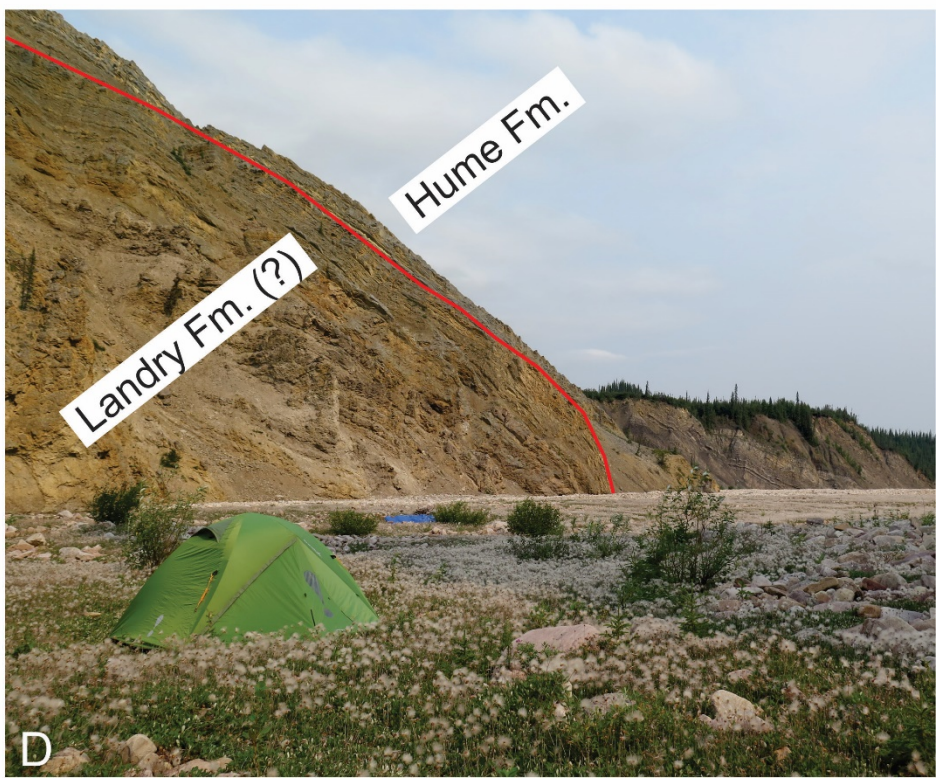


Figure 3. Illustrations of the described sections. A-B. part of the Powell Creek section in 1971, with formations contacts based on the description given below (photo T. T. Uyeno) NRCan Photo DB 2021-032A-F; C: large fossil coral (within red oval) in the Hume Formation at Prohibition Creek (photo courtesy of P. Kabanov), hammer for scale NRCan Photo DB 2021-033; D: View on the Powell Creek section from the Landry Formation (left) to the Imperial Formation (right) (photo S. Gouwy) NRCan Photo DB 2021-034 .

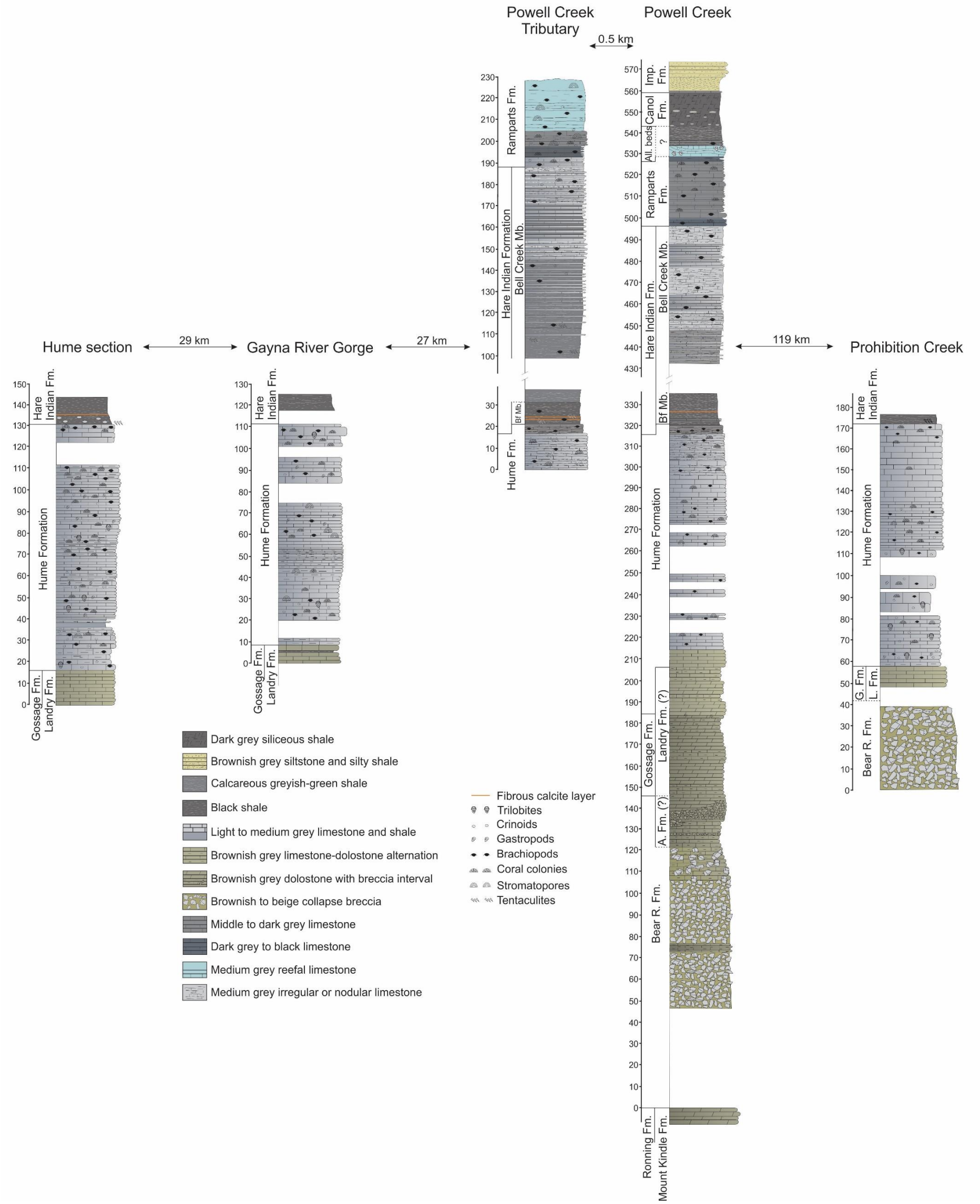


Figure 4. Lithostratigraphic logs of the described sections. Where two formation names are shown for an interval, the name on the right is the current terminology, the name on the left i s obsolete terminology used by WSM in original field notes. Thickness is indicated in meters. For locations, see Figure 1. G. Fm.: Gossage Formation; L. Fm.: Landry Formation; A. Fm.: Arnica Formation; Bf. Mb.: Bluefish Member; All. Beds: Allochthonous beds; Imp. Fm. Imperial Formation.

HUME RIVER SECTION
(Type locality of Hume Formation)

65°20'N, 129°59'W; NTS 106-H

Section Ref. MN-8-72

Three small streams flowing northeast join Hume River at about the same place, where they leave the Mackenzie Mountain front. The name Hume Formation was proposed by Bassett (1961) for a series of limestones and interbedded shales that on the east bank of Hume River (the middle stream, about 5 miles (8 km) upstream from the common junction) that overlie the Gossage Formation and is overlain by the Hare Indian Formation. The strata are almost completely exposed and easily accessible by helicopter.

Based on current topographic maps this section is situated on a tributary of the Hume River (in contrast to along the Hume River in MacKenzie's original description above) and the coordinates give the approximate location of the base of the section.

Section measured by W. S. MacKenzie, T. T. Uyeno, and A. E. H. Pedder, August, 1972.

MIDDLE AND LOWER DEVONIAN

Hare Indian Formation	44 feet (incomplete) (13.4 m)
Hume Formation	376 feet (114.6 m)
Gossage Formation	51 feet (incomplete) (15.5 m)

Unit	Description	Thickness of unit feet	Thickness from base feet (m)
	HARE INDIAN FORMATION		
30	Shale, dark grey, sericitic, soft, in part fissile; weathers dark grey, recessive	30	471 (143.6)
29	Shale, dark grey and almost black, fissile, thin interbeds of dark grey argillaceous limestone, scattered small concretions, styliolinids and tentaculitids common near base of unit, 2-inch bed of fibrous calcite at top	14	441 (134.4)
	HUME FORMATION		
28	Limestone, dark grey, finely crystalline, argillaceous, intermittent partings of dark grey calcareous shale, estimate about 30 per cent of unit composed of well preserved brachiopods; weathers recessive Fossil collection (GSC Loc. C-24674) from talus in upper 14 feet of Hume Formation; *Disphyllum* sp. , *Moravophyllum mcfarlanei* (Meek), *Zonophyllum petilum* McLean, *Digonophyllum powellense* McLean, *Mesophyllum rectum* (Meek), chonetid brachiopod indet., *Spinulicosta stainbrooki* Crickmay , rhynchonellid? brachiopod, *Spinatrypa* (*Isospinatrypa*) *borealis* (Warren). Age: Eifelian Fossil collection (GSC Loc. C-24671) from lower 1 foot of unit; *Eliorhynchus castanea* (Meek), *Variatrypa* sp . Age: Eifelian, *castanea* brachiopod assemblage	1.5	427 (130.1)

27	Limestone, dark grey to almost black, finely crystalline, strongly argillaceous, contains abundant finely broken skeletal remains of ostracods , brachiopods, crinoids and corals; occurs in thin nodular beds, weathers dark grey, resistant Fossil collection (GSC Loc. C-24670) from upper 1/2 foot of unit; *Eliorhynchus castanea* (Meek). Age: Eifelian, *castanea* brachiopod assemblage Fossil collection (GSC Loc. C-24669) from 4 to 5 feet above base of unit; *Favosites* sp., *Thamnopora* sp., *Caliapora* sp., *Radiastraea* sp. nov., *Spinatrypa* (*Isospinatrypa*) *borealis* (Warren). Age: Eifelian Fossil collection (GSC Loc. C-24668) from upper 3 feet of unit 26 and lower 4 feet of unit 27; *Favosites* sp., *Radiastraea verrilli* (Meek) broad sense, solitary coral not studied, stringophyllid coral undet., *Mesophyllum* sp., *Spinulicosta stainbrooki* Crickmay. Age: Eifelian	5.5	425.5 (129.7)
26	Limestone, dark grey, argillaceous, occurs as thin nodular beds intermittently exposed, mainly in upper part of unit, weathers recessive	20	420 (128)
25	Covered interval	35	400 (121.9)
24	Limestone, dark brown-grey, finely crystalline argillaceous; contains an estimated 20 per cent of finely broken skeletal remains, mainly unidentifiable, abundant brachiopods and large colonial corals throughout unit; occurs in beds about 4 inches thick; weathers light grey, resistant Fossil collection (GSC Loc. C-24665) from 3 to 8 feet below top of unit; *Favosites* sp., *Caliapora* sp., *Radiastraea verrilli* (Meek) broad sense, *Utaratuia* sp. nov., *Sociophyllum glomerulatum* (Crickmay), *S.* sp. nov. , *Aphroidophyllum meeki* Pedder, *Mesophyllum* sp., "*Plasmophyllum*" sensu Birenheide 1964, chonetid brachiopod indet., *Variatrypa* (*Variatrypa*) *arctica* (Warren). Age: Eifelian, probably *dysmorphostrota* brachiopod assemblage Fossil collection (GSC Loc. C-24664) from 14 to 20 feet above base of unit; *Favosites* sp., *Thamnopora* sp., *Caliapora* sp. , *Syringopora* sp., *Disphyllum* sp., *Radiastraea* sp. nov., *Exilifrons* sp. tending towards *Utaratuia* sp., *Moravophyllum mcfarlanei* (Meek), *Sociophyllum glomerulatum* (Crickmay) , *Redstonea* sp., *Aphroidophyllum* sp. cf. *A. howelli* Lenz, stropheodontid brachiopod indet., *Schizophoria* sp., *Spinulicosta stainbrooki* Crickmay, *Spinatrypa* (*Isospinatrypa*) *borealis* (Warren), *Carinatrypa dysmorphostrota* (Crickmay). Age: Eifelian, *dysmorphostrota* brachiopod assemblage Fossil collection (GSC Loc. C-24662) from 10 to 14 feet above base of unit; *Syringopora* sp., *Exilifrons*? sp. nov. , *Moravophyllum*? sp., *Stringophyllum*? sp., *Redstonea sperabilis* (Crickmay), *Gansuastraea norrisi* (*Pedder*), *Mackenziephyllum insolitum* Pedder small form, *Variatrypa* (*Variatrypa*) *aperanta* (Crickmay), *Carinatrypa dysmorphostrota* (Crickmay), *Dechenella* sp. Age: Eifelian, *dysmorphostrota* brachiopod assemblage Fossil collection (GSC Loc. C-24661) from 6 to 10 feet above base of unit; *Favosites* sp., *Caliapora* sp., *Radiastraea verrilli* (Meek) broad		

	sense, *R*. sp. nov., stringophyllid coral indet., *Aphroidophyllum meeki* Pedder, *A.* sp. nov. cf. *A. howelli* Lenz, *Mesophyllum* sp., "*Schuchertella*" sp., *Carinatrypa dysmorphostrota* (Crickmay), *Undispirifer* sp. Age: Eifelian, *dysmorphostrota* brachiopod assemblage Fossil collection (GSC Loc. C-24660) from 1 to 5 feet above base of unit; *Caliapora* sp., *Radiastraea verrilli* (Meek) broad sense, *Stringophyllum* sp., *Sociophyllum glomerulatum* (Crickmay) small form, *Aphroidophyllum meeki* Pedder, *Mesophyllum* sp., *Variatrypa* (*Variatrypa*) *arctica* (Warren), *Spinatrypa*? sp., *Undispirifer compactus* (Meek). Age: Eifelian	28	365 (111.3)
23	Limestone, medium brown-grey, finely crystalline, partly medium grained texture, scattered remains of crinoids, brachiopods and unidentifiable broken fossil fragments, many colonial corals; occurs in beds about one foot thick, weathers light grey, resistant Fossil collection (GSC Loc. C-24658) from lower 1 foot of unit 24 and upper 9 feet of unit 23; *Favosites* sp., *Caliapora* sp., *Radiastraea verrilli* (Meek) broad sense, *R*. sp. nov., *Sociophyllum glomerulatum* (Crickmay), *Aphroidophyllum meeki* Pedder, *Mesophyllum* sp. , Chonetid brachiopod indet., *Spinatrypa*? sp., trilobite pygidium. Age: Eifelian Fossil collection (GSC Loc. C-24656) from 1 to 11 feet above base of unit; *Favosites* sp., *Syringopora* sp., *Radiastraea verrilli* (Meek), broad sense, *Microplasma caespitosum* (Schlüter). Age: Eifelian	20	337 (102.7)
22	Limestone, dark brown-grey, finely crystalline, slightly argillaceous, abundant finely broken fossil remains, gastropods, brachiopods, crinoids and corals; occurs as alternating thick massive beds and thin rubbly; weathers light grey, resistant Fossil collection (GSC Loc. C-24655) from lower 1 foot of unit 23 and upper 9 feet of unit 22; *Favosites* sp., *Argutastrea* sp., *Exilifrons* sp. , solitary coral not studied, *Variatrypa* (*Variatrypa*) *arctica* (Warren). Age: Eifelian Fossil collection (GSC Loc. C-24653) from 1 to 11 feet above base of unit; *Radiastraea* sp. nov., *Mesophyllum* sp.	20	317 (96.6)
21	Limestone, dark grey, finely crystalline, argillaceous, with abundant fossil remains; occurs in alternating thick massive and thin rubbly beds; weathers light grey, resistant	16	297 (90.5)
20	Limestone, dark grey-brown, finely crystalline, strongly argillaceous, consists of about 4 per cent finely broken fossil remains of brachiopods, gastropods, corals, and trilobites, fine calcite-filled fractures; occurs in thin beds; weathers medium grey, recessive Fossil collection (GSC Loc. C-23977) from top of unit; *Humeia merga* Ormiston	12	281 (85.6)
19	Limestone, medium grey, finely crystalline, argillaceous, made up largely of broken fossil remains of gastropods, brachiopods, corals and trilobites, a little finely disseminated pyrite, occurs in thin hackly beds, weathers light grey, recessive		

	Fossil collection (GSC Loc. C-24650) from 19 to 23 feet above base of unit; stromatoporoid not studied, *Caliapora* sp., *Syringopora* sp. , *Argutastrea* sp. cf. *A. gemmifera* (Crickmay), *Radiastraea* spp. nov., *Utaratuia laevigata* Crickmay, *Tawuphyllum hesperium* (Crickmay), cf. *Psydracophyllum* sp., *Mackenziephyllum profundum* Pedder, *Microplasma caespitosum* (Schlüter). Age: Eifelian Fossil collection (GSC Loc. C-24648) from 4 to 9 feet above base of unit; *Favosites* sp., *Alveolites* sp., *Radiastraea* sp. nov., *Exilifrons* sp. nov., *Utaratuia laevigata* Crickmay, *Microplasma caespitosum* (Schlüter). Age: Eifelian	23	269 (81.9)
18	Limestone, dark grey-black, finely crystalline, strongly argillaceous, with abundant broken unidentifiable skeletal remains, scattered brachiopods, large solitary corals at base of unit; occurs in thin nodular beds, weathers medium grey, recessive Fossil collection (GSC Loc. C-24647) from upper 10 feet of unit; *Favosites* sp., *Thamnopora* sp., *Caliapora* sp., *Syringopora* sp., *Disphyllum* sp., *Exilifrons* sp. nov., *Utaratuia acupicta* Crickmay, *Gaynaphyllum hyperbolicum* (Crickmay), atrypid brachiopod indet. Age: Eifelian Fossil collection (GSC Loc. C-24645) from 10 to 13 feet below top of unit; *Sociophyllum glomerulatum* (Crickmay). Age: Eifelian Fossil collection (GSC Loc. C-24644) from 6 to 7 feet above base of unit. *Exilifrons* sp. nov., *Utaratuia* sp. cf. *U. acupicta* Crickmay	28	246 (74.9)
17	Limestone, medium brown, finely crystalline, with scattered irregularly shaped eyes of sparry calcite, traces of finely comminuted skeletal debris, a little very fine quartz silt; occurs in a single bed; weathers light grey, resistant	4	218 (66.4)
16	Limestone, dark grey-black, finely crystalline, strongly argillaceous and slightly silty, very fine quartz grains; contains abundant finely broken skeletal debris of ostracods, brachiopods and crinoids, occurs in thin beds, weathers medium grey, recessive	14	214 (65.2)
15	Limestone, dark grey-black, finely crystalline, argillaceous and silty; contains an estimated 40 per cent of broken fossil remains, mainly of gastropods and brachiopods, some crinoids, abundant large solitary and colonial corals; weathers medium grey, moderately resistant Fossil collection (GSC Loc. C-24642) from 5 to 9 feet below top of unit; *Favosites* sp., *Syringopora* sp., *Radiastraea* sp. nov., *Taimyrophyllum stirps* (Crickmay) subsp. nov. Age: Eifelian Fossil collection (GSC Loc. C-24640) from 10 to 11 feet above base of unit; *Microplasma caespitosum* (Schlüter) Fossil collection (GSC Loc. C-24639) from 4 to 10 feet above base of unit; *Favosites* sp., gen. and sp. nov. derived from *Kozlowiaphyllum* sp., *Sociophyllum glomerulatum* (Crickmay), *Mesophyllum* sp., *Microplasma hadron* McLean. Age: Eifelian	25	200 (60.9)
14	Limestone dark grey-black, finely argillaceous, slightly silty, partly dolomitized, fossil fragments fairly abundant, corals, gastropods,		

	brachiopods, trilobites; occurs in thin nodular beds; weathers grey, recessive	18	175 (53.3)
13	Limestone, dark brown-black, finely crystalline, argillaceous, with abundant finely comminuted fossil remains, trace of fine quartz silt, corals, brachiopods and trilobites visible on weathered surfaces, occurs in beds 1 to 2 inches thick, weathers medium grey, recessive Fossil collection (GSC Loc. C-24637) from 1 to 2 feet below top of unit; *Caliapora* sp., *Spinulicosta*? sp. Fossil collection (GSC Loc. C-24635) from 2 feet above base of unit; coral possibly a polycoeliid gen., illustrated in Pedder (2017) text-fig. 4A-C, F, other solitary corals not studied, trilobite fragments. Age: Eifelian	10	157 (47.8)
12	Limestone, dark brown, finely crystalline, slightly silty, made up of about 40 per cent fossil fragments, ostracods, brachiopods, crinoids, trilobites; large coral colonies conspicuous in outcrop, forms a single bed, weathers light grey, resistant Fossil collection (GSC Loc. C-24634) from lower 1 foot of unit 13 and upper 1 foot of unit 12; *Caliapora* sp., *Radiastraea* sp. nov. , *Mesophyllum* sp.	2	147 (44.8)
11	Limestone, dark grey, finely crystalline, argillaceous, abundant gastropods, brachiopods and crinoids as tracings on weathered surfaces, rock consists of about 40 per cent fossil remains, unit made up of alternating beds of fossiliferous mudstone about 3 inches thick and thin beds of calcareous shale, weathers grey, recessive	14	145 (44.2)
10	Shale, grey-green, calcareous, silty; weathers pale grey, recessive	11	131 (39.9)
9	Limestone, light grey, coarsely crystalline, consists of about 70 per cent fossil fragments, mainly brachiopods and crinoids in partly dolomitized finely crystalline matrix; occurs in thin beds with interbedded grey-green calcareous shale, weathers light grey, recessive Fossil collection (GSC Loc. C-24631) from 7 to 15 feet above base of unit; stromatoporoid not studied, *Aulopora* sp., *Gansunstraea* sp., *Radiastraea trichomisca* (Crickmay), *Devonodiscus multiradiatus* (Meek), *Hederella* sp., *Eoschuchertella adoceta* (Crickmay), *Variatrypa* sp. nov., *Desquamatia (Independatrypa) aperanta* (Crickmay), *Undispirifer* sp. , bivalve fragments, trilobite pygidium, *Spirorbis* sp. Age: Eifelian, *adoceta* brachiopod assemblage	26	120 (36.6)
8	Limestone, medium grey, fine and medium crystalline, slightly argillaceous, abundant fossil remains, occurs in thin nodular beds, weathers grey, resistant Fossil collection (GSC Loc. C-24630) from upper 3 feet of unit; *Favosites* sp., *Caliapora* sp., *Syringopora* sp., *Radiastraea* sp. nov. cf. *R. trichomisca* (Crickmay), *R*. sp. nov. , *Mesophyllum* sp., coral possibly a polycoeliid, gen., *Variatrypa* sp. nov., *Desquamatia (Independatrypa) aperanta* (Crickmay). Age: Eifelian	4	94 (28.6)
7	Limestone, light grey-green, finely crystalline, slightly silty, strongly pyritized along bedding planes, abundant skeketal remains, mainly		

	brachiopods and crinoids; unit consists of about 50 per cent medium grey calcareous shale interbeds, weathers grey, recessive Fossil collection (GSC Loc. C-24628) from lower 1 foot of unit 8 and upper 4 feet of unit 7; *Favosites* sp., *Caliapora* sp. , *Taimyrophyllum* sp. nov. cf. *T. vescibalteatum* Pedder, *Variatrypa* sp. nov., trilobite fragments. Age: Eifelian	10	90 (27.4)
6	Limestone, medium grey, finely crystalline, with abundant fossil remains, many brachiopods on weathered surfaces, occurs in beds, thin shale partings, weathers grey, recessive Fossil collection (GSC Loc. C-24627) from lower 1 foot of unit 7 and upper 3 feet of unit 6; *Caliapora* sp., *Eoschuchertella adoceta* (Crickmay), *Desquamatia* (*Independatrypa*) *aperanta* (Crickmay), *Dechenella* sp. Age: Eifelian, *adoceta* brachiopod assemblage	8	80 (24.4)
5	Limestone, light grey, finely crystalline, slightly silty; contains abundant small brachiopods as in unit 6, many interbeds of brown-grey calcareous shale, weathers grey, recessive Fossil collection (GSC Loc. C-24625) from14 feet above base of unit; *Eoschuchertella adoceta* (Crickmay), bivalve undet. Age: Eifelian, *adoceta* brachiopod assemblage	19	72 (21.9)
4	Limestone, medium and light grey, fine and medium crystalline, in part fine grained, numerous fossil remains, brachiopods, crinoids, trilobites, weathered light grey, moderately resistant	2	53 (16.2)
	GOSSAGE FORMATION		
3	Limestone, dark brown, fine and microcrystalline, with finely disseminated pyrite, occurs in thin beds with interbeds of brown-black shale, weathers grey, resistant	27	51 (15.5)
2	Limestone, medium brown, microcrystalline, numerous irregularly shaped eyes of coarsely crystalline calcite, a few small broken ostracod shells, weathers light grey, resistant	3	24 (7.3)
1	Limestone, medium brown, microcrystalline, slightly argillaceous, traces of finely broken ostracod shells, occurs in beds about 1 foot thick, weathers light grey, resistant	21	21 (6.4)

GAYNA RIVER GORGE SECTION
65°24'45"N, 129°11'W; NTS 106-H

Section Ref. MN-5-72

The upper part of the Gossage Formation, 337 feet (102 m) of Hume Formation, and a few feet of overlying Hare Indian Formation beds are almost continuously exposed along the west side of Gayna River about 2 miles (3.2 km) upstream from its junction with Mountain River.

Thin nodular and rubbly recessive-weathering beds and relatively thick frequently cliff-forming strata, characteristic of the lower and upper parts of the sequence respectively, provide a two-fold division of the Hume Formation at this locality.

Section measured by W. S. MacKenzie, T. T. Uyeno, and A. E. H. Pedder, August 3rd, 1972.

MIDDLE and LOWER DEVONIAN

Hare Indian Formation	42 feet (incomplete) (12.8 m)
Hume Formation	337 feet (102.7 m)
Gossage Formation	30 feet (incomplete) (9.1 m)

Unit	Description	Thickness of unit feet	Thickness from base feet (m)
	HARE INDIAN FORMATION		
23	Shale, black, fissile, slightly calcareous, weathers recessive	20	409 (124.6)
22	Talus-covered interval	22	389 (118.6)
	HUME FORMATION		
21	Partly covered interval, scattered outcrops of limestone, dark grey, finely crystalline, argillaceous, weathers grey, recessive Fossil collection (GSC Loc. C-25838) from upper 8 feet of unit; *Aulocaulis* sp., *Radiastraea verrilli* (Meek) broad sense, *R*. sp. nov., *Devonodiscus latisubex* Pedder, *Digonophyllum powellense* McLean, bryozoan not studied, *Spinulicosta stainbrooki* Crickmay, rhynchonelloid brachiopod or *Atribonium* sp., *Variatrypa* (*Variatrypa*) *arctica* (Warren), *Humea merga* Ormiston. Age: Eifelian, probably *dysmorphostrota* brachiopod assemblage	8	367 (111.8)
20	Limestone, dark grey-brown, fine and microcrystalline, argillaceous, composed largely of finely comminuted fossil fragments mainly unidentifiable, occurs in thick grey-weathering beds, resistant Fossil collection (GSC Loc. C-25836) from upper 5 feet of unit; *Thamnopora* sp., *Caliapora* sp., *Chostophyllum coniculus* Pedder, *Disphyllum*? sp., *Radiastraea* sp. nov. , *Sociophyllum glomerulatum* (Crickmay), *Carinatrypa dysmorphostrota* (Crickmay) , *Spinatrypa* (*Isospinatrypa*) *borealis* (Warren), *Variatrypa (Variatrypa) arctica* (Warren), trilobite pygidium. Age: Eifelian, *dysmorphostrota* brachiopod assemblage Fossil collection (GSC Loc. C-25834) from 16 to 21 feet above base of unit; *Favosites* sp., *Moravophyllum mcfarlanei* (Meek)? not		

	sectioned, *Chostophyllum coniculus* Pedder, *Exilifrons* sp., *Radiastraea verrilli* (Meek) broad sense, *Carinatrypa dysmorphostrota* (Crickmay) , *Spinatrypa* (Isospinatrypa) *borealis* (Warren), *Variatrypa* (*Variatrypa*) *arctica* (Warren). Age: Eifelian, *dysmorphostrota* brachiopod assemblage Fossil collection (GSC Loc. C-25832) from 11 to 16 feet above base of unit; *Favosites* sp., *Alveolites* sp., *Caliapora* sp., *Radiastraea verrilli* (Meek) broad sense, *Moravophyllum mcfarlanei* (Meek)? not sectioned, *Minussiella* sp., *Aphroidophyllum meeki* Pedder, *Redstonea sperabilis* (Crickmay), *Sociophyllum glomerulatum* (Crickmay) , stringophyllid coral indet., *Spinulicosta stainbrooki* Crickmay, *Carinatrypa dysmorphostrota* (Crickmay), *Spinatrypa* (*Isospinatrypa*) *borealis* (Warren), *Variatrypa* (*Variatrypa*) *arctica* (Warren), *Cyrtina* sp. age: Eifelian, *dysmorphostrota* brachiopod assemblage Fossil collection (GSC Loc. C-25831) from 7 feet above base of unit; *Radiastrea* sp. nov., age: Eifelian	26	359 (109.4)
19	Covered interval	14	333 (101.5)
18	Limestone, medium brown, medium grained with cement of coarsely crystalline calcite, many skeletal remains, strongly recrystallized, occurs in massive cliff-forming beds, weathers light grey Fossil collection (GSC Loc. C-25828) from 4 to 6 feet above base of unit; *Favosites* sp., *Thamnopora* sp., *Caliapora* sp., *Syringopora*? sp., *Argutastrea* sp., *Radiastraea verrilli* (Meek) broad sense, *R.* sp. nov., *Mesophyllum* sp., *Schizophoria* sp. broad sense, *Spinulicosta stainbrooki* Crickmay, *Carinatrypa dysmorphostrota* (Crickmay), *Spinatrypa* sp., *Undispirifer compactus* (Meek), cricoconariids not studied. Age: Eifelian, *dysmorphostrota* brachiopod assemblage	8	319 (97.2)
17	Limestone, dark grey, fine and microcrystalline, argillaceous and slightly silty, abundant broken skeletal remains, many brachiopods and corals, occurs in thin rubbly beds, weathers grey, recessive Fossil collection (GSC Loc. C-2S826) from 2 to 4 feet above base of unit; *Syringopora* sp., *Spinulicosta stainbrooki* Crickmay, *Carinatrypa dysmorphostrota* (Crickmay), *Undispirifer compactus* (Meek). Age: Eifelian, *dysmorphostrota* brachiopod assemblage	7	311 (94.8)
16	Limestone, dark grey, finely crystalline, argillaceous, finely broken fossil fragments of crinoids, brachiopods, gastropods, corals and traces of *Girvanella* algae comprise an estimated 60 per cent of the rock, occurs in massive cliff-forming beds from 1 to 3 feet thick, weathers light grey	25	304 (92.6)
15	Covered interval	37	279 (85)
14	Limestone, medium grey, partly medium grained, partly finely crystalline, argillaceous, scattered globular stromatoporoids on weathered surface, occurs in thick grey-weathering beds, resistant	8	242 (73.7)
13	Limestone, medium grey, finely crystalline, argillaceous and slightly silty, abundant skeletal debris, fossil remains comprise an estimated		

	50 percent of the rock, ostracods, corals, brachiopods, gastropods, parathuramminid foraminifers, occurs in thick light grey-weathering beds, resistant Fossil collection (GSC Loc. C-25821) from 8 to 12 feet above base of unit; stromatoporoids not studied, *Thamnopora* sp., *Dendrostella trigemme* (Quenstedt), *Argutastrea* sp. Age: Eifelian Fossil collection (GSC Loc. C-25819) from 2 to 4 feet above base of unit; stromatoporoids not studied, *Thamnopora* sp., *Syringopora* sp., *Dendrostella trigemme* (Quenstedt), *Spinatrypa* sp. Age: Eifelian	40	234 (71.3)
12	Limestone, dark grey, argillaceous and slightly silty, fossil remains abundant throughout, occurs in thin rubbly beds, recessive	31	194 (59.1)
11	Limestone, dark grey, fine and medium sized grains in a cement of coarsely crystalline calcite, forms a single light grey-weathering bed, resistant	5	163 (49.7)
10	Limestone, dark grey, finely crystalline, strongly argillaceous, small stromatoporoids on weathered surfaces; occurs in thin nodular beds, weathers grey, recessive	35	158 (48.2)
9	Limestone, medium grey, medium grained, strongly recrystallized, argillaceous and slightly silty, many broken fossil fragments, mostly unidentifiable; occurs in beds up to 1 1/2 feet thick with intervening thin nodular beds, large globular stromatoporoids on weathered surfaces, weathers light grey, resistant Fossil collection (GSC Loc. C-25817) from 1 to 9 feet below top of unit, *Thamnopora* sp., coral possibly a polycoeliid gen., Spinulicosta? sp., ambocoeliid gen. indet. Age: Eifelian	16	123 (37.5)
8	Limestone, medium grey, finely crystalline, consists largely of skeletal remains, some broken, some relatively little damaged, ostracods , corals, crinoids, trilobites, occurs in thin nodular beds, weathers grey-green, recessive Fossil collection (GSC Loc. C-25815) from upper 3 feet of unit; stromatoporoids not studied, *Favosites* sp., *Thamnopora* sp., *Caliapora* sp., *Aulocystis* sp., *Dendrostella trigemme* (Quenstedt), *Radiastraea* sp. nov. , *Gaynaphyllum hyperbolicum* (Crickmay), *Taimyrophyllum stirps* (Crickmay), *Sociophyllum glomerulatum* (Crickmay), *Nucleospira* sp., trilobite pygidium. Age: Eifelian Fossil collection (GSC Loc. C-25813) from 14 to 22 feet above base of unit; *Favosites* sp., *Alveolites* sp., *Syringopora* sp., *Radiastraea* sp. nov., *Taimyrophyllum stirps* (Crickmay), *Sociophyllum glomerulatum* (Crickmay), coral possibly a polycoeliid gen. Age: Eifelian Fossil collection (GSC Loc. C-2S812) from 8 to 10 feet above base of unit; *Eoschuchertella adoceta* (Crickmay), cricoconariid not studied, *Dechenella* sp. Age: Eifelian, *adoceta* brachiopod assemblage Fossil collection (GSC Loc. C-25811) from 2 to 4 feet above base of unit; *Eoschuchertella adoceta* Crickmay. Age: Eifelian, *adoceta* brachiopod assemblage	35	107 (32.6)
7	Covered interval	34	72 (21.9)

6	Limestone, dark brown, finely crystalline, argillaceous, abundant finely broken fossil remains, many pyritized ostracod shells; occurs in alternating thick resistant and thin less resistant-weathering beds	8	38 (11.6)
	GOSSAGE FORMATION		
5	Limestone dark grey-brown, fine and medium grained, strongly recrystallized, abundant ostracod shells, scattered parathuramminid foraminifers; occurs in beds about 2 feet thick, weathers light grey, resistant	8	30 (9.1)
4	Shale, black, fissile, calcareous, weathers recessive	1	22 (6.7)
3	Limestone, dark brown, medium and coarse grained, with cement of coarsely crystalline calcite, abundant skeletal remains, ostracods , brachiopods, crinoids , occurs in thin nodular beds, weathers grey, recessive	3	21 (6.4)
2	Limestone dark brown, medium grained, slightly argillaceous, a few ostracod remains, scattered authigenic quartz crystals, some disseminated pyrite, occurs in thick beds, weathers light grey; resistant	8	18 (5.4)
1	Limestone, dark brown to almost black, microcrystalline, argillaceous occurs in distinctive beds from 2 to 3 feet thick, weathers light grey, resistant	10	10 (3)

POWELL CREEK TRIBUTARY SECTION
65°16'40"N, 128°47'00"W; NTS 106-H

Section Ref. MN-6-70 and MN-6-71

The Ramparts and Hare Indian Formations and a few feet of the underlying Hume are almost completely exposed along the west bank of a small stream that joins Powell Creek about 1/4 mile to the southeast. The Ramparts Formation is 30 feet thicker here than at the main Powell Creek section. Overlying limestone turbidites and debris beds, so conspicuous at Powell Creek, were not observed at this location. In this original description by MacKenzie, he claims that the tributary joins the Powell Creek to the southeast of the section while in reality this happens about 1km to the northeast.

Section measured by W.S. MacKenzie, A.E.H. Pedder on July 9, 1969 and visited by T.T. Uyeno for sampling in June 1971.

MIDDLE DEVONIAN

Ramparts Formation	130 feet (39.7 m)
Hare Indian Formation	545 feet (166.1 m)
Hume Formation	71 feet (incomplete) (21.6 m)

Unit	Description	Thickness of unit feet	Thickness from base feet (m)
	MIDDLE DEVONIAN		
	Overlying strata (probably Canol Fm) covered by trees and talus		
	RAMPARTS FORMATION		
28	Limestone, medium brown, mainly fine grained, abundant remains of encrusting stromatoporoids; Amphipora and brachiopods numerous in thin 3- to 4-inch interbeds; cliff-forming, weathers light grey T.S. pelleted grainstone made up of rounded fossil fragments, composite grains and pellets in a cement of coarsely crystalline calcite. Abundant remains of corals, brachiopods, crinoids, gastropods, stromatoporoids and small unidentified fragments, scattered small silicified areas Fossil collection (GSC Loc. C-5900) from top of unit, *Desquamatia* sp. indet., ambocoeliid indet., *Warrenella* sp.	12	746 (227.4)
27	Limestone, dark brown, with medium grained texture, slightly argillaceous, many finely comminuted fossil remains, scattered traces of brachiopod shells on weathered surfaces, cliff-forming beds weather light grey T.S. medium grainstone of rounded grains of microcrystalline calcite and a few pellets in a cement of coarsely crystalline calcite, scattered small unidentifiable fragments, many small parathuramminids about 200 microns average diameter with well preserved peripheral spines	16	734 (223.7)

26	Limestone, dark brown, argillaceous with vague fine grained texture, fine sub-vertical calcite-cemented fractures, strong odour of hydrocarbons when freshly broken, a few small solitary coral fragments, cliff-forming beds weather light grey T.S. fine and medium pelleted grainstone, with coarsely crystalline calcite cement, strongly recrystallized with consequent blurring and modification of grain boundaries, abundant finely divided fossil remains, mostly unidentifiable, some brachiopod fragments and parathuramminids	6	718 (218.8)
25	Limestone, medium brown, vaguely granular and pelleted, abundant broken fossil fragments, occurs in beds from 1 to 3 feet thick, weathers light grey T.S. fossiliferous pelleted grainstone, mainly large fragments of corals, encrusting stromatoporoids, *Amphipora* and crinoids in a coarsely crystalline calcite cement, fossil remains silicified locally	10	712 (217)
24	Limestone, medium brown, granular texture, with microcrystalline slightly argillaceous interbeds; occurs in beds from 1 to 3 feet thick, cliff-forming, weathers light grey T.S. fine pelleted grainstone, with many areas of pelleted mudstone, abundant finely comminuted fossil remains, brachiopods, cricoconarids, corals and parathuramminids	7	702 (213.9)
23	Limestone, dark brown-grey, argillaceous and slightly silty, abundant broken remains of small brachiopods and crinoids, occurs in beds up to 2 feet thick, some nodular interbeds, moderately resistant, weathers grey T.S. fine pelleted grainstone with areas of pelleted mudstone, argillaceous, a few subrounded grains of detrital quartz, abundant finely comminuted remains of brachiopods, crinoids, and cricoconarids Fossil collection (GSC Loc. C-12192) from 8 feet above base of unit, *Warrenella timetea* Crickmay	25	695 (211.8)
22	Limestone, dark brown-grey, argillaceous, fossiliferous, scattered pockets of ambocoeliid brachiopods, a few dolomitized patches, occurs in beds from 1 to 2 feet thick, weathers light grey T.S. fine pelleted grainstone, with many areas of pelleted mudstone, abundant fossil remains, brachiopods, corals, cricoconarids, parathuramminids	9	670 (204.2)
21	Limestone, argillaceous, dark grey to brown, with scattered remains of corals, brachiopods, stromatoporoids and crinoids, occurs in massive beds up to 3 feet thick, weathers light grey T.S. fossiliferous pelleted mudstone, fossil content mainly of *Stachyodes* and stromatoporoid *Syringopora* consortia commonly encrusted by vaguely defined algal tubes, possibly *Girvanella* sp.	9	661 (201.5)
20	Limestone, dark grey to almost black, strongly argillaceous, scattered brachiopods and *Amphipora* throughout, recessive, weathers grey		

	T.S. fossiliferous mudstone, abundant fossil remains of corals, brachiopods, integrated bryozoans, crinoids, ostracods, calcispheres, and unidentifiable fragments in a matrix of fine lime mud Fossil collection (GSC Loc. C-5901) from 4 feet below 0 top of unit, *Toryophyllum*? n. sp. Fossil collection (GSC Loc. C-5902) from 5 feet below top of unit, *Thamnopora* sp. indet., *Alveolites* sp. indet., *Moravophyllum* n. sp., *Schizophoria* sp. indet., *Spinatrypa* sp. indet., ambocoeliid indet. Fossil collection (GSC Loc. C-12191) from lower 1 foot of unit, *Alveolites* sp., *Cladopora* (s. l.) sp. indet., *Hexagonaria* n. sp., Moravophyllum n. sp.,	6	652 (198.7)
19	Limestone, dark grey-brown, argillaceous, fossiliferous, scattered brachiopods and corals, some vaguely granular areas, forms a single, resistant grey weathering bed T.S. fossiliferous mudstone, abundant fossil remains of corals, crinoids, brachiopods, and unidentifiable fragments in a matrix of lime mud, some coral fragments encrusted by *Girvanella* algae, a few small sllicified areas	4	646 (196.9)
18	Limestone, dark grey, argillaceous and slightly silty, occurs in thin 2- to 4-inch beds, recessive, weathers grey	3	642 (195.7)
17	Limestone, grey-brown, medium grained with *Thamnopora*-bearing black shale interbeds, a few brachiopods, cliff-forming beds weather light grey Fossil collection (GSC Loc. C-12190) from interval 2 to 4 feet above base of unit, *Cladopora* (s. l.) sp. indet., *Hexagonaria* n. sp., *Temnophyllum richardsoni* (Meek), "*Atrypa*" sp. ex gr. "*A.*" *hormophora* Crickmay, *Polygnathus linguiformis linguiformis* Hinde, *P. ansatus* Ziegler & Klapper, *Icriodus brevis* Stauffer	13	639 (194.7)
16	Limestone, dark grey-brown, argillaceous and slightly silty, fossiliferous, medium grained with cement of coarsely crystalline calcite, grain boundaries blurred by extensive recrystallization, unit is moderately resistant, weathers light grey T.S. fossiliferous mudstone, abundant fossil remains of corals, crinoids, brachiopods and broken skeletal fragments in a matrix of lime mud Fossil collection (GSC Loc. C-12189) from upper 3 ½ feet of unit, *Cladopora* (s. l.) sp. indet., *Moravophyllum* spp. indet., "*Atrypa*" sp. ex gr. "*A.* " *hormophora* Crickmay, "*A.*" sp. indet., *Spinatrypa*? sp. indet., *Stringocephalus* sp. undet., but probably *S. aleskansus* Crickmay, *Nothognathella* sp. Fossil collection (GSC Loc. C-12188) from interval 2 to 4 feet above base of unit, *Cladopora* (s. l.) sp. indet., stropheodontid indet. (*Douvillina*? sp.), *Atrypa* (s. l.) sp. indet., *Icriodus brevis* Stauffer	10	626 (190.8)
	HARE INDIAN FORMATION		
15	silty shale, with interbedded dark grey argillaceous limestone, appreciable bituminous material associated with shale, scattered		

	fossiliferous beds, moderately recessive, weathers light and dark grey Fossil collection (GSC Loc. C-12187) from 23 feet below top of unit, *Alveolites* sp. indet., *Disphyllum* n. sp., *Moravophyllum* sp. indet., *Plasmophyllum* ? sp. indet.	32	616 (187.7)
14	Shale, dark grey, calcareous and silty, with interbeds of nodular grey argillaceous limestone, shale contains pockets and blebs of black bituminous material, scattered pyrite crystals and nodules, a few small brachiopods in limestone interbeds, weathers grey	25	584 (178)
13	Limestone and shale in alternating beds, beds of dark grey argillaceous limestone from 8 inches to 1 foot thick with intervening 4- to 6-inch beds of dark grey silty shale, small clay ironstone concretions common in shale interbeds, moderately resistant, weathers yellow-grey and dark grey	54	559 (170.4)
12	Limestone, dark grey, argillaceous, occurs in thin nodular and pinching and swelling beds separated by interbeds of black calcareous and silty shale from 1/2 to 1 inch thick, recessive, weathers dark and light grey Fossil collection (GSC Loc. C-12186) from interval 16 to 18 feet below top of unit, *Polygnathus l. linguiformis* Hinde	30	505 (153.9)
11	Shale, dark grey, calcareous and silty with thin nodular interbeds of dark grey argillaceous limestone, recessive, weathers grey and dark grey Fossil collection (GSC Loc. C-12185) from interval 9 to 10 feet below top of unit, *Polygnathus varcus* Stauffer Fossil collection (GSC Loc. C-12184) from interval 2 to 3 feet above base of unit, *Polygnathus l. linguiformis* Hinde	37	475 (144.8)
10	Shale, black, calcareous, hard, fissile, with traces of pyrite, a few thin interbeds of dark grey argillaceous limestone	17	438 (133.5)
9	Shale, grey-green, calcareous, sericitic and slightly silty, soft, crumbly, recessive, weathers grey Fossil collection (GSC Loc. C-12183) from interval 4 to 5 feet below top of unit, *Polygnathus timorensis* Klapper, Philip & Jackson	15	421 (128.3)
8	Shale, grey-green, calcareous and sericitic, soft and crumbly, a few small clay ironstone nodules, recessive, weathers grey-green Fossil collection (GSC Loc. C-12182) from interval 5 to 6 feet below.top of unit, *Polygnathus l. linguiformis* Hinde, *Polygnathus rhenanus* Klapper, Philip & Jackson Fossil collection (GSC Loc. C-12181) from interval 28 to 30 feet below top of unit *Polygnathus l. linguiformis* Hinde, *Polygnathus rhenanus* Klapper, Philip & Jackson	85	406 (123.7)
7	Talus-covered interval	199	321 (97.8)
6	Shale, grey-green, calcareous, sericitic, intermittently covered; contact with underlying dark grey shales not exposed, recessive, weathers grey	19	122 (37.2)
	"SPORE-BEARING MEMBER"		

5	Shale, dark grey to almost black, slightly calcareous, scattered pyrite crystals, soft, fissile, intermittent concentrations of trilete spores along bedding planes, contains large clay ironstone concretions up to 2 feet long, recessive, weathers dark grey	17	103 (31.4)
4	Shale, dark grey to black, calcareous, fissile to splintery, contains large clay ironstone concretions up to 3 feet long, tentaculitids, styliolinids, and trilete spores common along bedding planes; two beds of fibrous calcite with cone-in-cone structures, each about 2 inches thick occur 6 feet and 12 feet above the base of the unit; the lower bed thins to 1/2 inch below a large concretion; a third thin discontinuous bed of fibrous calcite occurs 1 foot above the lowermost bed; shale unit is in sharp contact with underlying limestone; recessive, weathers brown-black T.S. (fibrous calcite); calcite, fibrous texture, crystals elongate normal to shale stratification, cone-in-cone structures, many with capping of black argillaceous material, are conspicuous, some spherical bodies about 200 microns in diameter are preserved in the calcite Fossil collection (GSC Loc. C-11492) from top of unit, *Buchiola* sp., *Lingula* sp., *Oboella* sp., *Nowakia* sp. cf. *N. otomari* Bouček and Prantz 1959, *Styliolina* sp. cf. *S. fissurella* (Hall), *Striatostyliolina* sp. cf. *S. roemeri* Bouček 1964; trilete spores and scolecodonts, also locally abundant, were altered by corrosion and not identifiable	15	86 (26.2)
	HUME FORMATION		
3	Limestone, dark brown-grey, slightly argillaceous, occurs in beds from 4 to 6 inches thick with intermittent interbeds of black calcareous shale, 2 to 3 inches thick, contains numerous brachiopods throughout, moderately resistant; weathers light and dark grey Fossil collection (GSC Loc. C-12180) from interval 2 to 4 feet below top of unit, *Polygnathus l. linguiformis* Hinde, *Polygnathus parawebbi* Chatterton Fossil collection (GSC Loc. C-12179) from lower 2 feet of unit, barren for conodonts	14	71 (21.6)
2	Limestone, brown-grey, microcrystalline, slightly argillaceous, thin wavy shale interbeds, scattered brachiopods and corals throughout, moderately resistant, weathers grey, barren for conodonts Fossil collection (GSC Loc. C-12178, C-12176) from interval 0 to 8 feet below top of unit, *Favosites* sp. indet., *Radiastraea verrilli* (Meek), *Sociophyllum globerulatum* (Crickmay), *Stringophyllum* n. sp., *Carinatina dysmorphostrota* (Crickmay), "*Atrypa" borealis* Warren, *Polygnathus curtigladius* Uyeno, *Polygnathus l. linguiformis* Hinde, *Polygnathus angusticostatus* Wittekindt	10	57 (17.4)
1	Limestone, brown-grey, argillaceous, slightly silty, occurs in thin nodular beds with wavy calcareous shale interbeds, abundant fossils throughout, recessive weathering, partly talus-covered		

	Fossil collection (GSC Loc. C-12175) from 4 feet below top of unit, "*Spinulicosta" stainbrooki*, Crickmay, "*Atrypa" borealis* Warren, *Emanuella* sp. indet. , new cystiphillid genus and species, *Neopanderosus* sp. , *Panderosus* sp., *Polygnathus angusticostatus* Wittekindt Fossil collection (GSC Loc. C-12174) from 17 to 20 feet below top of the unit and probably equivalent to basal 3 feet of unit 48 of the main Powell Creek section; *Favosites* sp. undet., *Caliapora* sp. undet., digitate tabulate corals not studied, *Mesosphyllum rectum* (Meek), cystimorpyh corals not studied, *Disphyllum* sp. undet., *Moravophyllum mcfarlanei* (Meek), *Schizophoria* sp. undet., *Spinulicosta stainbrooki* Crickmay, *Spinatrypa* (*Isospinatrypa*) *borealis* (Warren), *Carinatrypa dysmorphostrota* (Crickmay), *Tentaculites* sp. undet., *Camsellia truncata* Ormiston. Age: Eifelian, *dysmorphostrota* brachiopod assemblage. Fossil collection (GSC Loc. C-12173) from 24 to 28 feet below top of the unit and probably equivalent to upper part of unit 47 of the main Powell Creek section; *Favosites* sp. undet., *Mesophyllum rectum* (Meek), *Sociophyllum glomerulatum* (Crickmay), *Disphyllum* sp. undet., *Radiastraea verrilli* (Meek), *Moravophyllum mcfarlanei* (Meek), trepostomatous bryozoan not studied, *Spinulicosta stainbrooki* Crickmay, *Spinatrypa* (*Isospinatrpa*) *borealis* (Warren), *Carinatrypa dysmorphostrota* (Crickmay), *Emanuella* sp. undet., *Undispirifer compactus* (Meek), *Tentaculites* sp. undet. Age: Eifelian, *dysmorphostrota* brachiopod assemblage. Fossil collection (GSC Loc. C-12172) from 35 to 40 feet below top of the unit and probably equivalent to unit 44 of the main Powell Creek section; *Favosites* sp. undet., *Caliapora* sp. undet., digitate tabulate corals not studied, *Mesophyllum rectum* (Meek), *Disphyllum* sp. undet., *Schizophoria*? not studied, *Variatrypa* (*Variatrypa*) *arctica* (Warren), *Spinatrypa* (*Spinatrypa*) *coriacea* (Crickmay), *Spinatrypa* (*Isospinatrypa*) *borealis* (Warren), *Carinatrypa dysmorphostrota* (Crickmay), *Nucleospira*? sp. not studied, *Emanuella* sp. undet., *Paracyclas* sp., *Humeia merga* Ormiston. Age: Eifelian, *dysmorphostrota* brachiopod assemblage.	47	47 (14.3)

POWELL CREEK SECTION
65°16'16"N, 128°46'50"W; NTS 106-H

Section Ref. MN-6-69

An almost completely exposed section of Devonian strata occurs at Powell Creek about 55 miles west of Norman Wells. The section is located in the stream valley where Powell Creek leaves the mountain front to join Mountain River a short distance to the north. Beds of the Bear Rock, Hume, Hare Indian, Kee Scarp reef debris and limestone turbidites (MacKenzie, 1970), Canol and Imperial Formations rest with apparent conformity on Ordovician strata and are overlain unconformably in the region by Lower Cretaceous.

Section measured by W. S. MacKenzie and A. E. H. Pedder, July 1 to 4, 1969. Sampled for conodonts by T.T. Uyeno June 9 to 10, 1971. Their original coordinates for this section were 65°16'N, 128°46'W

UPPER DEVONIAN

Imperial Formation (Famennian)	206 feet (incomplete) (62.7 m)
(Frasnian)	1,182 feet (360.3m)
Canol Formation	53 feet (16.1 m)
Allochthonous beds	53.5 feet (16.3 m)

MIDDLE DEVONIAN

Ramparts Formation	100 feet (30.48 m)
Hare Indian Formation	593 feet (545 feet T.T. Uyeno, reassessment 2014) (180.7 m)
Hume Formation	438 feet (453 feet T.T. Uyeno, reassessment 2014) (133.5 m)
Bear Rock Formation	602 feet (Gossage 126 feet, Bear Rock 476 feet) (138.5 m)

ORDOVICIAN

Ronning Formation (now Mount Kindle) 25 feet (incomplete) (7.6 m)

Unit	Description	Thickness of unit feet	Thickness from base feet (m)
	IMPERIAL FORMATION (Famennian) (1,388 feet of Imperial Formation is exposed at this location, an almost complete section 2, 764 feet thick, occurs at Imperial River about 30 miles to the southeast)		
113	Siltstone to fine sandstone, pale green-grey, quartzose, slightly calcareous, grains angular and subrounded, fine crossbedding, occasional worm burrows, weathers resistant Fossil collection (GSC Loc. C-3940) small brachiopods collected from 5 feet above base of unit, productid and chonetid brachiopods, *Ptychomaletoechia* n sp., *Cyrtospirifer* sp. indet. Age: Frasnian T.S. Angular and subrounded grains of quartz about 80 microns average diameter, about 80% in a cement of argillaceous microcrystalline calcite, trace of organic remains; very fine grained calcareous siltstone	50	3,227 (983.6)

112	Shale, grey-green, soft, crumbly, in part micaceous; weathers recessive	47	3,177 (968.3)
111	Siltstone, grey-green, quartzose, slightly calcareous, scattered small brachiopods, weathers resistant	10	3,130 (954)
110	Shale, grey-green, soft, crumbly, slightly calcareous; weathers recessive	15	3,120 (950.9)
109	Siltstone, grey-green, in part fine sandstone, quartzose, micaceous, slightly calcareous, some fine cross-bedding; brachiopods occur in upper 6 inches, Cyrtospirifer sp. undet., (GSC Loc. C-3890); weathers resistant	5	3,105 (946.4)
108	Shale, grey-green, soft, crumbly, slightly calcareous, traces of mica, occasional thin beds of siltstone; weathers recessive	25	3,100 (944.8)
107	Siltstone, pale grey-green, fine grained, calcareous micaceous, contains many specks of black organic material, conspicuous fine crossbedding; weathers resistant T.S. Angular and subrounded grains of quartz about 80 microns average diameter, about 75%, in a matrix of argillaceous material, fine crossbedding conspicuous in thin section, a few brachiopod shale fragments; very fine grained argillaceous siltstone	23	3,075 (937.3)
106	Shale, grey-green, with interbedded fine siltstone, slightly calcareous, micaceous, scattered small brachiopods; weathers recessive	31	3,052 (930.2)
	(Frasnian)		
105	Siltstone predominantly, with interbedded shale, grey-green, fine-grained, quartzose, micaceous, brachiopods and colonial corals in calcareous beds about 20 feet above base of unit, weathers moderately resistant Fossil collection (GSC Loc. C-3889) from 20 feet above the base of the unit, *Frechastraea* n. sp., *Productella* sp. undet., *Theodossia* n. sp., *Cyrtospirifer* sp., *Bellerophon* sp. undet., *Orecopia* sp. cf. *O. mccoyi* (Walcott), *Tentaculites* sp. undet.	105	3,021 (920.8)
104	Siltstone, with thin one- to two-inch interbeds of coarsely granular to conglomeratic limestone, grey-green, quartzose, calcareous, micaceous; scattered small brachiopods in pockets, numerous crinoids, corals and brachiopods; weathers moderately resistant Fossil collection (GSC Loc. C-3888) from 10 feet below top of unit, *Frechastraea* n. sp. *Devonoproductus* sp. indet., *Cyrtospirifer* sp. undet. T.S. Rounded fragments, mainly of crinoids and stromatoporoids about 1.25 mm, average diameter in a matrix of smaller fossil fragments and silty mudstone, *Girvanella* sp., chambered foraminifers, and calcispheres occur among the fragments, small specks of hematite outline fragment and grain boundaries; very coarse grained fossiliferous packstone	50	2,916 (888.8)
103	Siltstone, pale grey-green, fine-grained, calcareous, argillaceous; grades to silty shale at base of unit; weathers moderately resistant		

	T.S. Angular and subrounded quartz grains about 125 microns average diameter, about 85 per cent, in a cement of argillaceous microcrystalline calcite; fine calcareous siltstone	40	2,866 (873.5)
102	Sandstone, grey-green, with interbedded siltstone, fine-grained, calcareous and argillaceous, some thin shale interbeds scattered brachiopods in pockets Fossil collection (GSC Loc. C-3887) from 10 feet below top of unit, chonetid brachiopod, 4-inch limestone bed, coarse grained to conglomeratic at top of unit; moderately resistant weathering T.S. Angular and subrounded grains of quartz about 100 microns average diameter, with a little intergranular argillaceous material, a little glauconite; very fine grained siltstone T.S. Rounded and tabular fragments of crinoids, stromatoporoids, and fine pellet mudstone about 3 mm average diameter in a matrix of coarsely crystalline, calcite, scattered silty patches in matrix, many grains and fragments encrusted by *Girvanella* sp., scattered pyrite crystals; conglomerate	135	2,826 (861.4)
101	Shale, grey-green, calcareous, silty and micaceous, moderately recessive weathering	113	2,791 (850.7)
100	Shale, dark grey to black, slightly silty, soft, forms conspicuous recessive-weathering unit	88	2,678 (816.3)
99	Siltstone, green, fine-grained, argillaceous, slightly calcareous, micaceous, characterized by thin ½-inch rust-coloured beds about every 8 inches; weathers moderately resistant	222	2,590 (789.4)
98	Shale, grey, slightly silty, micaceous, slightly calcareous; weathers moderately recessive	67	2,368 (721.7)
97	Siltstone, green-grey, fine and medium-grained, fine dark bedding laminae conspicuous on fresh surfaces; occurs in 1/4 to 2-inch beds; weathers resistant T.S. Angular and subrounded grains of quartz about 80 microns average diameters about 95 per cent, and argillaceous material; very fine grained argillaceous siltstone	10	2,301 (701.3)
96	Shale predominantly, grey-green, slightly silty, with interbedded fine-grained argillaceous siltstone; unit weathers moderately recessive	52	2,291 (298.3)
95	Covered interval	58	2,239 (682.4)
94	Shale, green-grey, strongly micaceous, soft, weathers recessive	28	2,181 (664.7)
93	Sandstone and siltstone, green-grey, with trace of glauconite, calcareous; occurs in resistant beds from 4 to 5 feet thick, some interbeds of slightly calcareous, micaceous shale T.S. Angular and subrounded quartz grains about 100 microns average diameter, about 98 per cent with a little argillaceous material, traces of unidentifiable organic remains; very fine siltstone	59	2,153 (656.2)
92	Conglomerate; grey-green and rust coloured, rust coloured rounded and angular pebbles of fine calcareous siltstone up to one inch long		

	in a matrix of grey-green calcareous siltstone, broken brachiopod shells throughout	3	2,094 (638.2)
91	Siltstone, grey-green, with interbedded shale, fine- and coarse-grained, some fine sandstone; weathers resistant T.S. Angular and subrounded quartz grains about 80 microns average diameter, about 95 per cent, and argillaceous material, trace of organic remains; very fine grained argillaceous siltstone	25	2,091 (637.3)
90	Shale, green-grey, soft, micaceous, with occasional rust-weathering silty interbeds near top of unit	34	2,066 (629.7)
89	Siltstone, grey-green, fine-grained, argillaceous slightly calcareous, with interbedded soft grey shale; weathers moderately resistant	12	2,032 (619.4)
88	Siltstone, dark grey, fine- and medium-grained argillaceous, occurs in massive beds from 1 to 3 feet thick, weathers resistant, cliff-forming	25	2,020 (615.7)
87	Siltstone, dark grey, micaceous, argillaceous, with interbedded grey silty shale; weathers moderately resistant	42	1,995 (608.1)
86	Shale, grey, soft, micaceous, in part silty and slightly calcareous; weathers recessive	9	1,953 (595.3)
85	Shale, grey and dark grey, silty and micaceous, contains silty concretions and nodules; weathers moderately recessive T.S. Angular and subrounded quartz grains about 80 microns average diameter, about 95 per cent, and argillaceous material, trace only of organic remains; very fine-grained argillaceous siltstone	20	1,944 (592.5)
84	Siltstone, brown-grey, fine-grained, argillaceous with interbeds of silty shale up to 1 foot thick, silty concretions in shale interbeds, weathers resistant T.S. Angular and subrounded grains of quartz about 80 microns average diameter, about 90 per cent, and argillaceous material, trace of glauconite; very fine grained argillaceous siltstone	25	1,924 (586.4)
83	Shale, dark brown to black, soft, silty, with beds of argillaceous limestone at base; weathers recessive	60	1,899 (578.8)
	CANOL FORMATION		
82	Shale, brown to black, siliceous, traces of pyrite as disseminated crystals and small nodules; conspicuous yellow bloom on weathered surfaces; weathers recessive Note. 0.5 feet has been dropped from the cumulative thickness column for the overlying part of the section	53	1,839 (560.5)
	ALLOCHTHONOUS BEDS		
	Upper unit (with limestone turbidites)		
81	Shale, brown to almost black, calcareous, with thin interbeds of dark grey argillaceous mudstone and hard splintery calcareous shale in upper part, thin graded beds of echinoderm remains in lower part of unit; weathers brown and black, more recessive in upper half	26	1,786.5 (544.5)
80	Limestone, consists of an estimated 90 per cent of echinoderm fragments in a matrix of brown-black argillaceous material, characterized by graded bedding, and presence of argillaceous		

	mudstone fragments near top of unit, contains scattered bone fragments, a few pyrite crystals, and small spherical bodies, probably radiolarids, lower contact sharp, upper contact gradational T.S. Angular and subrounded crinoid fragments grading from about 1.5 mm diameter at base of 6-inch bed to 250 microns at the top, many fragments have sutured contacts, also overgrowths of calcite, crinoid fragments constitute an estimated 90 per cent of the rock, remaining interfragment material consists of grains and fossil fragments about 100 microns diameter in a matrix of fine lime mud, a few detrital quartz grains, angular fragments of silty and argillaceous mudstone with contorted bedding common near top of unit	0.5	1,760.5 (536.6)
79	Shale, brown to almost black, calcareous, fissile and splintery, thin interbeds of argillaceous mudstone; abundant cricoconarids on some bedding planes, weathers light grey, brown and black; moderately resistant	5	1,760 (536.4)
78	Shale, brown to almost black, calcareous, fissile, small brachiopods, weathers brown recessive Fossil collection (GSC Loc. C-3886) from 3 feet below top of unit, *Schizophoria* sp. indet., *Variatrypa* (*Radiatrypa*) *clarkei* (Warren), Fossil collection (GSC Loc. C-12167) collected ½ foot below top of the unit, *Tecnocyrtina billingsi* (Meek). Age: Frasnian	4	1,755 (534.9)
	Lower Unit (with reef debris)		
77	Limestone, medium brown, microcrystalline, slightly argillaceous, with thin interbeds of calcareous shale, contains subangular blocks and fragments of brown granular and microcrystalline limestone up to 2 feet maximum dimension, with coral remains and other unidentifiable organic debris, appreciable black chert in irregularly shaped masses, and as vein and fracture filling Note. The upper surface of unit 77 is disconformable with up to 4 feet of relief. Cricoconarids and crushed, poorly preserved brachiopods occur in the lower parts of scour channels in the erosion surface. Unit 77 is about 4 feet thicker farther along the hillside	9.5	1,751 (533.7)
76	Limestone, dark brown and grey, microcrystalline, occurs in thin 1-inch beds, contains a few ostracods, sponge spicules and calcispheres, fine argillaceous laminae are frequently crenulated on weathered surfaces, small scour channels with poorly preserved megafossils, mostly brachiopods,), thin *Amphipora* bed at base of unit Fossil collection (GSC Loc. C-12164) collected throughout the unit, *Schizophoria* sp., *Ladogiodes* sp., *Tecnocyrtina billingsi* (Meek. Age: Frasnian T.S. Rounded grains and pellets about 80 microns average diameter in a matrix of recrystallized lime mud, a few broken fossil remains, about 5 per cent, of ostracods, crinoids, brachiopods, and		

	parathuramminids, trace of bituminous material, a little fine detrital quartz; very fine packstone Note. The thin-bedded limestones of unit 76 can be traced along the hillside to where they abut against a large block of brown to grey granular limestone 3 feet thick, containing abundant remains of corals, stromatoporoids, brachiopods, crinoids and bryozoans and irregularly shaped blebs, pinching and swelling lenses, and branching veins of black chert; bedding is horizontal in the limestone block. T.S. (limestone block), rounded and angular fragments of mudstone, corals, and stromatoporoids up to 2 inches maximum diameter in a matrix of medium and coarse grained packstone, fragments in matrix are mainly crinoid remains, and a few brachiopod shells, some *Vermiporella* and indeterminate coraline? algae, appreciable dolomitization of the matrix, traces of fine detrital quartz. T.S. (silicified area), rounded grains of microcrystalline calcite about 100 microns average diameter in a cement of coarsely crystalline calcite, about 10 per cent of finely comminuted remains of tentaculitids, parathuramminids, and sponge spicules, a little detrital quartz, sediment partly silicified with preservation of many fossil remains and in some areas, of granular texture; partly silicified very fine grainstone	3	1,741.5 (530.8)
75	Shale, brown to black, blocky in part, fissile and crumbly, a few small clay ironstone concretions, weathers black, recessive	2.5	1,738.5 (529.9)
74	Limestone, brown and dark grey, argillaceous, microcrystalline, a few styliolinids, some fine argillaceous laminae, small scour channels; occurs in beds about 4 inches thick with intervening shale partings; ½- to 2-inch bed of soft black shale occurs at base of unit; brachiopods collected from near top of unit, *Schizophoria* sp., atrypacean indet., *Tecnocyrtina* sp., *Styliolina* sp. Fossil collection (GSC Loc. C-3884) from throughout the unit; *Mesotaxis dengleri* (Bischoff & Ziegler), *Skeletognathus norrisi* (Uyeno), *Polygnathus cristatus ectypus* Huddle, *P. decorosus* Stauffer s. l. of Ziegler, 1966, *Mehlina gradata* (Youngquist), *Spathognatodus* sp. A in Norris & Uyeno (1981) T.S. Limestone, microcrystalline, with abundant fine pellets about 10 per cent of finely comminuted fossil remains of ostracods, parathuramminids, calcispheres, tentaculitids, and sponge spicules, scattered specks of pyrite and hematite, some areas partly recrystallized to microspar; fossiliferous fine pellet mudstone	3	1,736 (529.1)
	RAMPARTS FORMATION		
73	Limestone, medium brown, fine and medium granular, thin discontinuous dolomite zones parallel bedding; contains a few thin lenses and blebs of black chert; forms massive cliff-forming beds; weathers light grey Fossil collection (GSC Loc. C-3883) from interval 5 to 10 feet below top of unit; megafossils comprise, *Amphipora* sp., *Thamnopora* sp., *Cladopora*? sp., "*Alaiophyllum*" sp. ex. gr. "*A*" *mackenziense* Pedder,		

	Schizophoria sp., rhynchonellid fragments, atrypid indet., *Warrenella franklini* (Meek)?, *Klapperina disparilis* (Ziegler & Klapper), *Polygnathus cristatus ectypus* Huddle (small and large basal cavity), *P. foliatus* Byrant, *P. ordinatus* Byrant (fragmentary specimen), *P. linguiformis linguiformis* Hinde, *Schmidtognathus wittekindti* Ziegler; T.S. Rounded pellets and grains about 150 microns average diameter in a matrix of fine lime mud, has conspicuous laminated texture muds manifest by discontinuous subhorizontal lenses of fine pellet grainstone about 1 mm thick, scattered remains of ostracods, brachiopods, paratharamminids and tentaculitids; fine laminated pellet packstone	16	1,733 (528.2)
72	Limestone, brown-grey, fine granular, contains abundant organic remains, *Tentaculites*, *Styliolina*; a few thin 1/2-inch chert lenses near base of unit; occurs in beds from 4 inches to 1 foot thick; Fossil collection (GSC Loc. C-3882) from interval 6 to 11 feet below top of unit, *Schmidtognathus wittekindti* Ziegler, *Polygnathus cristatus ectypus* Huddle (small and large basal cavity), *Elsonella rhenana* Lindstrom & Ziegler, *Icriodus brevis* Stauffer T.S. Subrounded grains of microcrystalline calcite in a cement of clear sparry calcite, areas of finely disseminated dolomite and small patches of finely crystalline dolomite, a few finely comminuted skeletal remains of tentaculitids, parathuramminids, and patches of *Girvanella* sp., very fine grainstone	20	1,717 (523.3)
71	Limestone, dark grey to dark brown, microcrystalline, with thin shale interbeds, slightly silty and argillaceous; weathers light grey, moderately resistant T.S. Rounded grains of microcrystalline calcite about 100 microns average diameter in a matrix of fine lime mud, mud matrix moderately uncrystallised to sparry calcite, patches of disseminated dolomite crystals, some pyrite, a few fossil remains of ostracods, parathuramminids, and tentaculitids; very fine packstone	3	1,697 (517.2)
70	Limestone, dark grey, argillaceous, with interbedded brown to black hard fissile shale, in part silty; weathers grey, moderately resistant	12	1,694 (516.3)
69	Limestone, medium to dark grey, argillaceous, slightly silty; contains abundant skeletal remains, Amphipora, Thamnopora; thin lenses of grey-green silty shale; weathers light grey, resistant T.S. Fine detrital quartz grains about 100 microns average diameter in an argillaceous matrix, about 70 per cent quartz silt; fine grained argillaceous siltstone	3	1,682 (512.7)
68	Limestone, dark grey, argillaceous, and interbedded brown to grey, fissile shale, limestone beds from 2 to 4 inches thick alternate with about 1-inch shale beds; weathers brown-grey, slightly recessive Fossil collection (GSC Loc. C-3881) from upper part of unit *Schmidtognathus wittekindti* Ziegler, *Polygnathus cristatus ectypus* Huddle, *P. dubius* Hinde of Huddle 1970, *Elsonella rhenana* Lindstrom & Ziegler, *Icriodus* aff *cedarensis* Narkiewicz & Bultynck	5	1, 679 (511.7)

67	Limestone, medium to dark grey, argillaceous, slightly silty; Contains abundant skeletal remains, brachiopods *Amphipora*, *Thamnopora*; forms massive grey-weathering beds, resistant T.S. Rounded and subrounded grains of microcrystalline calcite and fossil fragments in a matrix of lime mud, contains about 60 per cent of *Stachyodes* remains, also finely comminuted fragments of ostracods, crinoids, brachiopods, and bryozoans, trace of fine detrital quartz; fine *Stachyodes* packstone	7	1,674 (510.2)
66	Shale, black, calcareous, soft, crumbly bituminous appearance, waxy in part, micaceous; contains finely comminuted unidentifiable skeletal remains; a few silty calcareous nodules; weathers dark grey to black recessive	2	1,667 (508.1)
65	Limestone, medium grey, microcrystalline, argillaceous and slightly silty; contains abundant remains of corals and *Thamnopora*; weathers dark grey, resistant Fossil collection (GSC Loc. C-3939) from 2 feet below top of unit, *Ceratophyllum*? n. sp. T.S. Limestone, microcrystalline, average crystal size about 30 microns, abundant skeletal remains, about 30 per cent, mainly of corals, some ostracod, crinoid, and brachiopod fragments, and unidentifiable finely comminuted remains, trace of fine detrital quartz; fossiliferous mudstone	6	1,665 (507.5)
64	Limestone, medium and dark grey, microcrystalline argillaceous, slightly silty, with thin shale interbeds; contains numerous *Thamnopora* Fossil collection (GSC Loc. C-3880) from interval 1 to 6 feet below top of unit, *Thamnopora* sp., *Alveolites* sp., *Roemeripora* or *Holacanthopora* n. sp., *Moravophyllum* n. sp., *Schizophoria* sp. undet., *Desquamatia* (*Desquamatia*) sp. ex. gr. *D*. (*D*.) *homophora* (Crickmay), *Emanuella* sp., *Cyrtina* sp., *Stringocephalus aleskanus* Crickmay? T.S. Limestone, microcrystalline, average crystal size about 30 microns, a few broken skeletal remains of ostracods, crinoids, brachiopods, corals, and sponge spicules, small clusters of Girvanella sp., trace of fine detrital quartz; mudstone	17	1,659 (505.6)
63	Limestone, medium to dark grey, microcrystralline, argillaceous, with interbedded strongly argillaceous dark grey limestone and calcareous shale; abundant corals and brachiopods; weathers light grey, resistant Fossil collection (GSC Loc. C-3879) from upper 6 feet of unit; megafossils comprise *Moravophyllum* n. sp., *Hexagonaria* sp., *Desquamatia* (*Desquamatia*) sp. ex. gr. D. (D.) *hormophora* Crickmay; *Polygnathus varcus* Stauffer, *P. linguiformis linguiformis* Hinde, *P. xylus* Stauffer, *P. pseudofoliatus* Wittekindt, *Icriodus eslaensis* van Adrichem Boogaert T.S. Limestone, microcrystalline, average crystal size about 30 microns, abundant skeletal remains of ostracods, corals, sponge		

	spicules, and unidentifiable fragments, appreciable argillaceous material; fossiliferous mudstone	9	1,642 (500.5)
	HARE INDIAN FORMATION		
62	Limestone predominantly with interbedded shale, microcrystalline, argillaceous, slightly silty; shale contains small blebs black bituminous material; weathers dark grey, moderately recessive	34	1,633 (497.7)
61	Shale, dark brown to grey, calcareous and silty; contains black bitumen in pockets up to 1 foot maximum dimension and in shale surrounding numerous silty nodules, also appreciable pyrite in small nodules and as disseminated crystals; mud cracks and ripple marks on bedding planes; weathers dark grey, recessive T.S. Limestone, microcrystalline, with an estimated 10 per cent of detrital quartz silt, scattered small fragments of brachiopods and crinoids; silty mudstone	25	1,599 (487.4)
60	Limestone predominantly, with interbedded shale, dark grey, microcrystalline, argillaceous and silty; occurs in 8-inch to 1-foot beds with interbeds of shale about 4 inches thick; shale is dark grey, calcareous and silty, and contains small silty concretions; weathers light grey and dark grey, moderately resistant Fossil collection (GSC Loc. C-3878) from interval 30 to 35 feet below top of unit *Polygnathus rhenanus* Klapper Philip and Jackson T.S. Limestone, very finely crystalline, average crystal size about 50 microns, appreciable intercrystalline argillaceous material, some detrital quartz silt, traces of ostracod shells, silty mudstone	54	1,574 (479.7)
59	Limestone, dark grey-brown, silty and argillaceous, microcrystalline; occurs in thin nodular and pinching and swelling beds about 2 inches thick; shale dark grey, silty and calcareous, occurs as regular interbeds from 1/2 to 1 inch thick Fossil collection (GSC Loc. C-3877) from interval 11 to 16 feet below top of unit, *Icriodus eslaensis* van Adrichem Boogaert, *Polygnathus linguiformis linguiformis* Hinde, *P. ansatus* Ziegler & Klapper T.S. Limestone, microcrystalline, with appreciable argillaceous material and detrital quartz silt, scattered small fragments of brachiopods, ostracods, and crinoids, some finely disseminated pyrite and hematite; silty mudstone	30	1,520 (463.3)
58	Shale, dark grey, calcareous and slightly fissile to splintery, with interbedded limestone; limestone is dark grey, argillaceous and slightly silty; weathers light grey and dark grey, slightly recessive Fossil collection (GSC Loc. C-3876) from interval 21 to 26 feet below top of unit, *P. linguiformis linguiformis* Hinde T.S. Limestone, microcrystalline, with appreciable amounts of detrital silt and argillaceous material, some finely disseminated pyrite and hematite, a few and brachiopod remains; silty mudstone	37	1,490 (454.2)
57	Shale, black, calcareous, hard, fissile, with disseminated pyrite crystals; occasional light grey-weathering beds of argillaceous limestone, recessive	17	1,453 (442.8)

56	Shale, grey, calcareous silty and in part sandy, soft, crumbly; contains a few scattered brachiopods and broken shells; brachiopods collected from 2 feet above base of unit; ambocoeliid, indet. (GSC Loc. C-3875) weathers dark grey, recessive	15	1,436 (437.7)
55	Talus-covered interval	57	1,421 (433.1)
54	Tree-covered interval	277	1,364 (415.7)
53	Shale, brown to black, calcareous, fissile to brittle; a 2-inch bed of fibrous calcite 18 feet above base of unit; numerous tentaculitids at base of unit; weathers dark grey to black, recessive T.S. (fibrous calcite) Calcite, fibrous texture crystals elongate parallel the "C" crystallographic axis are oriented normal to the bedding and contain cone-in-cone structures with cappings of black argillaceous material, some spherical bodies about 200 microns, probably parathuramminids, are preserved in the calcite	32	1,087 (331.3)
52	Limestone, dark grey, argillaceous; occurs in beds about 6 inches thick with thin 1/2 to 1-inch calcareous shale interbeds, abundant brachiopods throughout weathers light grey, resistant	5	1,055 (321.6)
51	Limestone, brown to grey, slightly argillaceous; occurs in beds from 4 to 8 inches thick with intervening 2-to 3-inch shale interbeds, numerous brachiopods throughout; unit weathers light grey, resistant Fossil collection (GSC Loc. C-3873) from interval 0 to 10 feet above base of unit, megafossils comprise, *Lingula* sp., *Orbiculoidea* sp. , *Eliorhynchus castanea* (Meek), *Cassidirostrum pedderi* McLaren, *Spinatrypa* (*Isospinatrypa*) *borealis* (Warren), *Warrenella* sp. cf. *W. kirki* (Merriam), *Buchiola* sp., goniatite indet., *Styliolina fissurella* (Hall), *Tentaculites* sp., *Polygnathus* cf. *P. pseudofoliatus* Wittekindt. Age: Late Eifelian, *castanea* brachiopod assemblage T. S. Limestone, microcrystalline, with an estimated 40 per cent of finely comminuted fossil remains, mostly unidentifiable, some ostracod, brachiopod, crinoid, corals, tentaculitid, and parathuramminid remains, traces of disseminated pyrite and hematite, a little fine detrital quartz; fossiliferous mudstone	10	1,050 (320)
	HUME FORMATION		
50	Partially covered interval, about 10 feet of limestone outcrop near top of unit Fossil collection (GSC Loc. C-12180) 2 to 4 feet below top of unit *Eliorhynchus castanea* (Meek) (top 4 inches with *Eliorhynchus castanea* (Meek) = PT 81-29 Limestone, dark grey, microcrystalline, argillaceous; occurs in nodular beds from 2 to 4 inches thick, brachiopods and corals occur throughout unit Fossil collection (GSC Loc. C-3871) from interval 6 to 52 feet below top of unit, *Sphaerospongia tessellata* of Warren 1944 if not Phillips 1841, *Favosites* sp. undet., *Thamnopora* sp., *Aulopora* sp., on *Exilifrons*? sp., *Radiastraea verilli* (Meek), *R. tapetiformis* (Crickmay),		

	Moravophyllum mcfarlanei (Meek), *Minussiella* n. sp., *Exilifrons*? n. sp., *Pseudodohmophyllum mutabile* (Pedder), *Stringophyllum* sp., *Devonodiscus latisubex* Pedder, *Digonophyllum rectum* (Meek), *Fistulipora* sp., large trepostomatous bryozoan, *Schizophoria* sp. undet., *Douvillina* n. sp., chonetid undet., pentamerid undet., rhynchonellid undet., *Spinulicosta stainbrooke* Crickmay, *Carinatina dysmorphostrota* (Crickmay), *Variatrypa* (*V.*) *arctica* (Warren), *Desquamatia* (*Independatrypa*) *aperanta* Crickmay, *Spinatrypa* (*Isospinatrypa*) *borealis* (Warren), *Spinatrypa* (*S.*) *coriacea* Crickmay, *Nucleospira*, *Emanuella* sp. I of Caldwell 1968, *Emanuella* sp. undet., *Cyrtina* sp. undet., *Undispirifer compactus* (Meek), *Fuscinipyge yolkini* Ormiston, orthoconic nautiloid, fish? spine, Fossil collection (GSC Loc. C-3872) from 8 to 13 feet below top of unit, *Favosites* sp., *Alveolites* sp., *Zonophyllum petilum* McLean, *Cystiphylloides macrocystis* (Schlüter), *C. pumilum* McLean, *Radiastraea verrilli* (Meek), *Digonophyllum rectum* (Meek), *Schizophoria* sp., *Douvillina* n. sp. I, *Carinatina dysmorphostrota* (Crickmay), *Variatrypa* (*V.*) *arctica* (Warren), *Spinatrypa* (*Isospinatrypa*) *borealis* (Warren), *Nucleospira* sp., *Emanuella* sp. I of Caldwell 1968, *Cyrtina* sp. undet., *Undispirifer compactus* (Meek), Fossil collection (GSC Loc. C-3872) taken from interval 8 to 13 feet below top of unit *P.* curtigladius Uyeno, *P. parawebbi* Chatterton	52	1,040 (316.9)
49	Limestone, medium brown, microcrystalline and fine granular; contains appreciable comminuted skeletal remains; occurs in thick massive beds made up of thinner nodular units; weathers light grey, resistant Fossil collection (GSC Loc. C-3870) from upper 5 feet of unit, *Polygnathus curtigladius* Uyeno, *P. pseudofoliatus* Wittekindt, *Icriodus expansus* Branson & Mehl sensu Chatterton 1978; T.S. Limestone, microcrystalline, with an estimated 50 per cent or more of fossil remains; mostly unidentifiable, many crinoids and brachiopod fragments, a few parathuramminids, traces of pyrite, hematite, detrital, and authigenic quartz; fossiliferous mudstone	8	988 (301.1)
48	Limestone, medium to dark grey microcrystalline, slightly argillaceous; occurs in thin nodular beds; large colonial corals at base of unit, a few scattered brachiopods also crinoids and tentaculitids; weathers dark grey, recessive Fossil collection (GSC Loc. C-3869) megafossils collected throughout unit and sample for conodonts taken to represent the upper 6 feet, *Favosites* sp., *Thamnopora* sp., *Syringopora* sp., *Radiastraea verrilli* (Meek) large var., *Aphroidophyllum howelli* Lenz, *Redstonea graciliseptata* (Pedder), *Microplasma caespitosum* (Schlüter), *Polygnathus angusticostatus* Wittekindt, *P.* cf. *P. pseudofoliatus* Wittekindt, *Icriodus expansus* Branson & Mehl sensu Chatterton 1978 T.S. Limestone, microcrystalline, with pelleted area, appreciable recrystallization, abundant skeletal remains of ostracods, brachiopods, crinoids, and corals, traces of fine detrital quartz,		

	specks of hematite; fossiliferous pelleted mudstone PT-81-26 (2' recessive interval 3-5' below top of unit)	14	980 (298.7)
47	Limestone, medium to dark brown, fine- to medium-grained abundant comminuted skeletal debris throughout; occurs in massive beds from 1 to 2 feet thick; weathers light grey resistant Fossil collection (GSC Loc. C-3868) collected throughout the unit, stromatoporoid undet., *Favosites* sp., *Thamnopora* sp., *Alveolites* sp., *Radiastraea verrilli* (Meek), *Exilifrons*? n. sp., *Taimyrophyllum stirps* (Crickmay), *Aphroidophyllum howelli* Lenz, *Redstonea graciliseptata* (Pedder), *Sociophyllum glomerulatum* (Crickmay), stringophyllid indet., *Mesophyllum* sp., *Carinatina dysmorphostrota* (Crickmay), *Carinatina* n. sp., *Variatrypa* (*Variatrypa*) *arctica* (Warren), sp., *Undispirifer compactus* (Meek), *Bellerophon* sp. T.S. Limestone, microcrystalline, with abundant finely comminuted skeletal remains, mostly unidentifiable, some crinoids, gastropods, parathuramminids, and patches of *Girvanella* sp. a little disseminated hematite and pyrite, trace of detrital quartz; fossiliferous mudstone	15	966 (294.4)
46	Limestone, dark grey, microcrystalline, slightly silty; occurs in thin nodular beds; weathers medium light grey, recessive	1	951 (289.8)
45	Limestone, dark grey to brown, fine- to medium grained, dolomitic, contains a few poorly preserved brachiopods; weathers light grey, resistant	2	950 (289.5)
44	Limestone, dark grey, microcrystalline, argillaceous and slightly silty; occurs in thin nodular beds; many megafossils including large colonial corals; weathers dark grey, recessive Fossil collection (GSC Loc. C-3867) collected throughout the unit, megafossils comprise, *Favosites* sp., *Thamnopora* sp., *Minussiella*? sp., *Disphyllum* sp., *Radiastraea verrilli* (Meek), *R. tapetiformis* (Crickmay), *Hexagonaria* sp. cf. *H. gemmifera* Crickmay, *Aphroidophyllum howelli* Lenz, *A. meeki* Pedder, *Pseudodohmophyllum mutabile* (Pedder), *Redstonea graciliseptata* (Pedder), *Mesophyllum* sp., *Mackenziephyllum* n. sp. , *Undispirifer compactus* (Meek), conodonts represented by *Pandorinellina* sp. and simple cones	2	948 (288.9)
43	Limestone, medium brown, microcrystalline and fine-grained; contains abundant comminuted fossil remains, crinoids, brachiopods, stromatoporoid fragments; weathers light grey resistant T.S. Limestone, microcrystalline, with abundant fossil remains, mostly unidentifiable, some ostracods, crinoids, brachiopods, and parathuramminids; fossiliferous mudstone	1	946 (288.3)
42	Limestone, light brown and light grey, micro-crystalline and fine-grained, scattered "birdseye" texture, in part laminated, fossiliferous in upper part; occurs in massive beds from 2 to 3 feet thick; weathers light grey, resistant		

	Fossil collection (GSC Loc. C-3866) from upper 5 feet of unit, *Lekanophyllum vescum* McLaren, *Redstonea graciliseptata* (Pedder) T.S. Limestone, microcrystalline, with scattered finely pelleted and granular areas, a few fossil remains of brachiopods, ostracods, and parathuramminids, fenestral fabric provided by irregularly shaped patches of coarsely crystalline calcite; pelleted mudstone	17	945 (288)
41	Limestone, light brown, microcrystalline and fine-grained with "birdseye" texture, scattered stromatoporoids; occurs in thin nodular beds; weathers medium grey, resistant T.S. Limestone, microcrystalline, with scattered grains and fossil fragments, mostly unidentifiable, appreciable fine detrital quartz, scattered specks of hematite, irregularly shaped patches of coarsely crystalline calcite provide fenestral fabric; granular mudstone	1	928 (282.8)
40	Limestone, brown and light brown, microcrystalline, laminated and pelleted, conspicuous "birdseye" texture, fossiliferous; weathers light grey, resistant Fossil collection (GSC Loc. C-3865) from top of unit; *Dendrostella trigemme* (Quenstedt), and from throughout unit, *Favosites* sp., *Alveolites* sp., *Dendrostella trigemme* (Quenstedt), *Exilifrons*? n. sp. Fossil collection (GSC Loc. C-3864) yielded *Mesophyllum* sp. and simple conodont cones only T.S. Limestone, microcrystalline, with vaguely pelleted areas, fossil remains of *Amphipora*, solitary corals, ostracods, and parathuramminids, trace of pyrite, fenestral fabric made manifest by scattered irregularly shaped patches of coarsely crystalline calcite, some with geopetal fabric, mudstone	3	927 (282.5)
39	Limestone, dark grey, fine- and medium-grained slightly argillaceous; contains abundant comminuted fossil remains, coral, brachiopod, and stromatoporoid fragments; megafossils collected throughout interval, occurs in beds from 8 inches to 1 foot thick; weathers light grey, resistant Fossil collection (GSC Loc. C-3863) megafossils from lower 5 feet of unit comprise stromatoporoid, undet., *Favosites* sp. undet., *Thamnopora* sp., *Alveolites* sp., *Dendrostella trigemme* Quenstedt), *Utaratuia acupicta* Crickmay, *Utaratuia laevigata* Crickmay, *Redstonea gracilisepta* (Pedder), *Sociophyllum glomerulatum* (Crickmay), *Microplasma caespitosum* (Schlüter), *Plasmophyllum* sp. T.S. Limestone, microcrystalline, with an estimated 40 per cent of fossil remains, mainly ostracods, brachiopods, gastropods, crinoids, corals, and parathuramminid foraminifers, a few patches of *Girvanella* sp., traces of *Vermiporella*, scattered pyrite crystals; fossiliferous mudstone	10	924 (281.6)
38	Limestone, brown, fine- and medium-grained, in part argillaceous; contains abundant comminuted remains of corals and brachiopods, scattered solitary and colonial corals, many colonies overturned, occurs in light grey-weathering beds, moderately resistant		

	Fossil collection (GSC Loc. C-3862) from interval 5 to 10 feet below top of unit, stromatoporoid, undet., *Favosites* sp., *Dendrostella trigemme* (Quenstedt), *Exilifrons*? n. sp., *Utaratria acupicta* Crickmay, *Utaratuia laevigata* Crickmay T.S. Limestone, strongly recrystallized, with an estimated 40 per cent of fossil fragments, mainly ostracods, crinoids, brachiopods, stromatoporoids, corals, and parathuramminid foraminifers, a few patches of *Girvanella* sp., traces of detrital quartz, a little pyrite, primary granular texture almost completely destroyed by recrystallization; fossiliferous packstone	13	914 (278.6)
37	Limestone, medium grey, microcrystalline, laminated, conspicuous "birdseye" texture, abundant *Thamnopora*, colonial corals, stromatoporoids; weathers light grey, moderately resistant Fossil collection (GSC Loc. C-3861) from 2 to 12 feet below top of unit, *Favosites* sp., *Alveolites* sp., *Syringopora* sp., *Dendrostella trigemme* (Quenstedt), *Exilifrons*? n. sp., *Utaratuia acupicta* Crickmay, *Sociophyllum glomerulatum* (Crickmay), *Microplasma caespitosum* (Schlüter), conodonts consist of simple cones only T.S. Limestone, microcrystalline, vaguely pelleted, abundant remains of parathuramminids and ostracods, scattered tubular foraminifers?, subhorizontally aligned irregularly shaped elongate patches of coarsely crystalline calcite constitute a laminated fenestral fabric in the rock, many fine sub vertical calcite-cemented fractures; mudstone	10	901 (274.6)
36	Covered interval	12	891 (271.6)
35	Limestone, medium brown, fine-grained, in part microcrystalline; contains abundant fossil debris, brachiopods, crinoids, weathers light grey, resistant Fossil collection (GSC Loc. C-3860) from upper 10 feet of unit, *Favosites* sp., *Thamnopora* sp., *Exilifrons*? n. sp., *Utaratuia laevigata* Crickmay, *Sociophyllum glomerulatum* (Crickmay), cystiphyllid undet., *Variatrypa* (*Variatrypa*) *arctica* (Warren), *Spinatrypa* sp. T.S. Limestone, microcrystalline, finely pelleted, distinctly laminated in beds about 1 mm thick, beds grade up from a sharp lower contact with dense lime mud through finely pelleted limestone to limestone to lime mud again, upper surface of laminae uneven perhaps due to scouring; laminated mudstone and fine pellet grainstone	17	879 (267.9)
34	Limestone, medium grey-green, argillaceous and slightly silty, microcrystalline and fine-grained; consists of alternating laminae of microcrystalline and fine-grained limestone, fossiliferous; occurs in thin beds from ¼ to 1 inch thick, light grey-weathering, recessive beds Fossil collection (GSC Loc. C-3859) stromatoporoid, indet., *Alveolites* sp., *Syringopora* sp., *Dendrostella trigemme* (Quenstedt), *Exilifrons*? n. sp., *Utaratuia laevigata* Crickmay, *Stringophyllum* sp. indet., *Sociophyllum glomerulatum* (Crickmay), *Mesophyllum* sp., undet., *Spinatrypa* sp. undet., *Undispirifer compactus* (Meek), *Paracyclas* sp., conodonts consist of *Dvorakia klapperi* Chatterton	3	862 (262.7)

33	Covered interval	43	859 (261.8)
32	Limestone, medium brown, microcrystalline, in part fine-grained; contains abundant comminuted fossil remains, gastropods, brachiopods, corals, crinoids, Tentaculites, occurs in thin beds from 2 to 6 inches thick; weathers grey, moderately recessive Fossil collection (GSC Loc. C-3858) from upper 4 feet of unit; megafossils comprise, *Alveolites* sp., *Radiastraca verrilli* (Meek), *Spinulicosta* n. sp., *Variatrypa* (*Variatarypa*) *arctica* (Warren), *Emanuella* sp. I of Caldwell 1968, trilobite pygidia 2 species, *Polygnathus linguiformis linguiformis* Hinde, *P. parawebbi* Chatterton, *Icriodus* sp. T.S. Limestone, microcrystalline, with scattered medium sized grains of microcrystalline calcite, abundant skeletal remains, about 70 per cent of brachiopods and gastropods, some patches of *Girvanella* sp., trace of fine detrital quartz, disseminated specks of hematite; fossiliferous partly granular mudstone	11	816 (248.7)
31	Covered interval		
30	Limestone, dark grey and light grey, microcrystalline, in part argillaceous traces of pyrite; contains abundant skeletal remains in scattered "fossil hash" beds of light grey limestone, occurs in thin grey-weathering beds, moderately resistant Fossil collection (GSC Loc. C-3857) collected throughout the unit, *Favosites* sp., *Thamnopora* sp., *Disphyllum*? sp., *Exilifrons*? n. sp., coral possibly a polycoeliid gen., *Mesophyllum* sp. undet., *Microplasma caespitosm* (Schlüter), *Pandorinellina* sp. T.S. Limestone, microcrystalline, with minor granular and brecciated areas, abundant skeletal remains, mainly of brachiopods and gastropods, appreciable chitinous material, probably trilobite remains, scattered fine detrital quartz grains, subhorizontal concentrations of skeletal remains provide a distinct lineation in the rock, recrystallization extends from fossil fragments into enclosing microcrystalline calcite; fossiliferous mudstone	10	793 (241.7)
29	Covered interval	27	783 (238.6)
28	Limestone, medium to light brown, microcrystalline, in part vaguely granular, appreciable pyrite in small nodules and as disseminated crystals, a few fossil fragments, crinoids, brachiopods; weathers yellow-grey, recessive Fossil collection (GSC Loc. C-3856) from interval 1 to 4 feet below top of unit, *Eoschuchertella adoceta* (Crickmay), trilobite pygidium, undet., *Steptotaxis pedderi* (Uyeno & Mason), *P. parawebbi* Chatterton, *Icriodus* cf. *I. angustus* Stewart and Sweet sensu Bultynck 1970 T.S. Limestone, microcrystalline, with broken remains of brachiopods, crinoids, and ostracods, appreciable fine detrital quartz, quartz grains and fossil fragments concentrated in diffuse patches, specks of hematite disseminated throughout, trace of pyrite; silty mudstone	5	756 (230.4)

27	Covered interval	24	751 (229)
26	Limestone, medium brown, microcrystalline, argillaceous, abundant finely disseminated pyrite, a few ostracod shells, some replaced by pyrite, occurs in nodular beds; weathers yellow-grey, recessive Fossil collection (GSC Loc. C-3855) from interval 6 to 12 feet below top of unit, *Icriodus* cf. *I. angustus* Stewart and Sweet sensu Bultynck 1970 T.S. Limestone, microcrystalline slightly silty, with traces of ostracods and parathuramminids, a little fine detrital quartz, scattered areas of coarse wackestone, some sediment burrowing; silty mudstone	24	727 (221.6)
25	Limestone, medium brown, fine-grained and microcrystalline, scattered fossil remains, traces of pyrite in small nodules, occurs in beds from 1 to 3 feet thick, weathers light grey, resistant Fossil collection (GSC Loc. C-3853) from interval 1 to 11 feet below top of unit, yielded no conodont specimens T.S. Irregularly shaped subrounded grains and fossil fragments in a cement of lime mud, fossil remains about 30 per cent, consist of almost equal amounts of gastropod, brachiopod, ostracod, and crinoid remains, with a few *Amphipora* fragments and scattered parathuramminids, a few rounded grains, up to. 3 mm of *Girvanella*, traces of authigenic quartz, some sediment burrowing; medium fossiliferous packstone	25	703 (214.3)
24	Limestone, medium brown, medium-grained, with interbedded argillaceous grey limestone; contains a few gastropod remains, scattered areas of "birdseye" texture; occurs in beds about 2 feet thick, weathers light grey, resistant Fossil collection (GSC Loc. C-3853) from interval 6 to 16 feet below top of unit, yielded no conodont specimens T.S. Rounded grains and pellets of microcrystalline calcite about 120 microns average diameter in a cement of clear coarsely crystalline calcite, traces of skeletal remains of ostracods, brachiopods, corals and parathuramminids, grains are notably uniform in size and consist mainly of pellets, some areas have matrix of lime mud; fine pellet grainstone	30	678 (206.6)
23	Limestone, medium brown, medium-grained, dolomitic; includes a bed of dark grey calcareous shale near centre of unit, contains abundant ostracods in pockets and a few gastropods and brachiopods; megafossils collected from 3 feet below top of unit; Fossil collection (GSC Loc. C-3853, C-3851), *Pandorinellina* sp. (highly fragmentary specimen), pyritized ostracods T.S. Rounded grains of microcrystalline calcite about 150 microns average diameter in a matrix of lime mud, abundant remains, about 30 per cent, of ostracod shells, a few brachiopod fragments, skeletal remains concentrated in thin subhorizontal beds, mud matrix almost entirely recrystallized to clear coarsely crystalline calcite, some disseminated dolomite in non-recrystallized areas appreciable detrital quartz; recrystallized ostracod packstone	6	648 (197.5)

22	Limestone, medium brown, microcrystalline and in part fine-grained, conspicuous "birdseye" texture, many fine cemented fractures, a little comminuted skeletal debris; occurs in beds from 1 to 3 feet thick, weathers light grey, resistant T.S. Limestone, microcrystalline, with abundant remains of ostracods, crinoids and brachiopods, scattered large areas of clear sparry calcite; fossiliferous mudstone	22	642 (195.7)
21	Dolomite, brown and light brown, finely crystalline, in part sucrosic, porous in small vugs and in intercrystalline spaces, weathers brown-grey, moderately resistant T.S. Dolomite, very finely crystalline, with wavy subhorizontal argillaceous laminae, a few ostracods, trace of fine detrital quartz, a little intercrystalline bituminous material	3	620 (188.9)
20	Limestone, medium and light brown, medium-grained and microcrystalline, some areas conspicuously laminated by alternating bands of light brown microcrystalline limestone and medium brown granular limestone, areas of "grape stone" texture; weathers light grey, resistant Fossil collection (GSC Loc. C-3850) from the interval 5 to 15 feet below top of unit yielded no conodont specimens T.S. Limestone, microcrystalline, partly granular, distinctly laminated in alternating beds of micro-crystalline and medium grained limestone with intergranular lime mud matrix, abundant ostracod shell fragments throughout, a few scattered parathuramminids; laminated mudstone and medium grained packstone	15	617 (188)
	BEAR ROCK FORMATION		
19	Dolomite, brown, finely crystalline, slightly argillaceous, fine bedding laminae conspicuous on weathered surface; weathers yellow-grey, resistant T.S. Dolomite, very finely crystalline, trace of detrital quartz, distinct laminae of coarser crystals and darker more argillaceous dolomite, small scour channels cut across laminae	2	602 (183.4)
18	Limestone, dark brown, medium-grained, slightly argillaceous, occasional thin laminae of light brown microcrystalline limestone, many fine cemented fractures; weathers light grey, resistant Fossil collection (GSC Loc. C-3849) *Pandorinellina* n. sp. A Uyeno & Mason T.S. Limestone, microcrystalline with a few medium sized grains of microcrystalline calcite, a few broken ostracod shells, has distinct laminae of unequal thickness made manifest by thin subhorizontal granular beds in the mudstone; laminated mudstone	3	600 (182.8)
17	Dolomite, brown, finely crystalline, sucrosic texture in part, porous in sucrosic areas; occurs in beds from 1 to 2 feet thick, weathers yellow-grey, resistant T.S. Dolomite, finely crystalline, average crystal size about 40 microns, scattered small areas of clear coarsely crystalline dolomite, fine dolomite-cemented fractures, disseminated bituminous		

	material, dark wavy argillaceous and bituminous laminae appear to outline former fragment boundaries	5	597 (181.9)
16	Limestone, dark brown, medium- and coarse-grained, cemented by clear coarsely crystalline calcite; forms a single resistant, light grey-weathering bed Fossil collection (GSC Loc. C-3848) taken from 2 to 7 feet below top of unit, *Pandorinellina expansa* Uyeno & Mason. T.S. Limestone, microcrystalline grains about 200 microns average diameter mostly in a matrix of fine lime mud, some winnowed areas with intergranular cement of clear sparry calcite, dark irregularly shaped tracings suggest sediment deformation by burrowing, a few large tabular wackestone fragments, abundant skeletal remains mostly of ostracods, trace of bituminous material between grains; mixed medium packstone and wackestone	7	592 (180.4)
15	Dolomite, grey and light grey, fine- and medium crystalline, scattered "eyes" of clear coarsely crystalline calcite; occurs in beds from 2 to 4 inches thick, weathers light grey, moderately resistant T.S. Dolomite, finely crystalline, with subrounded and irregularly shaped fragments of medium grained packstone and wackestone, finely disseminated bituminous material appears to outline former fragment and grain boundaries in the dolomite	15	585 (178.3)
14	Dolomite and limestone interbedded; dolomite, brown, medium crystalline with sucrosic porous areas and limestone, light and medium brown, microcrystalline; dark bands of disseminated bituminous material in the light limestone produce a laminated appearance; occurs in beds about 2 feet thick, weathers yellow-grey, resistant T.S. Limestone, microcrystalline with subhorizontal pelleted laminae, alternating dense and pelleted mudstone bands about 3 mm thick, abundant ostracod shell fragments, some whole shells, abundant cube shaped light coloured more coarsely crystalline areas, pseudomorphs after salt crystals, trace of authigenic and detrital quartz, also traces of bituminous material; laminated pellet mudstone	25	570 (173.7)
13	Limestone, with interbedded dolomite; limestone, medium brown, fine-grained and dolomite, brown, medium crystalline, calcareous; occurs in beds about 1 foot thick, weathers brown-grey, moderately resistant Fossil collection (GSC Loc. C-3847); from upper 5 feet of unit, *Pandorinellina* n. sp. A Uyeno & Mason T.S. Small pellets of microcrystalline limestone about 60 microns average diameter, and irregularly shaped patches of finely crystalline dolomite, pellets of notably uniform size, subrounded pellet-filled areas in dolomite suggest burrowing, a few calcite-filled fractures; fine grained dolomite pellet mudstone	30	545 (166.1)

12	Dolomite, brown, finely crystalline, calcareous, with thin interbeds of brown limestone; contains numerous calcite "eyes"; occurs in beds 4 to 6 inches thick, weathers yellow-grey, resistant T.S. Dolomite, finely crystalline, with vermiform patches and tracings of dark grey argillaceous limestone, scattered areas of clear coarsely crystalline calcite, possibly vug filling, laminations provided by subhorizontal arrangement of dolomitized and partly dolomitized areas	20	515 (156.9)
11	Dolomite, brown, medium crystalline, slightly argillaceous, calcareous, vague bedding laminae visible on weathered surface, strong fetid odour, some intercrystalline porosity, weathers yellow grey, resistant T.S. Dolomite, fine and coarsely crystalline, large euhedral crystals about 300 microns diameter in a matrix of small about 30 micron diameter crystals, dark wavy argillaceous bands provide laminated texture, traces of broken ostracod shells	19	495 (150.8)
	(Gossage/Bear Rock contact)		
10	Dolomite and dolomite breccia; dolomite essentially as above; breccia consists of dark brown angular and subrounded fragments of medium crystalline dolomite in a light brown sucrosic and porous matrix; bedding vague in brecciated areas; unit weathers yellow-grey, moderately resistant	30	476 (145.1)
9	Dolomite breccia with occasional interbeds of dolomite, medium brown, finely crystalline, with fine dark argillaceous laminae, spherical fossil "ghosts" of white coarsely crystalline dolomite are suggestive of crinoid remains; bedding vague to indistinct, weathers yellow-grey, moderately resistant Illustration 4D.6 in Moore (1993) is of unit 9 or 10 of Bear Rock breccia at Powell Creek. T.S. Dolomite, finely crystalline, with distinctly laminated texture, laminae caused by wavy seams of dark grey argillaceous material, by layers of larger dolomite crystals, and by near horizontal lineation of oval shaped fossil ghosts of clear coarsely crystalline dolomite, probably replaced ostracods, some calcite filling in central parts of fossil ghost areas	50	446 (135.9)
8	Dolomite, brown, finely crystalline, argillaceous, slightly calcareous, with occasional thin brecciated areas, well bedded and vaguely bedded, weathers brown-grey, resistant T.S. Dolomite, finely crystalline, with laminated texture caused by thin wavy beds of dark grey argillaceous limestone, scattered irregular and oval-shaped areas of coarsely crystalline calcite, the latter probably replaced ostracods, a few fine calcite-filled fractures	51	396 (120.7)
7	Dolomite breccia, subrounded fragments of dark grey, microcrystalline limestone with vuggy porosity, angular fragments of light brown medium crystalline dolomite in a matrix of brown		

	medium crystalline dolomite fragments up to 1 foot maximum dimension; fossil ghosts of supposed crinoids and unidentifiable remains in limestone fragments, vaguely bedded, yellow-weathering, resistant T.S. Dolomite, finely crystalline, silty and argillaceous, consists partly of alternating silty and argillaceous bands about 2 mm thick, quartz silt consists of detrital grains about 175 microns average diameter, irregular shape of detrital grains, suggests erosion or partial replacement by calcite, a few pyrite crystals, scattered specks of black bituminous material	38	345 (105.2)
6	Dolomite breccia, essentially as above, with angular and subrounded limestone fragments up to 6 feet maximum dimension, bedding vague to non-existent, weathers yellow brown and grey, moderately resistant T.S. Dolomite, finely crystalline, slightly silty, average crystal size about 100 microns, silt content of detrital quartz grains about 40 microns in diameter, a few small angular fragments of vaguely pelleted microcrystalline limestone	55	307 (93.6)
5	Dolomite medium brown, finely crystalline, slightly argillaceous and slightly calcareous, conspicuous dark wavy laminae, a little fine crossbedding; occurs in distinct beds from 1 to 2 feet thick, weathers brown, resistant T.S. Dolomite, finely crystalline, with small preserved laminae of alternating argillaceous and pelleted bands each about 3 mm thick, pellets about 175 microns average maximum diameter, scattered small specks of black bituminous material, trace only of intercrystalline porosity	15	252 (76.8)
4	Dolomite breccia, angular blocks of brown, medium crystalline bedded dolomite up to 30 feet maximum dimension in a matrix of fine breccia, cavernous, moderately resistant	47	237 (72.2)
3	Dolomite breccia, a mixture of angular. and subangular fragments of light brown, finely crystalline dolomite; medium brown, subrounded pebbles of argillaceous dolomite; and angular fragments of dark grey microcrystalline limestone; vaguely bedded in part, weathers moderately resistant	35	190 (57.9)
2	Covered interval	155	155 (47.2)
	RONNING FORMATION		
1	Dolomite, light brown, medium crystalline, porous, contains silicified corals, stromatoporoids, and crinoid remains; well bedded in 6- to 8-inch units; weathers yellow-grey resistant T.S. Dolomite, finely crystalline, average crystal size about 100 microns, areas of coarse euhedral crystals, probably replacing fossil remains, some calcite vug filling	25	25

PROHIBITION CREEK SECTION (West fork)
65°12'33"N, 126°13'15"W; NTS 96-E

Section Ref. MN-1-71

A nearly flat-lying sequence of Devonian Bear Rock, Gossage, and Hume Formation carbonates is exposed about 18 miles (29 km) east southeast of Norman Wells along the sides of a narrow gorge that contains the west fork of Prohibition Creek. Despite rugged terrain individual beds can be traced downstream visually along the sides of the gorge from one accessible site to another to provide reasonably accurate thickness measurements for the various units.

The Hume Formation at this location can be subdivided into two parts, a lower unit, 183 feet thick, made up of relatively thin, intermittently covered beds, and an upper unit, 192 feet thick of massive, continuously exposed cliff-forming beds. The lower partly covered unit is more fossiliferous and consists largely of shelly packstone. The upper unit, less fossiliferous, can be again divided into a lower dark brown to almost black shelly mudstone sequence 72 feet thick, and an overlying sequence of light brown mudstone with conspicuous fenestral texture 120 feet thick, Beds characterised by abundant *Eliorhynchus castanea* were not observed in the upper part of the Hume Formation at this location.

This original description by MacKenzie mentioned that the rock-sequence is nearly flat-lying, while in reality it dips at an angle of about 15-20 degrees although in some places it may give the impression of flat-lying beds.

Section measured by W. S. Mackenzie, A. E. H. Pedder and T. T. Uyeno, 2-3 June 1971

MIDDLE and LOWER DEVONIAN

Hare Indian Formation	12 feet (incomplete) (3.6 m)
Hume Formation	375 feet (114.3 m)
Gossage Formation	51 feet (15.5 m)
Bear Rock Formation	140 feet (incomplete) (42.6 m)

Unit	Description	Thickness of unit feet	Thickness from base feet (m)
	HARE INDIAN FORMATION		
18	Shale, dark grey, slightly calcareous, soft fissile contains a few tentaculitids, weathers recessive	12	583 (177.7)
	HUME FORMATION		
17	Limestone, dark grey-brown, argillaceous and slightly silty, microcrystalline, a few brachiopods, occurs in moderately resistant, grey-weathering beds, fossil remains consist mainly of small unidentifiable fragments, a few *Amphipora*, brachiopods and ostracods in a matrix of fine mud, a little detrital quartz silt; shelly mudstone Fossil collection (GSC Loc. C-12136) from interval 18 to 21 feet above base of unit , *Dendrostella trigemme* (Quenstedt), *Icriodus* sp., *Polygnathus* sp. Age: probably Eifelian		

	Fossil collection (GSC Loc. C-12135) from upper 6 feet of unit, *Polygnathus parawebbi* Chatterton, *P*olygnathus aff. *curtigladius* Uyeno. Fossil collection (GSC Loc. C-12134) from interval to 18 feet above base of unit, *Dendrostella trigemme* (Quenstedt), *Tawuphyllum* sp., *Utaratuia acupicta* Crickmay infested with *Camptosalpina* sp., *Icriodus expansus* Branson & Mehl sensu Chatterton 1978, *Polygnathus curtigladius* Uyeno. Age: Eifelian	27	571 (174)
16	Limestone, light brown, microcrystalline with conspicuous fenestral fabric, occurs in cliff-forming units up to 15-feet thick, weathers light grey, fenestral texture consists of irregularly shaped patches of clear sparry calcite in fine lime mud, relicts of internal sediment in the sparry calcite patches provide a geopetal fabric in parts of the unit, fossil remains consist of a few scattered finely divided shell fragments, parathuranminid foraminifers , and calcisphere-like bodies, a few *Amphipora* fragments near top of unit; mudstone with fenestral texture. Fossil collection (GSC Loc. C-12133) from 85 feet above base of unit, *Amphipora* sp., *Dendrostella trigemme* (Quenstedt) large var. Age: Eifelian Fossil collection (GSC Loc. C-12131) from 49 feet above base of unit, *Dendrostella trigemne* (Quenstedt) Fossil collection (GSC Loc. C-12129) from 2 feet above base of unit, *Amphipora* sp. undet., *Dendrostella trigemme* (Quenstedt). Age: Eifelian	98	544 (165.8)
15	Limestone, dark brown to almost black, argillaceous, slightly silty, microcrystalline, a few colonial corals and stromatoporoids, thin partings of black calcareous shale, occurs in thick cliff-forming beds, weathers dark grey, fossil remains consist of finely divided mostly unidentifiable shell fragments, floating in a matrix of fine partly pelleted lime mud, large crinoid columnals, brachiopod shells and spines and coral fragments are common, appreciable fine detrital quartz; shelly mudstone Fossil collection (GSC Loc. C-12127) from interval 46 to 47 feet above base of unit, *Tawuphyllum* sp., *Utaratuia laevigata* Crickmay Fossil collection (GSC Loc. C-12126) from interval 33 to 37 feet above base of unit, stromatoporoid, *Favosites* sp., *Radiastraea* sp. or subsp. nov., *Tawuphyllum* sp., cystimorph coral indet. , *Redstonea sperabilis* (Crickmay) *Mackenziephyllum* sp. nov. Age: Eifelian Fossil collection (GSC Loc. C-12125) from interval 27 to 29 feet above base of unit, *Syringopora* sp., *Radiastraea* sp., *Mesophyllum* sp. undet., *Icriodus expansus* Branson & Mehl sensu Chatterton 1978, *Ozarkodina* sp., *Polygnathus curtigladius* Uyeno Fossil collection (GSC Loc. C-12124) from interval 23 to 24 feet above base of unit, *Icriodus expansus* Branson & Mehl sensu Chatterton 1978, *Neopanderosus* sp., *Panderosus* sp., *Scolopodus* sp.		

	Fossil collection (GSC Loc. C-12123). From interval 6 to 11 feet above base of unit, *Favosites* sp., *Radiastraea* sp. or subsp. nov., *Moravophyllum mcfarlanei* (Meek), *Mackenziephyllum* sp. nov., *Eoschuchertella adoceta* Crickmay? *Productella* sp. fragments of two valves, *Icriodus nodosus* (Huddle) s. l. Age: Eifelian Fossil collection (GSC Loc. C-12122) from interval 2 to 3 feet above base of unit, *Icriodus* sp., *Neopanderodus*? sp., *Polygnathus parawebbi* Chatterton, *Scolopodus*? spp.	72	446 (135.9)
14	Limestone, grey-green, microcrystalline , abundant fossil remains on weathered bedding planes, crinoids, trilobites, brachiopods, auloporids, occurs in thin 1- to ¼ -inch beds with thin interbeds of shale, recessive, weathers light grey rock consists largely of crinoid columnals in a matrix of fine lime mud; crinoid mudstone	15	374 (113.9)
13	Covered interval	33	359 (109.4)
12	Limestone, grey-brown, fossiliferous, occurs in massive cliff-forming beds, weathers light grey, fossil remains of brachiopods, gastropods, corals and crinoids form a self-supporting framework in a matrix of fine lime mud, many skeletal fragments bored and encrusted by filamentous algae, probably species of Girvanella, evidence of sediment burrowing, appreciable fine detrital quartz silt; shelly packstone Fossil collection (GSC Loc. C-1803b) from near top of unit, *Spinulicosta stainbrooki* Crickmay, *Eoschuchertella adoceta* (Crickmay). Age: Eifelian, *adoceta* brachiopod assemblage Fossil collection (GSC Loc. C-12121) from interval 14 to 15 feet above base of unit, *Belodella* sp. Fossil collection (GSC Loc. C-12120) from interval 7 to 15 feet above base of unit, *Favosites* sp., *Alveolites*? sp., *Caliapora* sp., *Syringopora* sp., *Mesophyllum* sp., *Microplasma caespitosum* (Schlüter), polycoelliid coral, *Radiastraea* sp. nov., *Tawuphyllum* sp., *Sociophyllum glomerulatum* (Crickmay), *Gaynaphyllum hyperbolicum* (Crickmay), *Spinatrypa?* sp., indet., *Straparollus (Euomplalus)* sp. Age: Eifelian	25	326 (99.4)
11	Limestone, brown, microcrystalline, with numerous remains of brachiopods, crinoids and trilobites, cliff-forming, weathers light grey Unit consists of relatively flat-lying beds that form the upper few feet of a narrow gorge, upper surface of the limestone beds is intermittently exposed through and grass cover for several hundred feet along either side of the gorge, thickness recorded for the unit is probably reasonably accurate despite the need to trace beds through partial cover and over rugged terrain to an accessible site downstream Fossil collection (GSC Loc. C-12119) from upper 5 feet of unit, *Favosites* sp., *Radiastraea trichomisca* (Crickmay). Age: Eifelian		

	Fossil collection (GSC Loc. C-12118) from interval 5 to 7 feet below top of unit, *Steptotaxis pedderi* (Uyeno & Mason), *Polygnathus parawebbi* Chatterton Fossil collection (GSC Loc. C-12117) from interval 1 to 13 feet above base of unit, *Acodina* sp., *Belodella* sp., *Steptotaxis pedderi* (Uyeno & Mason), *Icriodus* aff. *angustus* Stewart and Sweet, *Ozarkodina* sp., *Polygnathus parawebbi* Chatterton	29	301 (91.7)
10	Partly covered interval with intermittent outcrops of thin rubbly and nodular beds of grey argillaceous limestone containing remains of corals, brachiopods, trilobites, and crinoids Fossil collection (GSC Loc. C-12116) from interval comprising lower 3 feet of unit 11 and upper 7 feet of unit 10, stromatoporoids, *Favosites* sp., *Alveolites*? sp., *Caliapora* sp., *Aulopora* sp. undet., *Syringopora* sp., tabulate corals not studied, *Radiastraea trichomisca* (Crickmay), *Mesophyllum* spp., Devonodiscus *multiradiatus* (Meek), *Eoschuchertella adoceta* (Crickmay), *Spinatrypa* (*Spinatrypa*) *andersonensis* (Warren), atrypid not studied, *Emanuella* sp. undet., *Undispirifer compactus* (Meek), bellerophontid gastropods, *Tentaculites* sp., *Spirorbis* sp., *Fuscinipyge applanata* Ormiston, *Humeia merga* Ormiston, *Acodina* sp., *Icriodus* aff. *angustus* Stewart and Sweet, *Icriodus* sp., *Steptotaxis pedderi* (Uyeno & Mason), *Polygnathus parewebbi* Chatterton. Age: Eifelian, *adoceta* brachiopod assemblage Fossil collection (GSC Loc. C-12115) from interval 18 to 23 feet above base of unit, *Acodina* sp., *Icriodus* sp., *Steptotaxis pedderi* (Uyeno & Mason), *Polygnathus parewebbi* Chatterton	55	272 (82.9)
9	Limestone, brown, with abundant fossil remains, occurs in beds about 1—1/2 feet thick resistant, weathers medium grey, fossil remains form a self-supporting framework in a matrix of fine lime mud, brachiopods, gastropods, trilobite fragments, crinoid columnals and a few ostracods are the most common organic constituents, scattered patches of fine pellet grainstone occur in the otherwise microcrystalline matrix, extensively burrowed and recrystallized; shelly packstone Fossil collection (GSC Loc. C-12114) from interval 9 to 14 feet above base of unit, *Icriodus* aff. *angustus* Stewart and Sweet, *Icriodus* sp.	21	217 (66.1)
8	Limestone, light brown, medium grained, forms a single resistant weathering bed, granular element consists of rounded grains of fine lime mud and composite grains of pelleted mudstone, average grain size about 200 microns, shapes of commonly rounded granular constituents have been modified by extensive recrystallization of interparticle areas of coarsely crystalline calcite cement, fossil remains consist of a few *Amphipora* fragments, brachiopod and ostracod shells, parathuramininid foraminifers and serpularid worm tubes, a little detrital quartz silt; medium grainstone	2	196 (59.7)
7	Limestone green-grey, argillaceous, microcrystalline, occurs in thin grey-green-weathering slightly recessive beds, fossil remains consist		

	mainly of finely divided unidentifiable shell fragments, some ostracods, a few thin-walled calcareous tubes, presumably remains of tubicolous worms, appreciable fine detrital quartz silt, abundant finely disseminated pyrite crystals, clusters of large pyrite crystals associated with patches of clear sparry calcite argillaceous mudstone	3	194 (59.1)
	GOSSAGE FORMATION		
6	Limestone, dark brown, occurs in well defined beds, weathers brown, has randomly distributed fenestral texture with geopetal fabric provided by finely crystalline areas in the otherwise coarsely crystalline calcite patches, a few areas of vaguely pelleted mudstone; mudstone with fenestral texture	9.5	191 (58.2)
5	Shale dark brown to almost black, calcareous, soft, fissile	0.5	181.5 (55.3)
4	Limestone, medium brown, occurs in well-defined laterally persistent beds from 4 to 6 inches thick, weathers brown, elements of fenestral texture and alternating mm thick bands of fine pellet grainstone and pelleted mudstone provide a pronounced horizontal lineation visible on weathered surfaces, abundant fossil remains consist mainly of disarticulated ostracod valves, accessory minerals are authigenic and detrital quartz and disseminated pyrite crystals; laminated pellet mudstone Fossil collection (GSC Loc. C-12109) from interval 2 to 3 feet above base of unit, *Icriodus* sp.	26	181 (55.1)
3	Covered interval	15	155 (47.2)
	BEAR ROCK FORMATION		
2	Covered interval	15	140 (42.7)
1	Dolomite breccia fragments of feet maximum fine breccia angular and subrounded dolomite some up to 5 feet maximum dimension in a matrix of fine breccia and calcareous rock flour, locally bedded, mainly cavernous weathering	125	125 (38.1)

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REFERENCES

Aitken, J.D., Yorath, C.J., Cook, D.G., Balkwill, H.R., 1968. Operation Norman, District of Mackenzie (86D, E, L, M; 87B, C; 96; 97A, B, C, D, F; 106A, B, G, H, I, J, O, P; 107A, D, E) *In* Report of Activities, Part A: April to October, 1968. Geological Survey of Canada, Paper, 69-1A; 1969, p. 223–229. http://dx.doi.org/10.4095/119856

Aitken, J.D., Cook, D.G., Balkwill, H.R., 1969. Operation Norman, District of Mackenzie (86D, E, L, M; 87B, C; 96; 106A, B, G, H, I, J, O, P; 107A, D, E) *In* Report of Activities, Part A: April to October, 1969. Geological Survey of Canada, Paper, 70-1A; 1970, p. 202–206. http://dx.doi.org/10.4095/119858

Birenheide, R., 1964. Die “Cystimorpha” (rugosa) aus dem Eifeler Devon; Abhandlungen der Senckenbergischen Naturforschenden Gessellschaft, v. 507, p. 1–120.

Caldwell, W.G.E., 1968. Ambocoeliid Brachiopods from the Middle Devonian rocks of northern Canada; *in* International Symposium on the Devonian System, Calgary 1967 (ed.) D.H. Oswald, Alberta Society of Petroleum Geologists, Calgary, Alberta. v. 2, p. 601–616.

Copper, P., 1978. Devonian Atrypoids from Western and Northern Canada; *in* Western and Arctic Canadian Biostratigraphy, (eds.) C.R. Stelck and B.D.E. Chatterton; The Geological Association of Canada, Special paper 18, p. 289–331.

Gouwy, S.A., MacNaughton, R.B. and Fallas, K.M., 2017. New conodont data constraining the age of the ‘Bear Rock assemblage’ in the Colville Hills, Northwest Territories; Geological Survey of Canada, Current Research 2017-3, 11p.

Gratsianova, R.T., 1974. “Shukhertelly” rannego i srednego devona na yuge zapadnoi Sibiri: Sistematicheskaya prinadlezhnost’ elementy ekologii, stratigraficheskoe znachenie; Trudy Akademia Nauk SSSR Sibirskoe otdelenie Institut Geologii i Geofiziki, tom 84, p. 77–87.

Johnson, J.G. and Norris, A.W., 1972. *Tecnocyrtina*, a new genus of Devonian brachiopods; Journal of Paleontology, v. 46, p. 565–572.

Kabanov, P. and Gouwy, S., 2021. The type section of the Canol Formation (Devonian black shale) at Powell Creek: Critical assessment and correlation in the northern Cordillera, NWT, Canada. BCPG. (in review)

Kabanov, P., Gouwy, S. A. and Chan, W. C., 2016. Report on field activity for Devonian studies in the Mackenzie Mountains in 2016, GEM 2 Mackenzie Project; Geological Survey of Canada Open File 8131, 16p.

Kabanov, P., VandenBerg, R., Gouwy, S., van der Boon, A., Thallner, D. and Biggin, A., 2019. Geological and geochemical data from Mackenzie corridor. Part X: reference sections of Middle-Upper Devonian strata at Prohibition Creek, Norman Range, Northwest Territories; Geological Survey of Canada, Open File 8648, 1 .zip file. https://doi.org/10.4095/321379

Lenz, A. C. and Pedder, A. E. H., 1972. Lower and Middle Paleozoic sediments and paleontology of Royal Creek and Peel River, Yukon and Powell Creek, N.W.T.; *in* XXIV International Geological Congress Montreal, Quebec 1972, (ed.) D. J. Glass; Excursion A-14, 43p.

MacKenzie, W.S., 1974. Hare Indian Formation (spore-bearing member) *In* Report of activities par A. April to October 1973, (eds.) R.G. Blackader, Geological Survey of Canada, Paper 74-1A, p. 321.

McLean, R.A., 1976. Middle Devonian cystiphyllid corals from the Hume Formation, northwestern Canada; Geological Survey of Canada, Bulletin 274, p. 1–80.

McLean, R.A. and Klapper, G., 1998. Biostratigraphy of Frasnian (Upper Devonian) strata in western Canada, based on conodonts and rugose corals. Bulletin of Canadian Petroleum Geology, v. 46 (4), p. 515–563.

Moore, P.F., 1993. Devonian; *in* Sedimentary cover of the craton in Canada, (eds.) D.F. Stott, and J.D. Aitken, Geological Survey of Canada, Geology of Canada no. 5., p. 150–201

Morrow, D.W., 2012. Devonian of the Northern Canadian Mainland Sedimentary Basin (a contribution to the Geological Atlas of the northern Canadian Mainland Sedimentary Basin); Geological Survey of Canada, Open File 6997, 88p.

Morrow, D.W., 2018. Devonian of the Northern Canadian Mainland Sedimentary Basin: A Review; Bulletin of Canadian Petroleum Geology, v. 66 (3), p. 623–694.

Muir, I., 1988. Devonian Hare Indian and Ramparts Formations, Mackenzie Mountains, NWT; Basin Fill, platform and reef development; Ph.D. thesis, University of Ottawa. 593p.

Norris, A.W. and Uyeno, T.T., 1981. Stratigraphy and paleontology of the lowermost Upper Devonian Slave Point Formation on Lake Claire and the lower Upper Devonian Waterways Formation on Birch River, northeastern Alberta; Geological Survey of Canada Bulletin, v. 334, 53p.

Pedder, A.E.H., 2017. Benthic biostratigraphy of the upper Eifelian (Devonian) Hume Formation at Hume River (type locality), northern Mackenzie Mountains, Northwest Territories, Canada; Stratigraphy, v. 14, p. 349–364.

Pedder, A.E.H., 2019. Systematics, biostratigraphy and significance of discoid and partly discoid corals from the Devonian of northwestern Canada, Ural Mountains Russia and southeastern Australia; Bulletin of Geosciences, v. 94(2), p. 137–168.

Phillips, J., 1841. Figures and descriptions of the Palaeozoic fossils of Cornwall, Devon and west Somerset. xi + 231 pp. Longman, Brown, Green & Longmans, London.

Pyle, L.J. and Gal, L.P., 2007. Lower to Middle Paleozoic stratigraphy and measured sections, NTS 106F, G, H, I, Northwest Territories; Northwest Territories Geoscience Office, NWT Open Report 2007-004, 95p.

Pyle, L.J. and Gal, L.P., 2012. Measured Sections and Petroleum Potential Data (Conventional and Unconventional) of Horn River Group Outcrops, NTS 95M, 95N, 96C, 96D, 96E, 106H, and 106I, Northwest Territories – Part 2; Northwest Territories Geoscience Office, NWT Open Report 2012-008, 114p.

Pyle, L.J. and Gal, L.P., 2013. Measured Sections and Petroleum Potential Data (Conventional and Unconventional) of Horn River Group Outcrops – Part 3, NTS 96C, 96E, and 106H, Northwest Territories; Northwest Territories Geoscience Office, NWT Open Report 2013-005, 73p.

Pyle, L.J., Gal, L.P. and Lemiski, R.T., 2011. Measured Sections and Petroleum Potential Data (Conventional and Unconventional) of Horn River Group Outcrops- Part 1, NTS 96D, 96E, and 106H, Northwest Territories; Northwest Territories Geoscience Office, NWT Open File 2011-09, 116p.

Pyle, L.J., Gal, L.P. and Fiess, K.M., 2014. *Devonian Horn River Group: A Reference Section, Lithogeochemical Characterization, Correlation of Measured Sections and Wells, and Petroleum-Potential Data***,** Mackenzie Plain area (NTS 95M, 95N, 96C, 96D, 96E, 106H, and 106I), NWT; Northwest Territories Geoscience Office, NWT Open File 2014-06, 70p.

Sartenaer, P., 1987. Re-examination of the *castanea* versus *hippocastanea* problem in the District of Mackenzie, and establishment of a new early-middle Givetian rhynchonellid genus; Bulletin de l'Institute Royal des Sciences Naturelles de Belgique, Sciences de la Terre, v. 57, p. 139–147.

Tassonyi, E.J., 1969. Subsurface geology, lower Mackenzie River and Anderson River area, District of Mackenzie; Geological Survey of Canada, Paper 68-25, 207p.

Uyeno, T.T., 1978. Devonian conodont biostratigraphy of Powell Creek and adjacent areas, Western District of Mackenzie; *in* Western and Arctic Canadian Biostratigraphy, (eds.) C. R. Stelck and B. D. E. Chatterton Geological Association of Canada, Special Paper, v. 18, p. 233–257.

Uyeno, T.T., 1991. Pre-Famennian Devonian conodont biostratigraphy of selected intervals in the eastern Canadian Cordillera; *in* Ordovician to Triassic conodont paleontology of the Canadian Cordillera, (eds.) M.J. Orchard, and A.D. McCracken; Geological Survey of Canada, Bulletin 417, p. 129–161.

Uyeno, T.T. and Mason, D., 1975. New Lower and Middle Devonian conodonts from Northern Canada; Journal of Paleontology, v. 49 (4), p. 710–723.

Uyeno, T.T., Pedder, A.E.H. and Uyeno, T.A., 2017. The conodont biostratigraphy and T-R cycles of the Hume Formation at Hume River (type locality), central Mackenzie Mountains, NWT; Stratigraphy, v. 14, p. 391–404.

Warren, P.S., 1944. The role of *Sphaerospongia tessellata* in the Mackenzie River Devonian; The Canadian Field-Naturalist, v. 58, p. 28–29.