GEOLOGICAL
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DEPARTMENT OF ENERGY,
MINES AND RESOURCES

PAPER 71-30

TRIASSIC STRATIGRAPHY OF THE PINE PASS-SMOKY RIVER AREA, ROCKY MOUNTAIN FOOTHILLS AND FRONT RANGES OF BRITISH COLUMBIA AND ALBERTA

(Report, 2 figures and 5 tables)

D. W. Gibson

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ABSTRACT

This preliminary report provides detailed information on the character, distribution, age, and stratigraphic relationships of Triassic rocks between Pine Pass and Smoky River in the Rocky Mountain Foothills and Front Ranges of British Columbia and Alberta.

Triassic rocks, comprising a thick succession of marine siltstone, shale, dolostone, limestone, solution and intraformational breccias, and evaporites are divided into two main and contrasting lithofacies, the Sulphur Mountain and Whitehorse Formations. Each formation is further divided into distinct members. Because of a difference in the physical appearance and composition of Upper Triassic strata in the northern Pine Pass-Sukunka River area, those strata, equivalent to the Whitehorse Formation of the Alberta Foothills, are subdivided into three formations which are, in ascending order, the Charlie Lake, the Baldonnel, and the Pardonet Formations.

All formations and members in the Pine Pass-Smoky River region are correlated with those in the Sikanni Chief River-Pine Pass area to the north, the Jasper-Athabasca River region to the south, and the subsurface Peace River Plains to the northeast.

RÉSUMÉ

Le présent rapport préliminaire contient des données précises sur la nature, la répartition, l'âge et les corrélations stratigraphiques des roches du Trias entre la passe aux Pins et la rivière Smoky, dans les Foothills et à chaîne Frontale des Rocheuses, en Alberta et en Colombie-Britannique.

Les roches du Trias, composées d'une épaisse succession de siltstone d'origine marine, de schiste argileux, de roches dolomitiques, de calcaire, de brèches de dissolution et intraformationnelles et de dépôts d'évaporites, sont divisées en deux lithofaciès principaux et contrastants, les formations de Sulphur Mountain et de Whitehorse. Chaque formation est divisée en deux niveaux distincts. Du fait d'une différence dans l'aspect physique et la composition des strates du Trias supérieur de la partie nord du secteur de la passe aux Pins et de la rivière Sukunka, ces strates, équivalentes à celle de Whitehorse des Foothills de l'Alberta, sont divisées en trois formations qui, en ordre ascendant, sont les formations de Charlie Lake, de Baldonnel et de Pardonet.

Toutes les formations et niveaux du secteur de la passe aux Pins et de la rivière Smoky sont mis en corrélation avec ceux du secteur de la rivière Sikanni Chief et de la passe aux Pins au nord, ceux de la région de Jasper et de la rivière Athabasca au sud et ceux sous-jacents aux plaines de la rivière de la Paix, au nord-est.

TRIASSIC STRATIGRAPHY OF THE PINE PASS - SMOKY RIVER AREA, ROCKY MOUNTAIN FOOTHILLS AND FRONT RANGES OF BRITISH COLUMBIA AND ALBERTA

INTRODUCTION

This report is based on field work carried out during the summers of 1969 and 1970 in the Rocky Mountain Foothills and Front Ranges of British Columbia and Alberta between Pine Pass and Smoky River (Fig. 1). The study is an extension of and concludes earlier work begun in 1962 between Smoky River and Crowsnest Pass (Gibson, 1965, 1968a, 1968b, 1969), and work begun in 1968 between Sikanni Chief River and Pine Pass (Gibson, 1970, 1971). The purpose of this investigation was to obtain information on the character, distribution, age, and stratigraphic relationships of the Triassic rocks in the area and, also, to determine if rock-stratigraphic units established north of Pine Pass and south of Smoky River can be identified and extended into the Pine Pass-Smoky River region.

Complete sections were difficult to find because of folding, faulting, poor exposure, and Pleistocene and Recent erosion. Consequently, sections were examined and measured where any recognizable members of formations were present. Sixteen outcrop sections were measured and sampled in detail, the more important of which are included in Appendix II. All field samples were re-examined in the laboratory with a binocular microscope, and were rechecked for the presence of calcite and dolomite using a 10 per cent hydrochloric acid solution. Selected thin sections were cut from samples representing the different members and facies in the region. The petrological results, including X-ray and insoluble residue analyses, will be reported at a later date pending completion of all phases of the study.

ACKNOWLEDGMENTS

Field and logistical support was provided by Operation Smoky, a regional geological mapping and stratigraphic investigation in northeastern British Columbia coordinated by G.C. Taylor of the Geological Survey of Canada. Able assistance in the field was given by J. Irish, G. Belik, P. Latour, D. Jamieson, P. Lord and J. Craig, student assistants.

All fossils were identified by E.T. Tozer of the Geological Survey of Canada.

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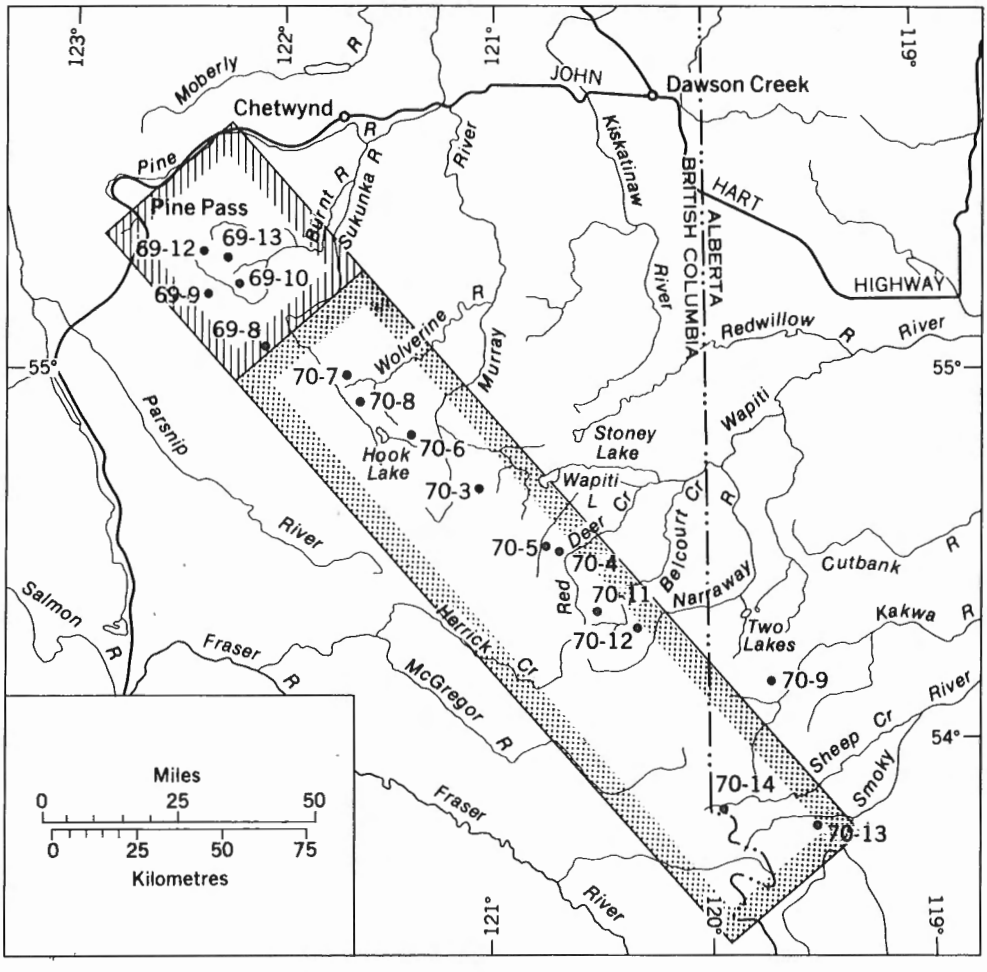
Geological Survey of Canada
Calgary, Alberta



69-8	Lean-to Creek	*70-6	Hook-Murray
*69-9	Main Fork Burnt River	*70-7	Wolverine-Sukunka
*69-10	Watson Peak	70-8	Wolverine Centre
69-12	Brazion Creek	*70-9	Lick Creek
*69-13	North Fork Burnt River	*70-11	Muinok-Belcourt
70-3	Fellers Creek	*70-12	Meosin Mountain
*70-4	Mount Becker	70-13	Haight Creek
70-5	Ganoid Ridge	*70-14	Casket Mountain

*Described in Appendix II . . . . . **

Sukunka River - Smoky River area of report

Pine Pass - Sukunka River area of report

GSC

Figure 1. Locations of Triassic sections between Pine Pass and Smoky River, British Columbia and Alberta

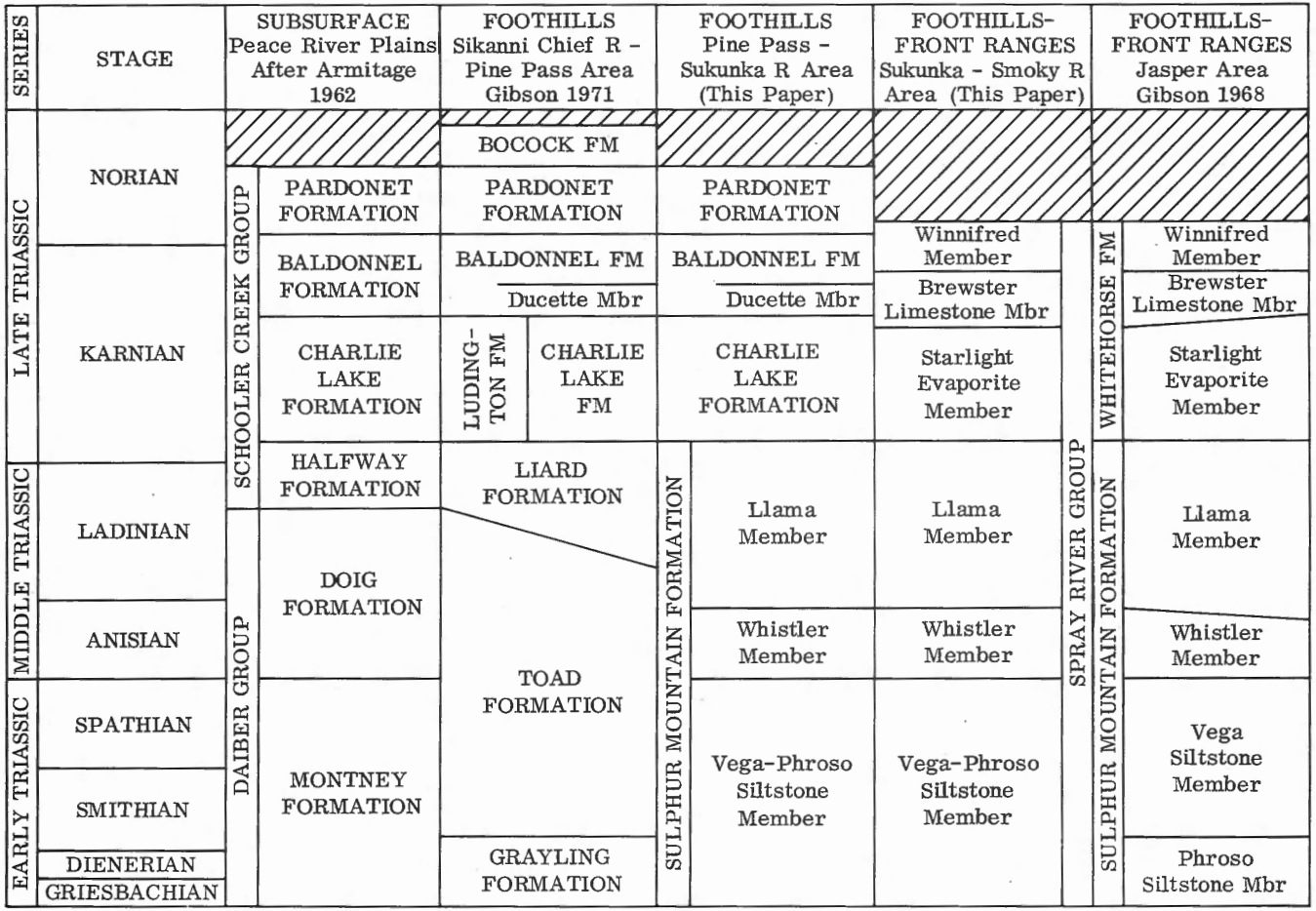


Figure 2. Nomenclature and Correlation chart, British Columbia and Alberta

PREVIOUS WORK

Triassic rocks in the vicinity of Pine Pass have been recognized and described in variable detail by McLearn and Kindle (1950), Colquhoun (1960, 1962), Muller (1961), Westermann (1962), Pelletier (1963), Hughes (1967), Matwe and Bos (1970), and Gibson (1970). However, very little detailed stratigraphic information has been published on the Triassic system in the report area south of Pine Pass. Laudon et al. (1949) first described Triassic rocks while investigating Devonian and Mississippian stratigraphy in the Wapiti Lake area. Irish (1954, 1965) mapped and described Triassic rocks north of Smoky River at Llama Mountain, a locality later visited and redescribed by Gibson (1968). Govett (1961), in a study of gypsum and anhydrite deposits, described a Triassic evaporite occurrence at Featherstonhaugh Creek. In 1963, Pelletier extended his Peace River Triassic studies as far south as Wapiti Lake. A synthesis of all published Triassic surface and subsurface information in Western Canada, including data from the report area, was made by Barss et al. (1964). This summary included subsurface and surface information gathered up to the end of 1961 and 1962 respectively.

STRATIGRAPHY

NOMENCLATURE

Triassic studies north of Pine Pass (Gibson, 1971) established a stratigraphic subdivision and nomenclature system that could be readily applied throughout most of the northern area. It was found, however, that this system could not be extended reliably into the southern region because field work by the writer south of Pine Pass in 1969 and 1970 revealed a noticeable difference in the physical appearance and composition of the Early and Middle Triassic rock assemblages between the two areas. Consequently, a new nomenclature system had to be adopted for the Triassic strata in the report area of Pine Pass-Smoky River. Figure 2 is a nomenclature and correlation chart illustrating the field units recognized and used in this report, and their relationship to field units north of Pine Pass and Peace River and to units in the Jasper Park area south of Smoky River. Because of the different nomenclature used for the upper Triassic rocks between Pine Pass and Sukunka River, these rocks will be described under a separate heading following the main discussion of Upper Triassic stratigraphy in the Sukunka-Smoky River part of the report area. A brief summary of the lithofacies and thickness range of the formations and members in the report area is given in Tables 1 and 2.

SPRAY RIVER GROUP

The Spray River Group in most of the Pine Pass-Smoky River area consists of two lithologically contrasting successions, a lower Sulphur Mountain Formation and an upper Whitehorse Formation. Each formation is characterized by distinct lithofacies that facilitates further subdivision into members. The Spray River Group, which ranges in age from Griesbachian to probable Karnian, disconformably overlies cherty sandstones and carbonates of the Permian Belcourt and Mowitch Formations and is disconformably overlain by dark-weathering shales and carbonates of the Jurassic Fernie Formation.

Member	Thickness in feet	LITHOLOGY
WINNIFRED MEMBER	135 to 210	Medium to yellowish grey-weathering sandy to silty dolostone, and limestone, with minor sandstones, siltstones, and intraformational breccias
BREWSTER LIMESTONE MEMBER	65 to 105	Light grey, cliff-forming limestone, with local intercalations of dolostone and intraformational breccia
STARLIGHT EVAPORITE MEMBER	230 to 700	Buff to light grey-weathering sequence of interbedded dolostones, sandstones, siltstones, limestones, and intraformational or solution breccias
LLAMA MEMBER	210 to 1,170	Resistant greyish brown-weathering assemblage of dolomitic and calcareous siltstones, and limestones, with minor sandstones and dolostones
WHISTLER MEMBER	60 to 280	Dark grey to black-weathering siltstones, silty and fossiliferous limestones, and minor silty shale, dolostone, phosphatic and quartz sandstone, and phosphatic pebble conglomerate
VEGA-PHROSO SILTSTONE MEMBER	260 to 890	Brownish grey to rusty brown, shaly to flaggy weathering sequence of dolomitic to calcareous siltstones, finely crystalline to bioclastic limestones, silty shales, and minor very fine-grained sandstones

Table 1. Table of formations of Triassic rocks in the Sukunka - Smoky River area

Formation & Member	Thickness in feet	LITHOLOGY
PARDONET FORMATION	0 to 270+	Dark grey to brownish grey-weathering, carbonaceous argillaceous limestones, silty limestones, calcareous and dolomitic siltstones, and minor shale
BALDONNEL FORMATION	83 to 240	Resistant, light grey to brownish grey-weathering limestones and minor dolostones
Ducette Member	0 to 40	Dark grey-weathering siltstones, very fine-grained sandstones, limestones, and minor dolostones
CHARLIE LAKE FORMATION	860 to 940	Buff to yellow to orange-brown-weathering dolostones, siltstones, and minor sandstones, intraformational and/or solution breccias and limestones

GSC

Table 2. Table of formations of Upper Triassic rocks in the Pine Pass - Sukunka River area

Sulphur Mountain Formation

The Sulphur Mountain Formation, as much as 1,800 feet thick, consists of dark grey- to orange-brown weathering, calcareous siltstone, silty and bioclastic limestone, and minor amounts of silty shale, dolostone, and very fine-grained quartz sandstone. The formation in the Pine Pass-Smoky River area is divided into three members which, in ascending order, are: Vega-Phroso Siltstone Member, Whistler Member, and Llama Member. An excellent reference section in the report area, illustrating all members and distinctive facies of the formation, is located at Meosin Mountain (Section 8, Appendix II). The Sulphur Mountain Formation contains a fauna that indicates an Early to Middle Triassic age.

Vega-Phroso Siltstone Member

The Vega-Phroso Siltstone Member comprises a dark brownish grey to rusty brown, shaly- to flaggy-weathering sequence of dolomitic to calcareous siltstone, finely crystalline to bioclastic limestone, silty shale, and minor amounts of very fine- to fine-grained quartz sandstone. The name Vega-Phroso is a combination of two names derived from two distinct Early Triassic Members of the Sulphur Mountain Formation in the Jasper region of Alberta (Gibson, 1968). The Vega Siltstone Member in the Jasper area consists of well-indurated, generally cliff-forming cyclical alternations of dolomitic siltstone and shale. In contrast, the Phroso Siltstone Member consists of recessive, shaly- to flaggy-weathering, thin-bedded, carbonaceous-argillaceous siltstone and shale. In the report area, subdivision into separate members is impractical since no well-defined contact exists between the two Jasper facies and there is interfingering of the lithologies over several hundred feet. Therefore, rather than designate a new member for this region, the two names Vega and Phroso and their respective lithologies have been combined and will be described as a single undifferentiated member of the Sulphur Mountain Formation. Stratigraphic sections illustrating litho-facies typical of the Vega-Phroso Member can be seen at Watson Peak, Ganoid Ridge, Mount Becker, and Meosin and Casket Mountains (Fig. 1).

The predominant lithology of the member is siltstone. It is thin- to thick-bedded, medium to dark grey, carbonaceous-argillaceous, very quartzose, and is generally cemented with a recrystallized mosaic of finely crystalline dolomite and minor calcite. The thin beds are finely laminated throughout, whereas the thicker, well-indurated, flaggy-weathering beds are only faintly to non-laminated. Some of the siltstone contains micro-cross-laminations and oscillation ripple-marks. Slightly siliceous limestone occurs, generally in the upper two thirds of the member, as thin, wavy to lenticular interbeds. In the area between Pine Pass and Sukunka River a few intercalated limestone beds were found in the lower third of the member. The limestone is medium to light grey, dense and finely crystalline to bioclastic, with the latter type composed of whole and fragmented pelecypod and brachiopod shells. Some of the bioclastic beds contain vugs filled with black, vitreous hydrocarbon or pyrobitumen material. At most localities examined, large finely laminated, silty limestone concretions as much as 18 inches in diameter were observed in an interval ranging between 80 and 300 feet above the base. In some places these concretions contain well-preserved pelecypods and ammonites. Some silty shale, which is normally carbonaceous-argillaceous and generally very dolomitic, is present; it occurs as thin, recessive zones throughout much of the rock succession. Most of the silty shale, however, occurs in the lower 100 to 150 feet of the member, and is similar to characteristic strata of the Phroso

Siltstone Member in the Jasper and Banff regions of Alberta (Gibson, 1968a, 1968b). The very fine- to fine-grained quartz sandstone was observed in the vicinity of Wapiti Lake. It is dense, well-indurated, non-porous, and slightly calcareous and dolomitic. The sandstone forms a distinctive orange-brown weathering marker facies, with beds up to 5 feet thick. It ranges in measured thickness from 55 feet near Mount Becker (Section 6) to 146 feet near Fellers Creek (Fig. 1). At the latter locality, the sandstone includes a tongue of dark-weathering siltstone which is 45 feet thick, demonstrating an interfingering relationship between the sandstone and siltstone at this locality.

The lower 80 to 150 feet of the Vega-Phroso Member are remarkably uniform at most sections. The strata consist of recessive, partly talus-covered, finely laminated, thin-bedded, very carbonaceous-argillaceous, dolomitic quartz siltstone, and silty shale. Strata of similar physical and mineralogical characteristics have been recognized in other regions of the Rocky Mountains, and have been called the Phroso Siltstone Member in the south (Gibson, 1968) and the Grayling Formation in the north (Gibson, 1971). However, in the Pine Pass-Smoky River area, this thin-bedded, recessive Phroso-like facies is not confined only to the basal 80 to 150 feet of the member, but is found also interfingering with the more resistant Vega-like facies stratigraphically higher in the section, thereby necessitating the combination of the Vega and Phroso Member names as previously mentioned.

Lithofacies similar to the Vega Siltstone Member of the Jasper region are best displayed at sections in the southern and eastern parts of the report area. At other localities, the strata are generally resistant and cliff-forming, weather into distinctive rusty brown flagstone plates, and are confined commonly to the upper two-thirds of the Vega-Phroso stratigraphic interval. However, the Vega Siltstone lithofacies may occur also as tongues or lenses in the lower 80 to 150 feet of the Vega-Phroso stratigraphic interval. North of Murray River (Fig. 1), the Vega-like lithofacies is not well developed, and the Vega-Phroso strata resemble those characteristic of the Toad Formation (Gibson, 1971). A distinctive alternation of resistant and recessive bedding similar to that characteristically found in the Toad Formation is displayed in the upper two-thirds of the Vega-Phroso Member. This alternation appears to be related to the concentration of carbonaceous and carbonaceous-argillaceous material in the strata. It is found also at some sections south of Murray River, occurring with the typical Vega and Phroso Siltstone facies.

The Vega-Phroso Siltstone Member in the Pine Pass-Smoky River area ranges in thickness from 260 feet near Hook Lake (Section 5), to 890 feet at Casket Mountain (Section 10). These thickness extremes, plus values from the intervening areas, indicate a general thickening trend toward the south and southeast.

Between Pine Pass and Sukunka River the Vega-Phroso disconformably overlies dark grey chert and siliceous mudstone of the Permian Fantasque Formation, and cherty limestone of the Mississippian Prophet Formation. Between Sukunka River and Wapiti Lake, the member disconformably overlies cherty sandstone and conglomeratic limestone of the Permian Belcourt Formation and, in the region south of Wapiti Lake to the Smoky River, it disconformably overlies calcareous and glauconitic sandstone of the Permian Mowitch Formation. The contact with the overlying Whistler Member is generally conformable and distinct. It is placed where the resistant, brownish grey to rusty brown weathering siltstone of the Vega-Phroso Member contrasts abruptly with the recessive, dark grey weathering siltstone and limestone of the Whistler Member. At many localities displaying this contact relationship, the lower one foot of the Whistler

FAUNA	GSC LOCATION																														
	84217	84223	84225	84239	84241	85529	85530	85531	85537	85540	85541	85542	85544	85547	85549	85553	85561	85562	85563	85565	85566	85576	85579	85580	85581	85583	85593	85595	85597
Claraia stachei Bittner								X																			X		
Paranorites sp.			X																										
Gervillia sp.																			X	X									
Arctoceras sp.					X										X														
Posidonia mimer Oeberg					X	X			X	X			X	X	X		X				X		X	X		X		X	X
Posidonia aranea Tozer		X																											
Posidonia n.sp.																X													
Posidonia sp.	X																												
Xenoceltites subevolutus Spath							X					X																	
Xenoceltites sp.				X														X							X				
"Pseudomonotis" occidentalis (Whiteaves)				X							X			X														X	X
"Pseudomonotis" occidentalis kindli McLearn												X													X				
Anasibirites sp.														X															X
Pseudosageceras? sp.						X	X																						
Pteria sp.																						X							

GSC

Specific form..... X

Location and stratigraphic position (see Appendix I)..... 84225

Table 3. Showing list and distribution of fauna of Vega-Phroso Siltstone Member

facies is characterized by a unit of phosphatic pebble conglomerate and phosphatic sandstone. This phosphatic zone is considered by the writer to be the same one used in the subsurface of the Plains around Peace River to separate the Montney and Doig Formations of the Daiber Group (Armitage, 1962). At stratigraphic sections between Wapiti and Hook Lakes (Fig. 1), the contact between the Whistler and Vega-Phroso Members is gradational, with the lithofacies of the two members interfingering throughout a stratigraphic interval of approximately 100 feet. The contact is placed where the cement and matrix of the siltstone of the Vega-Phroso Member change upward from a predominance of dolomite to a predominance of calcite. Also accompanying this change is a difference in lamination types. The laminae of the Vega-Phroso Member are generally regular to lenticular, whereas those in the Whistler Member are characteristically wavy and crenulated.

The silty limestone concretions and thin bioclastic limestone interbeds of the Vega-Phroso Member contain some well-preserved ammonites and pelecypods. The oldest fossil collected from the area is Claraia stachei Bittner, a pelecypod indicative of the Early Triassic Griesbachian Stage (Tozer, 1967, p. 12). Paranorites sp., representing the Dienerian Sverdrupi Zone, was collected from a large concretion near the base of the member at Burnt River (Section 69-9). Most collections are dated as Smithian in age, and assigned by Tozer to the Romunderi and Tardus Zones (Tozer, 1967, p. 12). However, Posidonia sp. was collected near Fellers Creek (Section 70-3) and was assigned an uppermost Smithian or Lower Spathian age. Tozer (pers. com.) suggests that this species may represent the Early Spathian Pilicatus Zone. It is known to occur between the Tardus and Subrobustus Zones on Liard River, and on Ellesmere Island. The youngest fossil collected from the Vega-Phroso Member is Posidonia aranea Tozer, and represents the Early Triassic Spathian Subrobustus Zone.

Whistler Member

The Whistler Member forms one of the most distinctive and easily recognized units of the Sulphur Mountain Formation in the Pine Pass-Smoky River area. It consists of a relatively thin succession of dark grey to black-weathering, quartz siltstone, silty and fossiliferous limestone, and minor amounts of silty shale, dolostone, phosphatic and quartz sandstone, and phosphatic pebble conglomerate. The member ranges in thickness from 280 feet at Watson Peak near Sukunka River, to 60 feet at Lick Creek and Casket Mountain (Fig. 1), making the Whistler Member the thinnest unit of the Sulphur Mountain Formation. The thicknesses recorded for the member at the extreme and intervening areas suggest a thinning trend from northwest to southeast, parallel to the topographic strike of the region.

The siltstone, which predominates, is quartzose, very carbonaceous-argillaceous, and is cemented by finely crystalline calcite and dolomite. It is thin to medium bedded, and commonly contains fine, regular to lenticular, light grey laminations. Dark grey to black limestone occurs as thin to medium, regular to lenticular interbeds throughout most of the measured sections. The limestone commonly contains quartz grains, is very carbonaceous-argillaceous and, in some places, very dolomitic. It is generally fossiliferous and, in part, comprises a coquina of whole and fragmented thin-shelled pelecypods and compressed ammonites. These compressed fossils impart a distinct wavy crenulated lamination to the carbonate strata. At some localities, silty limestone concretions as much as 1 foot in diameter occur near the base of the member and, in places contain well-preserved

ammonites and pelecypods. Some of the limestone is permeated by thin hair-like fractures filled with solidified, vitreous pyrobitumen matter. It also contains small "pockets" of oolitic phosphate, especially near the base. Most of the limestone of the member emits a strong fetid sulphurous odour upon fracture. Because of the high calcite content of some of the siltstone and, conversely, the high detrital quartz content of some of the limestone, the classification of these strata is sometimes difficult and must, therefore, be confirmed by results from insoluble residue and thin section analyses. Silty shale and dolostone also occur as thin interbeds within the siltstone at some localities, but are not as abundant as the limestone interbeds. The shale, which may in some instances be actually shaly siltstone (the masking effect of the carbonaceous-argillaceous matter makes grain size distinctions difficult to assess), is dark grey to black, generally soft and poorly indurated, and is usually calcareous and/or dolomitic. It occurs as thin fissile beds intercalated with the more resistant and better indurated siltstone. Dark grey, carbonaceous-argillaceous, silty quartzose dolostone occurs at some southern and eastern sections. The carbonate is finely crystalline and appears to be recrystallized. At many localities, the base of the Whistler Member is characterized by a bluish black weathering, phosphatic pebble conglomerate up to 1 foot thick. A medium-grained quartz and phosphatic sandstone occurs with the conglomerate at some sections. The conglomerate consists of well-rounded to subangular clasts of siliceous phosphate (collophane) and siltstone, up to 2 inches in diameter, in a matrix and cement of granular, sometimes oolitic, phosphate, medium- to fine-grained quartz, and fine to medium crystalline dolomite and some calcite. The occurrence of the conglomerate and oolitic phosphate suggests the existence of a diastem at the base of the Whistler Member at some localities. The genesis and deposition of the conglomerate and oolites appear to have taken place under agitated, very shallow water conditions. The very fine- to medium-grained sandstone, which in some places occurs near the base of the member, consists of well-rounded grains of quartz and minor amounts of feldspar in a matrix and cement of finely crystalline, recrystallized dolomite and calcite. At Mount Becker (Section 6, Appendix II) the sandstone consists mainly of well-rounded, commonly oolitic grains of phosphate and minor quartz, all cemented by phosphate and carbonate. Lenticles of black phosphate, as much as 3 inches long and 1/2 to 1/4 inches wide, were observed in the upper half of the member at sections between Pine Pass and Sukunka River.

Although facies changes in the Whistler Member are not common generally, an unusual facies of dense, resistant, dolomitic quartz siltstone was observed in the lower 120 feet of the member at Fellers Creek (Section 70-3, Fig. 1). The lithology and weathering characteristics of this facies closely resembles that of the overlying Llama Member. Another facies change is demonstrated by the carbonate minerals in the member. At most sections, the predominant carbonate is calcite. However, at Lick and Haight Creeks (Section 70-9, and 70-13, Fig. 1) the main carbonate is dolomite. The dolomite concentration increases progressively toward the south and southeast so that, in the Jasper region south of Smoky River, dolomite is the main cementing agent of the Whistler strata.

The Whistler Member is conformably overlain by the Llama Member. This contact is gradational at some localities, but at most sections it is sharp and abrupt, and placed where recessive, thin- to medium-bedded, calcareous or dolomitic siltstone and limestone of the Whistler Member change to resistant, cliff-forming, medium- to thick-bedded siltstone of the Llama Member. The gradational contact is confined to sections near Hook Lake and between Sukunka River and Pine Pass and is characterized by a zone up to 25 feet thick of interfingering strata. At these localities, the contact is placed at the base of a zone where the thicker bedded, more resistant siltstone, characteristic of the Llama Member, forms the predominant lithology.

FAUNA	GSC LOCATION																					
	84221	84224	84240	85532	85534	85536	85538	85539	85542	85546	85548	85557	85559	85570	85571	85573	85574	85582	85585	85594	85598	85599
Parapopanoceras selwyni McLearn	X						X		X		X		X			X						
Parapopanoceras vermeuili (Mojsisovics)					C												C					
Parapopanoceras sp.															X							
Anagymnotoceras sp.							X		X		X		X	X								
Gymnotoceras n. sp.												X										
Gymnotoceras sp.		X	X			X		X							X		X		X	X	X	
Ussurites sp.													X									
Czekanowskites hayesi McLearn									X													
Longobardites canadensis McLearn			C																			
Ptychites sp.					X																X	
'Arcestes' sp.																						X
Daonella dubia Gabb				X	X					X							C					
Daonella sp. *(americana* or *dubia)*			X																			
Daonella sp.						X									X				X	X	X	
Trigonodus sp.														X								
Spiriferina stracheyi Bittner																		X				

GSC

Specific form X

Comparable form C

Location and stratigraphic position (see Appendix I)..... 84224

Table 4. Showing list and distribution of fauna of Whistler Member

The Whistler Member in the report area contains a fauna of ammonites, pelecypods, and one brachiopod. These are representative of the Middle Anisian Varium Zone, and the Late Anisian Deleeni and Chischa Zones (Tozer, 1967, p. 12).

Llama Member

The upper member of the Sulphur Mountain Formation comprises a resistant assemblage of siltstone, limestone, and minor amounts of sandstone and dolostone ranging in thickness from 1,170 feet near Pine Pass (Section 69-9, Fig. 1), to 210 feet near Lick Creek (Section 70-9, Fig. 1). These extreme values plus those of intervening areas suggest a stratigraphic thinning of the member from the northwest to the southeast, paralleling the topographic and structural strike of the region.

The dominant lithology, as in other members of the Sulphur Mountain Formation, is dense, well-indurated quartz siltstone. It is thin- to thick-bedded (beds up to 4 feet thick), medium to dark grey, and is commonly calcareous and very dolomitic. At some localities the lower 100 to 150 feet of strata are very carbonaceous-argillaceous and contain fine, wavy, dark grey laminations. The siltstone is composed mainly of quartz, minor amounts of orthoclase and plagioclase feldspar, and common "heavy" minerals. The detrital grains are cemented usually by quartz and finely to medium crystalline dolomite and calcite. Near Wapiti Lake, Belcourt Creek, and Narraway River, the upper 50 to 150 feet of the Llama Member are characterized by a very distinctive orange-brown, slightly recessive sequence of very dolomitic, carbonaceous-argillaceous quartz siltstone to very fine-grained sandstone. This facies weathers shaly to flaggy. Light to medium grey weathering, finely to medium crystalline to bioclastic limestone occurs as intercalated thin to medium, sometimes lenticular, beds throughout the siltstone. However, at two sections (70-9, and 70-13, Fig. 1) limestone interbeds were not observed in the Llama Member. The limestone is generally dolomitic, and commonly very quartzose and carbonaceous-argillaceous, especially in the lower half of the member. At Fellers Creek (Section 70-3, Fig. 1), the upper 130 feet of the Llama Member contain interbeds of dense, subconchoidal fracturing, slightly silty limestone, and lesser amounts of iron-stained oolitic limestone. Bioclastic limestone forms the predominant carbonate type. It occurs as thin lenticular interbeds, concretions, and as irregular pockets or patches containing whole and fragmented pelecypod and/or brachiopod shells, and ammonites. The fragmented nature of much of the shell material suggests deposition under relatively shallow water conditions, possibly at times above active wave base. Between Pine Pass and Sukunka River (Fig. 1) the upper part of the Llama Member contains carbonaceous-argillaceous limestone beds replete with rhynchonellid-terebratulid brachiopods. Silty limestone concretions up to 1 foot in diameter are found in the lower 20 to 25 feet of the member; in the region between Burnt River and Brazion Creek (Fig. 1), fossiliferous, silty limestone concretions are scattered throughout the member and associated usually with thin, fossiliferous limestone beds. Throughout much of the report area, the siltstone is characterized by its distinctive light to medium grey weathering, limestone mottling, and the presence of calcareous pseudoconcretions or pseudonodules as much as 4 inches in diameter. The limestone of the mottled siltstone commonly contains fragmented shells and other fossil debris, and appears to be a diagenetic replacement of dolomite and silica. The carbonate of the host siltstone where the mottling occurs is mainly dolomite, with minor calcite at some localities. The limestone of the mottled facies, some of which may actually be very calcareous siltstone, occurs usually between 200 and 300 feet above the base of the member occupying a stratigraphic interval of 25 to

150 feet thick, but, at some localities, the mottled siltstone may occur throughout most of the rock succession above the lower limit of occurrence. The pseudoconcretions and pseudonodules are well developed at Muinok and Casket Mountains (Sections 70-10 and 70-14, Fig. 1). They are generally very silty to sandy, quartzose, commonly ovoid, and weather as recessive indentations in the host dolomitic siltstone. They are finely laminated in part, with the laminations extending through the concretion or nodules into the siltstone host. Very fine- to fine-grained sandstone is found at many sections in the upper third of the member in an orange-brown, flaggy-weathering siltstone-sandstone lithofacies. The sandstone is quartzose, slightly carbonaceous-argillaceous, and is cemented by finely to medium crystalline dolomite and quartz. The sandstone is generally dense and well indurated, although at some sections a few beds display an intergranular porosity. The sandstone is generally laminated with some strata containing micro-cross-laminations, ripple-marks, and flute casts, features which suggest shallow water deposition. Like the siltstone, some of the sandstone, because of its very fine grain size, may actually be classed as coarse-grained siltstone upon close microscopic examination. Many of the sandstone interbeds contain bioturbate mottling and well-preserved worm burrows both parallel and perpendicular to the bedding. Yellow-weathering, finely crystalline quartz dolostone occurs as thin intercalated beds in the upper 30 to 50 feet of the Llama Member at Meosin Mountain and Haight Creek (Sections 70-12 and 70-13, Fig. 1).

The Llama Member displays some very distinctive facies variations in the Pine Pass-Smoky River area. One of the most distinctive is illustrated by the light grey weathering silty limestone mottling of the siltstone which is found at many sections in the report area. It does not occur, however, in the vicinity of Burnt River and Pine Pass, Meosin Mountain, nor at Lick or Haight Creeks (Fig. 1). There the lateral equivalent consists of dolomitic or calcareous siltstone and silty limestone. The facies changes rapidly from west to east across the topographic and structural strike of the region as is illustrated by sections at Muinok and Meosin Mountains (Fig. 1). At Muinok Mountain the mottled facies is very well developed whereas, 8 miles to the southeast across the valley, the mottled facies is absent, having been replaced by dolomitic siltstone and very fine-grained quartz sandstone on the east side of the Meosin Mountain complex. The distinctive orange-brown weathering siltstone-sandstone lithofacies at the top of the Llama Member in many sections illustrates a similar rapid facies change. At Meosin Mountain (Section 70-12, Fig. 1) equivalent strata consist of yellow-weathering silty dolostone and dolomitic quartz siltstone. The carbonate matrix and cement of the siltstone also illustrate a noticeable facies variation in the member. The dolomite concentration increases at the expense of the calcite concentration toward the southeastern part of the study area so that, at Lick and Haight Creeks (Sections 70-9, and 70-13, Fig. 1) calcite does not form any significant part of the carbonate cement and matrix. This facies variation is developed also in the underlying Whistler Member.

An increase in grain size of the terrigenous detrital fraction is displayed from the base to the top of the Llama Member. Furthermore, the strata become lighter in colour and the concentration of carbonaceous material decreases toward the top in most sections; an exception to this is a concentration of carbonaceous matter in the orange-brown weathering siltstone-sandstone unit at the top of the member in the Wapiti Lake area. The siltstone is characterized also by the presence of bioturbate mottling and, at some localities, well-preserved worm burrows, both parallel and perpendicular to the stratification. The above sedimentological features, together with the occurrence of cross-stratification, ripple-marks, flute casts, and much fragmented fossil shell material, suggest that strata of the Llama Member were probably deposited under shallow marine, generally high energy conditions in a regressing sea.

FAUNA	GSC LOCATION												
	84218	84219	84220	84222	84226	84228	84230	84231	84235	84236	84244	84245	84246
Parapopanoceras sp.													
Gymnotoceras cf. *chischa* Tozer													
Gymnotoceras sp.													
Longobardites sp.													
Ptychites sp.													
Celtites? sp.													
Protrachyceras subasperum (Meek)													
Protrachyceras sikanianum McLearn	X	X			X								X
Protrachyceras sp.													
Progonoceratites poseidon Tozer			X								X		
"Arcestes" sp.												X	
Lobites pacianus McLearn													
Lobites sp.													
Meginoceras cf. *meginae* McLearn													
Meginoceras n. sp.													
Silenticeras n. sp.													X
Silenticeras sp.													
Nathorstites mcconnelli (Whiteaves)													
Nathorstites n. sp.													
Nathorstites sp.													
Megaphyllites sp.		X											
Hungarites sp.		X											
Asklepioceras n. sp.		X											
Paratrachyceras sutherlandi McLearn					X					X			
"Paratrachyceras" sp.							X						
Daxatina canadensis McLearn													
Daonella cf. *dubia* Gabb													
Daonella cf. *moussoni* Merian													
Daonella cf. *longobardica* Kittl			C										
Daonella cf. *nitanae* McLearn	C												
Daonella elegans McLearn					X								
Daonella cf. *elegans* McLearn							C						
Daonella cf. *degeeri* Bochun													
Daonella cf. *subarctica*													
Daonella sp.				X		X		X			X	X	
Terebratulid indet													
Arpaditid ammonoid undet.		X											

GSC

Table 5. Showing list and distribution of fauna of Llama Member

GSC LOCATION																										
84247	84248	84250	84251	84260	84261	84262	84263	84264	84265	84266	85533	85550	85555	85560	85567	85568	85572	85577	85578	85584	85587	85588	85589	85592	85600
												X													
												C													
											X														X
																	X				X				X
																	X						X		
																					X				
											C														
	X							X					X												
X																						X			
X		X								X				X											
				X				X		X															
													X			X									
				X				X										X				X			
																				C					
																			X			X			
								X														X			
													X												
									X																
																				X					
													X												
								X																	
							X	X		X															
									X																
																							C		
																					C				
C			C																						
								C					C												
							C	C																	
																		C							
																								C	
	X				X									X			X								
																X									

Note: For legend see Table 4

GSC

Table 5. Continued

The contact of the Llama Member with the overlying Charlie Lake and Whitehorse Formations ranges from gradational to sharp and distinct, depending on locality. Unfortunately, the upper strata of the Llama Member at many sections are absent owing to Recent and Pleistocene erosion. In the Pine Pass-Sukunka River area, the contact with the Charlie Lake Formation is gradational, and is placed where orange- to greyish brown weathering, dolomitic quartz sandstone and siltstone of the Llama Member grade into yellow-weathering, calcareous and dolomitic, fine- to medium-grained sandstone, dolostone, limestone, and calcareous and dolomitic intraformational or solution breccia of the Charlie Lake Formation. Between Sukunka and Smoky Rivers, the Llama Member is both gradationally and abruptly overlain by the Starlight Evaporite Member of the Whitehorse Formation. The gradational type of contact, which is illustrated by sections at Fellers and Lick Creeks (Sections 70-3, 70-9, Fig. 1), is established using the same lithologic criteria as used in the Pine Pass-Sukunka River area to the north. The contact is placed where the orange-brown weathering sandstone and siltstone of the Llama Member grade into yellowish grey weathering, calcareous and dolomitic, fine- to medium-grained sandstone, dolomite, limestone, and calcareous and dolomitic intraformational or solution breccias of the Starlight Evaporite Member. Sections at Muinok and Meosin Mountains (70-10, 70-12, Fig. 1) illustrate the conformable and abrupt type of contact. At Muinok Mountain, the upper Llama strata consist of flaggy, orange-brown weathering siltstone-sandstone lithofacies. This lithology is abruptly overlain by light grey to yellow-weathering dolomitic sandstone, siltstone, and silty dolostone of the Starlight Member of the Whitehorse Formation. At Meosin Mountain, where the orange-brown siltstone-sandstone facies is absent, the Llama Member consists of light orange-brown to yellow-brown weathering dolomitic quartz siltstone, which is overlain abruptly by very calcareous to dolomitic, yellow-weathering quartz sandstone, and a calcareous, pelecypod coquina. The contact with the underlying Whistler Member ranges from gradational to sharp and abrupt, as previously documented.

The Llama Member, the most fossiliferous facies of the Triassic succession, contains a fauna ranging in age from Late Anisian to Late Ladinian. The base of the member is characterized at some localities by a lithofacies similar to the underlying Whistler Member, and contains ammonites representative of the Late Anisian Chischa Zone. The remainder of the Llama Member contains ammonites, pelecypods and brachiopods characteristic of five ammonoid zones which, in ascending order, are: the Subasperum, Poseidon, Meginae, Maclearni, and Sutherlandi Zones (Tozer, 1967, p. 12).

The Llama Member is characterized also at many sections by black to dark grey, organic carbonaceous films which probably represent aquatic plant, seagrass, or algal remains. The films are flat, as much as 8 inches long and 1/2 to 1 inch wide, and are generally confined to the mottled siltstone facies of the member. The films commonly bifurcate and are generally parallel to the stratification, although a few were found cutting the strata. Thin amber-coloured filaments or fibres of possible algal origin were found also in some samples of the mottled siltstone facies. Another paleontological feature of the member is the occurrence of large blue-black phosphatic lingulid shells and shell fragments. They are up to 1 1/2 inches long and 1/2 inch wide, and are commonly found in the orange-brown weathering siltstone-sandstone lithofacies at the top of the member. However, at Lick and Haight Creeks (Sections 70-9, 70-12, Fig. 1), the phosphatic shells are found throughout the member, usually occurring in thin intervals up to 1 inch thick at the top or bottom of bedding planes. Although poorly preserved and not specifically identifiable, they contribute a useful local lithological criterion for correlation purposes since they appear to be limited to strata of the Llama Member. A similar occurrence and limitation was noted in the Llama Member of the Jasper region south of Smoky River (Gibson, 1968).

Whitehorse Formation

In the Pine Pass-Smoky River area, the name Whitehorse Formation is used for strata overlying the Sulphur Mountain Formation only between Sukunka and Smoky Rivers (Fig. 1). Contiguous strata in the remaining Sukunka River-Pine Pass region are given a different nomenclature and will be described separately.

Complete sections of the Whitehorse Formation in the Sukunka-Smoky River area are scarce because of Pleistocene and Recent erosion and structural complexities such as folding and faulting. The formation, composed of a variable sequence of buff- to light grey weathering dolostone, limestone, sandstone, with minor amounts of siltstone, intraformational breccia, and gypsum, is divided into 3 members which are, in ascending order: the Starlight Evaporite Member, the Brewster Limestone Member, and the Winnifred Member. The formation ranges in measured thickness from 430 feet at Lick Creek (Section 70-9, Fig. 1) in the east, to more than 1,300 feet at Meosin Mountain (Section 70-12, Fig. 1) in the west. The Whitehorse Formation is disconformably overlain by the Jurassic Fernie Formation.

Starlight Evaporite Member

The Starlight Evaporite Member consists of a recessive, buff- to light grey weathering sequence of interbedded dolostone, sandstone, siltstone, limestone, and intraformational or solution breccias, ranging in measured thickness from 230 feet at Lick Creek (Section 70-9) to 700 feet near Meosin Mountain to the west. Because of the general recessive nature of the strata, the Starlight Member contains many talus-covered intervals, with only sporadic ribs of outcrop. Yellowish to olive-grey dolostone appears to be the most common lithology in the member. It occurs as dense, well-indurated, thin to medium beds, intercalated throughout the unit. The dolostone is frequently silty to sandy, in some places calcareous, and a finely to medium crystalline texture is displayed. The dolostone generally contains small, white calcite-lined and -filled vugs up to 1 inch in diameter. The sandstone and siltstone, which form the next most common rock types in the member, are quartzose, and generally cemented by fine to medium crystalline dolomite and lesser amounts of calcite. The sandstone, the more common of the two detrital facies, is very fine to medium grained, commonly laminated, and is composed of well-rounded grains of quartz and feldspar. At one section the sandstone is partly brecciated, containing subangular to angular sandstone clasts as much as 1/2 inch in diameter. The sandstone and siltstone are moderately to well indurated, and have in part a fair to good intergranular porosity. The limestones are generally quartzose, very dolomitic, and form medium to thick, poorly indurated, porous interbeds at some western sections. The intraformational or solution breccia, although quantitatively insignificant forms a qualitatively diagnostic facies of the member. The breccia is grey- to buff-weathering, porous and poorly indurated, is found at most localities, but is best developed in the thicker sections to the west. The breccia is composed of angular clasts of quartzose, finely crystalline dolostone, dolomitic limestone, and minor amounts of sandstone and siltstone, in a matrix and cement of sandy to silty calcite and dolomite. The clasts are up to 1 inch in diameter, but average 1/2 inch. White gypsum was observed 4 miles southeast of Casket Mountain (Section 70-14, Fig. 1) on the north side of Forgetmenot Pass. Because of the folded and contorted bedding within the unit and insufficient field time, the author was unable to obtain thickness values for the deposit. However, a description of the stratigraphy and the gypsum at this locality is given by Govett (1961).

Facies changes are characteristic of the Starlight Member. They generally occur over relatively short horizontal and vertical distances, with the result that bedding or facies correlation between closely spaced sections is not possible. This facies feature was noted also in strata of the Starlight Member in the Jasper region south of Smoky River (Gibson, 1968). The occurrences of gypsum, solution or intraformational breccia, rapid facies changes, and a general light colouration of strata, are interpreted as characteristics which indicate deposition in a shallow water marine environment under semi-arid to arid climatic conditions.

The Starlight Evaporite Member is conformably overlain by the Brewster Limestone Member. The contact is placed where the yellow to grey, recessive carbonate, sandstone, and siltstone of the Starlight Member abruptly change to light to medium grey weathering, generally cliff-forming limestone of the Brewster Limestone Member. However, near Meosin Mountain the contact is gradational and must be placed at a point where the limestone forms the predominant lithology.

No fossils were collected from the Starlight Member, although poorly preserved fragmented pelecypod shells were seen. Based on relative stratigraphic position and correlation with the Charlie Lake Formation to the north, the age of the member is considered to be Karnian.

Brewster Limestone Member

The Brewster Limestone Member, where well exposed, forms a very distinctive and readily recognizable lithofacies of the Whitehorse Formation. The Brewster Member was observed only in the southern part of the report area at Lick and Haight Creeks, and at Meosin and Casket Mountains (Fig. 1).

The member comprises a light grey, resistant, cliff-forming, generally well-indurated, medium- to thick-bedded sequence of limestone, with minor local intercalations of dolostone and intraformational breccia. The limestone is yellowish grey to pale brown, slightly dolomitic and siliceous, generally bioclastic, and commonly contains light grey lenses of chert up to 6 inches long. The bioclastic limestone contains fragmented pelecypod and/or brachiopod shells and crinoid columnals cemented by finely crystalline, recrystallized calcite and dolomite. Some of the limestone is very finely crystalline, dense, well indurated, and breaks with a subconchoidal fracture. Furthermore, the dense limestone is characterized by the presence of small vugs as much as 1/2 inch in diameter, which are lined or filled with white calcite and lesser amounts of purple fluorite. Thin beds of very finely crystalline dolostone were noted near the base of the Brewster Member at Lick Creek; one of these beds contains small evaporite crystal pseudomorphs. The intraformational breccia is similar to that found in the underlying Starlight Member, but here it occurs as thin lenticular interbeds in the limestone. The Brewster Limestone Member ranges from 65 feet at Lick Creek to 105 feet near Meosin Mountain to the west. The former extent of the member in the central and northern part of the report area is unknown because of the absence of most of the Whitehorse strata as a result of erosion.

The contact with the overlying Winnifred Member is sharp and conformable, and is placed at a prominent lithological break where the resistant, light grey weathering limestone of the Brewster Member changes to the more recessive, darker weathering dolostone and siltstone of the Winnifred Member.

The Brewster Limestone Member is generally very fossiliferous, although most of the fossil material has been fragmented, and consequently is not generically or specifically identifiable. At Lick Creek, "Elegantinia" sp. (GSC loc. 85543) of Ladian or Karnian age according to Tozer, was collected.

Winnifred Member

In the Sukunka-Smoky River part of the report area, the upper member of the Whitehorse Formation was observed only at Lick Creek (Section 70-9), and on the west side of Meosin Mountain (Section 70-12). However, good exposures of the Winnifred Member occur at Llama Mountain, 5 miles northwest of Smoky River, a locality previously studied and described in detail by the writer (Gibson, 1968). Exposures of the Winnifred Member may be found also at Haight Creek (Section 70-12), 4 miles west of Llama Mountain. However, lack of time precluded a study of the Winnifred Member at that locality.

The Winnifred Member, where exposed, consists of a slightly recessive, yellowish grey weathering, medium-bedded sequence of dolostone and limestone, with minor intercalated beds of sandstone, siltstone, and intraformational breccia. Dolostone, the dominant rock type, is commonly quartzose and slightly calcareous. It is very finely to medium crystalline, generally dense and well indurated, and breaks with a subconchoidal fracture. Medium grey, very finely to finely crystalline, slightly dolomitic limestone is associated with the dolostone at both localities. The carbonate rocks generally contain light to dark grey chert lenses and nodules up to 6 inches long. The fine-grained sandstone is quartzose, slightly phosphatic in part, and is cemented by finely crystalline dolomite and calcite. Quartzose siltstone occurs as thin interbeds in the dolostone and, because of its high dolomite content, may be classed in part as silty quartzose dolostone. Both the sandstone and siltstone are dense and well indurated, with no obvious porosity. A few thin, lenticular interbeds of intraformational breccia were observed at Meosin Mountain. The breccia consists of small, angular, silty dolostone clasts, up to 1/2 inch in diameter, in a matrix and cement of finely crystalline dolomite and calcite.

The Winnifred Member is disconformably overlain by the Jurassic Fernie Formation. The contact is placed at the base of a phosphatic, quartzose pebble conglomerate, which ranges from 1/2 inch to 3 inches in thickness. The conglomerate is overlain by typical dark grey to black shales of the basal Fernie Formation which contrast sharply with the lighter weathering carbonates of the Winnifred Member.

No fossils were collected; however, the equivalent facies in the Jasper region south of Smoky River contains a sparse fauna of probable Late Triassic age.

LATE TRIASSIC ROCKS OF THE PINE PASS-SUKUNKA RIVER AREA

Late Triassic strata in the Pine Pass-Sukunka River part of the report area (Fig. 1) are divided into 3 formations which are, in ascending order: the Charlie Lake Formation, the Baldonnel Formation, and the Pardonet Formation. In this region, the rocks display a closer lithological affinity to the Late Triassic rocks of the Peace River region than to contiguous strata of the Whitehorse Formation in the Sukunka-Smoky River region. Consequently, they are subdivided and given the nomenclature adopted for Upper Triassic rocks in the Peace River region to the north. Although complete sections are scarce in the Pine Pass-Sukunka River area, a brief description of the 3 formations will be given. A more complete and comprehensive discussion of upper Triassic strata in the vicinity of Pine Pass is given by Gibson (1971).

Charlie Lake Formation

The Charlie Lake Formation comprises a buff- to yellow- to orange-brown weathering sequence of dolostone, siltstone, and minor sandstone, intraformational and/or solution breccia, and limestone. The formation is generally medium- to thick-bedded, recessive, and consequently contains many covered intervals. It ranges in measured thickness from 860 feet near the headwaters of the main fork of Burnt River (Section 69-9, Fig. 1), to 940 feet near the headwaters of the north fork of Burnt River (Section 69-13, Fig. 1) to the east.

Finely crystalline, silty dolostone forms the dominant rock type and generally occupies the upper one-third of the formation. Dolomitic quartz siltstone forms the second most abundant rock type and is usually found in close association with the dolostone. It is dense and well indurated, with no visible porosity. The lower one-third of the formation at both localities where Charlie Lake strata are exposed contains medium to thick beds of very fine- to medium-grained, calcareous and dolomitic quartz sandstone. The sandstone is commonly dense, well indurated, and contains fine to coarse, regular to lenticular laminations and crossbedding. Strata composed of intraformational and/or solution breccia are found in the middle part of the formation and, because of their friability and generally poor degree of induration, are thought to underlie some of the large covered intervals characteristic of the formation. The breccia is calcareous and dolomitic; it is composed of yellow to buff, angular clasts of silty to sandy dolostone and chalky limestone, up to 1 inch in diameter, cemented by sandy to silty, medium to coarsely crystalline calcite and dolomite. The limestone is lithologically similar to the dolostone, except that some of the limestone is bioclastic and consists of fragmented brachiopod and/or pelecypod shells, and crinoid columnals. The limestone becomes increasingly more dolomitic upward; like the dolostone, it contains white quartz-lined and -filled vugs, and light grey chert lenses, nodules and siliceous mottling. This latter feature is prevalent in the upper 100 to 150 feet of the formation at both localities.

The contact of the Charlie Lake Formation with the overlying Baldonnel Formation is abrupt and distinct near the main fork of Burnt River (Section 69-9, Fig. 1), but is gradational at the other locality (Section 69-13, Fig. 1). Near the main fork of Burnt River, the buff- to light grey weathering dolostone and siltstone of the Charlie Lake Formation contrast sharply with the overlying dark greyish brown weathering limestone and dolomitic siltstone of the Ducette Member of the Baldonnel Formation. Where the contact is gradational, the two formations interfinger over a stratigraphic interval of 25 feet. The contact with the underlying Sulphur Mountain Formation is gradational.

No identifiable fossils were collected from the Charlie Lake Formation. However, a correlative deeper water facies found north of Peace River contains a fauna of probable Karnian age (Gibson, 1971).

Baldonnel Formation

In the Pine Pass-Sukunka River area, the Baldonnel Formation is divided into two distinctive units. The upper or main unit can be recognized throughout the Foothills and subsurface Plains in most of northeastern British Columbia. However, the lower unit, called the Ducette Member (Gibson, 1971), is limited to the Foothills between Peace and Sukunka Rivers. A brief description of the Ducette Member will follow under a separate heading.

The main Baldonnel facies comprises a resistant, light grey to brownish grey weathering sequence of limestone and minor dolostone. The limestone is commonly dolomitic, slightly quartzose and, near the headwaters of the main fork of Burnt River (Section 69-9, Fig. 1), is very carbonaceous-argillaceous, and contains black, vitreous, pyrobitumen residues filling small vugs and fractures. It emits a strong, fetid, sulphurous odour upon fracture. Texturally the limestone ranges from aphanitic to finely crystalline, to oolitic and bioclastic. The bioclastic limestone consists of fragmented and abraded crinoid columnals, and pelecypod and/or brachiopod shells. Silty and, in places, calcareous dolostone are intercalated with the limestone near the headwaters of the north fork of Burnt River (Section 69-13, Fig. 1). This dolostone displays textural parameters similar to those of the limestone. The limestone and dolostone at both localities contain scattered medium to dark grey lenses and nodules. The Baldonnel Formation, including the Ducette Member, ranges in measured thickness from 83 feet near the headwaters of the main fork of Burnt River (Section 69-9) to at least 240 feet near the headwaters of the north fork of Burnt River (Section 69-13) to the east. The stratigraphic section at the latter locality is incomplete and terminates in the Baldonnel Formation.

The contact with the overlying Pardonet Formation is gradational, and must be placed within a stratigraphic interval where the lighter weathering limestone and dolostone of the Baldonnel Formation grade into shaly- to flaggy-weathering, crenulated, laminated limestone and siltstone of the Pardonet Formation.

No fossils were collected from the main facies of the Baldonnel Formation in the Pine Pass-Sukunka River area. However, in the adjacent Peace River region to the north, Spiriferina abichi Oppel (GSC loc. 82671), and Lima sp. and "Terebratula" julica Bittner (GSC loc. 82688) were collected, and are considered by Tozer to be part of the Mysidioptera poyana faunal zone of Karnian age.

Ducette Member

The Ducette Member is best developed in the adjacent Peace River-Pine Pass area to the north where it occurs as a dark weathering sequence of siltstone, very fine-grained sandstone, limestone, and minor dolostone (Gibson, 1971). In the Pine Pass-Sukunka River report area, the Ducette Member is composed of a thin- to thick-bedded, dark grey to grey-brown weathering, carbonaceous-argillaceous sequence of dolostone, siltstone, and very fine-grained sandstone up to 40 feet thick. The dolostone, which is the main lithology of the member, is quartzose, commonly calcareous, and is finely crystalline to bioclastic. The bioclastic dolostone contains fragmented brachiopod and/or pelecypod shells, and crinoid columnals. The siltstone and very fine-grained sandstone are quartzose, very dolomitic to calcareous, and commonly contain fine, regular to wavy laminations and colour banding.

The contact with the overlying main facies of the Baldonnel Formation is sharp and distinct, and is placed where the dark-weathering siltstone and dolostone of the Ducette Member change to generally more resistant, and lighter weathering strata of the typical Baldonnel Formation.

No fossils were collected from the member. On the basis of stratigraphic position, however, it is considered to be of Late Triassic Karnian age.

Pardonet Formation

The Pardonet Formation in the Pine Pass-Sukunka River area probably represents the southern limit of exposure of the formation in northeastern British Columbia. The Pardonet, the youngest of the Triassic formations in the report area, consists of dark grey to dark brownish grey weathering, carbonaceous-argillaceous limestone and siltstone, in approximately equal proportions. The limestone is quartzose, dolomitic, and finely crystalline to bioclastic. The bioclastic limestone consists of whole and fragmented pelecypod and brachiopod shells which in some places form dense, wavy crenulated coquina beds, especially in the upper third of the formation. The limestone is thin to medium bedded, weathers shaly, in part forming recessive, partly covered intervals, and commonly emits a fetid sulphurous odour upon fracture. The interbedded siltstone is quartzose and is cemented by finely crystalline calcite and minor quartz and dolomite. The siltstone and some of the limestone contains small vugs filled with black, vitreous pyrobitumen residues. The Pardonet Formation has a recorded thickness of 270 feet near the headwaters of the main fork of Burnt River (Section 69-9, Fig. 1), the only exposure of the formation south of Pine Pass. This section is incomplete, but only a small thickness of beds is considered to be absent.

Although not exposed near Burnt River, the upper contact with the overlying Jurassic Fernie Formation is probably disconformable and similar to the Triassic-Jurassic contact near Pine Pass.

The Pardonet Formation is generally one of the most fossiliferous units in the Triassic rock succession, but at Burnt River good collections were scarce. Monotis cf. ochotica densestriata Teller (GSC loc. 84229), and Monotis cf. subcircularis Gabb (GSC loc. 84234) were collected from the upper 20 feet of the formation and represent the Late Triassic, Late Norian Suessi Zone.

CORRELATION

The correlation of Triassic strata in various regions of Western Canada has been documented previously and discussed in variable detail by McLearn and Kindle (1950), Hunt and Ratcliffe (1959), Colquhoun (1960, 1962), Armitage (1962), Barss et al., (1964), Tozer (1967), and Gibson (1968, 1971). The following discussion is an extension of earlier work by the writer and will concentrate mainly on correlations which represent possible modifications of previous suggestions. The correlation of all formations and members is based, wherever possible, on stratigraphic position, lithologic similarity, and fossil content.

The Sulphur Mountain Formation of the report area correlates with the Grayling, Toad, and Liard Formations in the Foothills of the Sikanni Chief River-Pine Pass area, and with the Montney, Doig, and Halfway Formations in the subsurface Peace River Plains. The distinct lithologic contrast between the Whistler and Vega-Phroso and Vega Siltstone Members in this report, and that of the Jasper-Athabasca River areas, is not apparent in the Toad Formation of the Sikanni Chief River-Pine Pass region of the Foothills. The recessive, very dolomitic siltstone and silty dolomite of the Whistler Member grade laterally northwestward into the thick resistant sequence of calcareous siltstone and silty limestone of the Toad Formation. Correlation between the Whistler Member and strata of the Toad Formation is based on the similarity of faunas in the two areas. However, the distinct lithologic break between the Whistler and Vega-Phroso Members is reflected in the subsurface and is responsible for the subdivision between the Montney and Doig Formations. Stratigraphic equivalence to members of the Sulphur Mountain Formation in the Jasper-Athabasca River area is as shown in figure 2. The separation of the Vega and Phroso Siltstone Members into discrete units is not possible in the report area, and the two units must be combined as a single undifferentiated member.

The name Starlight Evaporite Member was extended from the Jasper-Athabasca River area into the report area because of its similar lithology and stratigraphic position in the two regions. The Starlight strata in the Smoky-Sukunka River area, although similar and equivalent to the Charlie Lake Formation of the Sukunka River-Pine Pass area, are restricted in name to the Rocky Mountain Foothills and Front Ranges south of Sukunka River. The Starlight Evaporite Member is equivalent also to the Charlie Lake and laterally equivalent Ludington Formations of the Foothills in the Sikanni Chief River-Pine Pass area, and to the subsurface Charlie Lake Formation of the Peace River Plains.

The Brewster Limestone Member is equivalent to the same lithofacies in the Jasper-Athabasca River region and probably correlates with the upper part of the Charlie Lake Formation and part of the Baldonnel Formation to a point immediately above the Ducette Member in the Pine Pass-Peace River region. In the Pine Pass-Sukunka River area, the upper part of the Starlight Evaporite Member contains a thin unit of bioclastic limestone which is similar to that of the Brewster Limestone Member, thus suggesting a possible partial equivalence to the Brewster Member. Strata similar to the Brewster Limestone Member and containing the pelecypod Lima cf. poyana have been noted between Pine Pass and Peace River in the Baldonnel Formation. The pelcypod was observed immediately above the Ducette Member. This fossil-species plus terebratulids, which are considered to be part of the Late Triassic Mysidioptera poyana faunal zone, were collected from the Brewster Limestone Member near Smoky River (Gibson, 1968), thus indicating a partial correlation between the Brewster Limestone Member of the Whitehorse Formation and the Baldonnel Formation of the Schooler Creek Group.

Strata overlying the Brewster Limestone Member in the Sukunka-Smoky River part of the report area are lithologically similar to those of the Winnifred Member of the Jasper-Athabasca River area and are, therefore, assigned the same member name. The Winnifred Member is considered to be equivalent to the remainder of the Baldonnel Formation, and possibly to the lower few feet of the Pardonet Formation especially in the Pine Pass-Sukunka River region. The suggested equivalence to part of the Pardonet Formation is based on the occurrence of a dark brownish grey weathering, dolomitic siltstone lithofacies commonly found at the top of the Winnifred Member near Smoky River, and at the base of the Pardonet Formation in the Pine Pass area.

The Pardonet Formation, exposed only in the Pine Pass-Sukunka River part of the report area, is lithologically similar to, and represents an extension of the name of, the lithofacies found to the north in the surface and western subsurface areas of northeastern British Columbia. The Pardonet Formation contains the characteristic Late Triassic Norian Monotis subcircularis fauna and, therefore, represents the youngest exposure of Triassic rocks in the Pine Pass-Smoky River report area.

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APPENDIX I

Location of Fossil Collections

VEGA-PHROSO SILTSTONE MEMBER

GSC Locality Number	Location	Height Above Base	Age
84217	Sukunka River, 55°04 1/2'; 121°59 3/4'	245 feet	Smithian or Spathian
84223	Sukunka River, 55°04 1/2'; 121°59 3/4'	250 feet	Spathian, Subrobustus Zone
84225	Mount Reynolds, 55°12 3/4'; 122°12 3/4'	60 feet	Dienerian, Sverdrupi Zone
84239	Mount Reynolds, 55°14'; 122°06 1/4'	207 feet	Smithian, Tardus Zone
84241	Mount Reynolds, 55°14'; 122°06 1/4'	165 feet	Smithian, Romunderi Zone
85529	Dry Canyon, 53°49'; 119°58 1/2'	400 feet	Smithian, prob. Romunderi Zone
85530	Dry Canyon, 53°49'; 119°58 1/2'	620 feet	Smithian, Tardus Zone
85531	Dry Canyon, 53°49'; 119°58 1/2'	Talus	Griesbachian
85537	Dry Canyon, 53°45'; 119°30 3/4'	156 feet	Smithian, prob. Romunderi Zone
85540	Narraway River, 54°16 1/2'; 120°19'	545 feet	Smithian, Romunderi Zone
85541	Narraway River, 54°21'; 120°29 3/4'	270 feet	Smithian, Tardus Zone
85542	Narraway River, 54°21'; 120°29 3/4'	270 feet	Smithian, Tardus Zone
85544	Dry Canyon, 53°49'; 119°58 1/2'	485 feet	Smithian, prob. Romunderi Zone
85547	Narraway River, 54°16 1/2'; 120°19'	370 feet	Smithian, Tardus Zone
85549	Narraway River, 54°21'; 120°29 3/4'	255 feet	Smithian, Romunderi Zone
85553	Monkman Pass, 54°41'; 121°00 1/2'	307 feet	U. Smithian or L. Spathian
85561	Wapiti Lake, 54°30 3/4'; 120°43'	223 feet	Smithian, prob. Romunderi Zone
85562	Wapiti Lake, 54°30 3/4'; 120°39 1/2'	359 feet	Smithian, Romunderi Zone
85563	Sentinel Peak, 54°55 1/4'; 121°32 1/2'	155 feet	Uncertain
85565	Sentinel Peak, 54°55 1/4'; 121°32 1/2'	185 feet	Dienerian??
85566	Sentinel Peak, 54°58 1/4'; 121°37'	170 feet	Smithian
85576	Kinuseo Falls, 54°49 1/2'; 121°20'	116 feet	Not determined
85579	Sentinel Peak, 54°58 1/4'; 121°37'	168 feet	Smithian

GSC Locality Number	Location	Height Above Base	Age
85580	Sentinel Peak, 54°58 1/4'; 121°37'	277 feet	Prob. Smithian
85581	Sentinel Peak, 54°58 1/4'; 121°37'	217 feet	Smithian, Tardus Zone
85583	Wapiti Lake, 54°30 3/4'; 120°39 1/2'	278 feet	Smithian
85593	Wapiti Lake, 54°30 3/4'; 120°43'	40 feet	Griesbachian
85595	Wapiti Lake, 54°30 3/4'; 120°39 1/2'	379 feet	Smithian, Tardus Zone
85597	Monkman Pass, 54°41'; 121°00 1/2'	257 feet	Smithian, Tardus Zone
	WHISTLER MEMBER		
84221	Sukunka River 55°04 1/2'; 121°59 3/4'	55 feet	M. Anisian, Varium Zone
84224	Sukunka River, 55°04 1/2'; 121°59 3/4'	Talus	L. Anisian, Chischa Zone
84240	Mount Reynolds, 55°14'; 122°06 1/4'	160 feet	L. Anisian, Deleeni or Chischa Zone
85532	Dry Canyon, 53°49'; 119°58 1/2'	53 feet	L. Anisian
85534	Narraway River, 54°21'; 120°29 3/4'	77 feet	L. Anisian
85536	Narraway River, 54°21'; 120°29 3/4'	75 feet	L. Anisian
85538	Dry Canyon, 53°45'; 119°30 3/4'	10 feet	M. Anisian, Varium Zone
85539	Narraway River, 54°21'; 120°29 3/4'	5 feet	L. Anisian
85542	Narraway River, 54°20 1/2'; 120°25 1/2'	Talus	M. Anisian, Varium Zone
85546	Dry Canyon, 53°49'; 119°58 1/2'	53 feet	L. Anisian
85548	Narraway River, 54°16 1/2'; 120°19'	7 feet	M. Anisian, Varium Zone
85557	Monkman Pass, 54°41'; 121°00 1/2'	Talus	L. Anisian, Chischa Zone
85559	Kinuseo Falls road		M. Anisian, Varium Zone
85570	Kinuseo Falls, 54°49 1/2'; 121°20'	105 feet	M. Anisian, Varium Zone
85571	Sentinel Peak, 54°55 1/4'; 121°32 1/2'	5 feet	L. Anisian, poss. Deleeni Zone
85573	Kinuseo Falls, 54°49 1/2'; 121°20'	120 feet	M. Anisian, Varium Zone
85574	Wapiti Lake, 54°30 3/4'; 120°43'	85 feet	L. Anisian, Chischa Zone

GSC Locality Number	Location	Height Above Base	Age
85582	Monkman Pass, 54°41'; 121°00 1/2'	5 feet	Anisian
85585	Kinuseo Falls, 54°50 1/2'; 121°24 1/2'	255 feet	L. Anisian
85594	Kinuseo Falls, 54°49 1/2'; 121°20'	68 feet	L. Anisian
85598	Wapiti Lake, 54°30 3/4'; 120°39 1/2'	70 feet	L. Anisian
85599	Kinuseo Falls, 54°49 1/2'; 121°20'	20 feet	Anisian

LLAMA MEMBER

84218	Sukunka River, 55°04 1/2'; 121°59 3/4'	Talus	L. Ladinian, Maclearni or Meginae Zone
84219	Sukunka River, 55°04 1/2'; 121°59 3/4'	187 feet	L. Ladinian, Maclearni Zone
84220	Sukunka River, 55°04 1/2'; 121°59 3/4'	54 feet	E. Ladinian, Poseidon Zone
84222	Sukunka River, 55°04 1/2'; 121°59 3/4'	143 feet	Ladinian
84226	Mount Reynolds, 55°12 3/4'; 122°12 3/4'	672 feet	L. Ladinian, Sutherlandi Zone
84228	Mount Reynolds, 55°12 3/4'; 122°12 3/4'	195 feet	Ladinian
84230	Mount Reynolds, 55°12 3/4'; 122°12 3/4'	Talus	L. Ladinian, Prob. Sutherlandi Zone
84231	Mount Reynolds, 55°12 3/4'; 122°12 3/4'	492 feet	Ladinian
84235	Mount Reynolds, 55°12 3/4'; 122°12 3/4'	153 feet	E. Ladinian, Prob. Poseidon Zone
84236	Mount Reynolds, 55°12 3/4'; 122°12 3/4'	Talus	L. Ladinian, Prob. Sutherlandi Zone
84244	Mount Reynolds, 55°14'; 122°06 1/4'	Talus	E. Ladinian, Poseidon Zone
84245	Mount Reynolds, 55°14'; 122°06 1/4'	243 feet	Ladinian
84246	Mount Reynolds, 55°14'; 122°06 1/4'	248 feet	L. Ladinian, Prob. Meginae Zone
84247	Mount Reynolds, 55°14'; 122°06 1/4'	122 feet	E. Ladinian, Poseidon Zone
84248	Mount Reynolds, 55°14'; 122°06 1/4'	198 feet	Ladinian
84250	Mount Reynolds, 55°14'; 122°06 1/4'	150 feet	E. Ladinian, Poseidon Zone
84251	Mount Reynolds, 55°14'; 122°06 1/4'	113 feet	E. Ladinian, Poseidon Zone

GSC Locality Number	Location	Height Above Base	Age
84260	Lemoray Creek, 55°18 3/4'; 122°14 1/2'	200 feet	Prob. L. Ladinian
84261	Lemoray Creek, 55°18 3/4'; 122°14 1/2'	528 feet	Ladinian
84262	Lemoray Creek, 55°18 3/4'; 122°14 1/2'	543 feet	L. Ladinian, Sutherlandi Zone
84263	Lemoray Creek, 55°18 3/4'; 122°14 1/2'	667 feet	L. Ladinian, Sutherlandi Zone
84264	Lemoray Creek, 55°18 3/4'; 122°14 1/2'	197 feet	L. Ladinian, Prob. Meginae Zone
84265	Lemoray Creek, 55°17 3/4'; 122°09 3/4'	450 feet ±	L. Ladinian, Sutherlandi Zone
84266	Lemoray Creek, 55°17 3/4'; 122°09 3/4'		E. Ladinian, Poseidon Zone
85533	Dry Canyon, 53°49'; 119°58 1/2'	50 feet	E. Ladinian, Subasperum Zone
85550	Narraway River, 54°16 1/2'; 120°19'	5 feet	L. Anisian, Chischa Zone
85555	Sentinel Peak, 54°55 1/4'; 121°32 1/2'	308 feet	L. Ladinian, Meginae Zone
85560	Wapiti Lake, 54°30 3/4'; 120°43'	255 feet	E. Ladinian, Poseidon Zone
85567	Sentinel Peak, 54°55 1/4'; 121°32 1/2'	213 feet	E. Ladinian
85568	Wapiti Lake, 54°30 3/4'; 120°43'	390 feet	L. Ladinian, Prob. Meginae Zone
85572	Kinuseo Falls, 54°49 1/2'; 121°20'	61 feet	Anisian or Ladinian
85577	Wapiti Lake, 54°30 3/4'; 120°43'	420 feet	Ladinian
85578	Sentinel Peak, 54°58 1/4'; 121°37'	Talus	L. Ladinian, Meginae Zone
85584	Sentinel Peak, 54°58 1/4'; 121°37'	320 feet	L. Ladinian, Meginae Zone
85587	Kinuseo Falls, 54°49 1/2'; 121°20'	48 feet	Anisian or Ladinian
85588	Kinuseo Falls, 54°49 1/2'; 121°20'	365 feet	L. Ladinian, Meginae Zone
85589	Kinuseo Falls, 54°49 1/2'; 121°20'	5 feet	L. Anisian
85592	Kinuseo Falls, 54°49 1/2'; 121°20'	455 feet	Ladinian
85600	Kinuseo Falls, 54°49 1/2'; 121°20'	19 feet	L. Anisian

BREWSTER LIMESTONE MEMBER

GSC Locality Number	Location	Height Above Base	Age
85543	Kakwa River, 54°11 1/2'; 119°44'	8 feet	Ladinian or Karnian

BALDONNEL FORMATION

82669	Marion Lake, 57°15'; 123°24'	143 feet	Ladinian or Karnian
82688	Marion Lake, 57°13'; 123°16'	120 feet	Prob. Karnian

PARDONET FORMATION

84229	Mount Reynolds, 55°12 3/4'; 122°12 3/4'	255 feet	L. Norian, Suessi Zone
84234	Mount Reynolds, 55°12 3/4'; 122°12 3/4'	265 feet	L. Norian, Suessi Zone

APPENDIX II

Measured Sections

Section 1: North Burnt River; section measured southwest up steep ridge above small pond, on northeast side of mountain, 3 1/2 miles downstream from headwaters of North Burnt River (55°17 3/4'N; 122°09 3/4'W). Stratigraphic field section GK-69-13.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Baldonnel Formation (195 feet plus)		
51	Limestone, very finely crystalline to bioclastic, medium grey with slight brown tint, weathering light grey; medium- to thick-bedded, up to 3 feet thick; bioclastic limestone consists of fragmented shell and crinoid material; minor white calcite-lined and -filled vugs in upper 5 feet; dense and well-indurated; subconchoidal fracture in part; estimated 50 feet more inaccessible outcrop above present unit; resistant	40	1,881
50	Limestone and minor dolomite; limestone same as above, except becomes dolomitic toward base; dolomite calcareous, and is very finely crystalline; yellowish grey, and weathering same; medium-bedded, up to 6 inches; limestone thick-bedded, over 3 feet; medium grey chert nodules 25 feet from top; resistant	40	1,841
49	Limestone and dolomite, possibly argillaceous; limestone same as above; dolomite slightly calcareous; aphano-crystalline to medium-grained; pale yellowish brown to light olive-grey, and weathering light grey; medium- to thick-bedded; dolomite contains coarse, granular laminations in part; minor white calcite-filled vugs in part; all dense and well-indurated; slightly recessive to resistant	20	1,801
48	Limestone, slightly silty and dolomitic, mainly bioclastic but very finely crystalline in part; medium to medium dark grey, with slight brown tint, and weathering same to light grey; medium- to thick-bedded; strata consist mainly of fragmented pelecypod-brachiopod shells and crinoid columnals; medium grey chert nodules scattered throughout; coarse colour banding in part; dense and well-indurated; unit represents base of main and typical Baldonnel facies	52	1,781

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Ducette Member (43 feet)		
47	Siltstone to dolomite, quartzose, very calcareous in part; carbonate finely crystalline to bioclastic; latter consisting of fragmented pelecypod-brachiopod shells and crinoid columnals; yellowish grey to pale yellowish brown, and weathering grey-brown; indistinctly bedded; well-indurated; siltstone may be in part classed as very fine-grained sandstone; resistant	20	1,729
46	Siltstone to very fine-grained sandstone, quartzose, very dolomitic; carbonate finely crystalline; yellowish grey, and weathering greyish brown; medium-bedded, up to 15 inches thick; fine to coarse, regular to lenticular laminations; crossbedded in part; well-indurated; slightly recessive; unit represents base of member	23	1,709
	Charlie Lake Formation (938 feet)		
45	Covered interval	39	1,686
44	Limestone to siltstone, and minor silty dolomite, quartzose, possibly argillaceous in part; limestone-siltstone very bioclastic in part, consisting of fragmented pelecypod shells, and crinoid columnals; dolomite finely crystalline; medium to medium dark grey to yellowish grey, and weathering brownish grey to light grey; medium- to thick-bedded, up to 2 1/2 feet thick; light grey chert nodules in centre; fine crossbedding in parts; dense and well-indurated; resistant and cliff-forming	20	1,647
43	Siltstone to very fine-grained sandstone, and minor bioclastic limestone; siltstone-sandstone, quartzose, very dolomitic, limestone very dolomitic and slightly sandy and bioclastic; dolomite finely crystalline; light to yellowish grey, and weathering light brownish grey; medium- to thick-bedded, over 4 feet thick; fine to coarse, regular to lenticular laminations in part; white quartz and calcite-filled vugs in upper 5 feet; dense and well-indurated; resistant	33	1,627

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
42	Limestone, slightly quartzose and dolomitic; medium crystalline to mainly bioclastic; yellowish grey, and weathering same to very light grey; medium-bedded; upper 2 feet laminated; bioclasts consist of recrystallized fragmented pelecypod-brachiopod shells; very vuggy and porous; slightly recessive	10	1,594
41	Covered interval	35	1,584
40	Dolomite, slightly quartzose in part, very calcareous in lower 10 feet; finely to very finely crystalline to bioclastic, latter consisting of fragmented pelecypod-brachiopod shells, crinoid columnals, and echinoid spines; yellowish grey to pale yellowish brown, and weathering light grey to brownish grey; medium-bedded; minor white calcite- and quartz-filled vugs in upper 20 feet, with traces of black, vitreous pyrobitumen; dense and well-indurated; resistant	28	1,549
39	Covered interval, except for small outcrop 20 feet from top consisting of light grey weathering dolomite, similar to unit 40; recessive	40	1,521
38	Dolomite, finely to very finely crystalline; yellowish grey, and weathering same to light grey; indistinctly bedded; minor white calcite-filled vugs; dense and well-indurated, and breaks with subconchoidal fracture; slightly recessive	21	1,481
37	Covered interval	40	1,460
36	Dolomite, slightly quartzose, very finely to finely crystalline, yellowish grey to pale yellowish brown, and weathering light grey; colour mottling in part; medium-bedded; dense and well-indurated; weathers rubbly in part; partly covered; slightly recessive to recessive	40	1,420
35	Dolomite, very finely to finely crystalline to bioclastic; yellowish grey with dark grey pyrobitumen mottling in lower 20 feet, and weathering light grey; medium to indistinctly bedded, with obvious beds to 15 inches thick; scattered light grey chert lenses and nodules - irregular shape, in upper 40 feet; bioclastic interbeds confined to upper half of unit; very dense and well-indurated; weathers rubbly in part; resistant	60	1,380

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
34	Dolomite, slightly silty to sandy; very finely to finely crystalline, may be in part bioclastic; yellowish grey, and weathering same; medium- to thick-bedded; dense and well-indurated; dark grey to black, pyrobituminous wavy laminations in upper 5 feet; resistant	20	1,320
33	Siltstone, and minor limestone, siltstone quartzose, very dolomitic, calcareous in part, slightly carbonaceous-argillaceous; limestone slightly quartzose and dolomitic, very carbonaceous-argillaceous, and is very finely crystalline to possibly bioclastic; medium dark grey with slight brown tint, and weathering brownish grey; indistinctly bedded; fine, regular to lenticular laminations in part; limestone confined to lower 5 feet, and has fetid odour upon fracture; dense and well-indurated; slightly recessive	40	1,300
32	Siltstone to very fine-grained sandstone, quartzose, very dolomitic, calcareous, carbonaceous-argillaceous; carbonate finely crystalline; medium dark grey, and weathering dark brownish grey; indistinctly bedded; dense and well-indurated; slightly recessive to resistant	19	1,260
31	Dolomite, slightly quartzose and calcareous in part; very finely to finely crystalline; medium grey to yellowish grey, and weathering light grey; indistinctly to medium-bedded; few wavy quartz silt-sand laminations in part; black, vitreous pyrobitumen mottling and filled fractures and vugs in part; few white calcite-filled vugs in lower 10 feet; dense and well-indurated; unit partly talus covered; weathers very rubbly; recessive to slightly recessive	103	1,241
30	Dolomite and minor limestone; dolomite same as unit 31; limestone slightly quartzose, and dolomitic, and bioclastic, consisting of fragmented pelecypod-brachiopod shells and crinoid columnals - Pentacrinus sp., medium grey to yellowish grey, and weathering same to light grey; indistinctly bedded; dolomite well-indurated, limestone, moderate induration; unit forms resistant rib	35	1,138

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
29	Covered interval	43	1,103
28	Dolomite, very calcareous, slightly quartzose, finely crystalline to chalky; yellowish grey, and weathering same; indistinctly bedded; poor induration; very porous; recessive	5	1,060
27	Covered interval	43	1,055
26	Limestone, very finely crystalline to bioclastic; yellowish grey, and weathering light brown; indistinctly bedded; bioclasts appear to consist mainly of fragmented brachiopod-pelecypod shells; textural mottling in part; possible algal? filaments; dense, well-indurated, and breaks with subconchoidal fracture in part; sporadic exposure; resistant to slightly recessive	20	1,012
25	Limestone, very finely crystalline; medium dark grey to yellowish grey, and weathering same to light grey; medium-bedded; pyrobitumen staining, and filling micro-vugs; dense and well-indurated; subconchoidal fracture in part; upper 20 feet partly covered; resistant	50	992
24	Covered interval, talus consists of dolomitic, fine-grained sandstone, sandy limestone, and minor solution breccia; unit forms recessive notch along ridge	150	942
23	Limestone, brecciated in part, but mainly very finely to finely crystalline; breccia consists of angular sandy limestone and sandstone clasts, up to 1 inch in diameter, in a very finely crystalline, limestone matrix and cement; yellowish grey, and weathering same; indistinctly bedded; breccia appears to be of solution or collapse type; "honeycomb" texture in part; slightly recessive to resistant	51	792
22	Sandstone, quartzose, calcareous; fine- to medium-grained; greyish yellow with slight orange tint, and weathering greyish orange; indistinctly bedded; intraformational breccia in part; moderate induration; porous; weathers as resistant pinnacle	20	741

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
21	Sandstone and limestone; sandstone same as unit 22; limestone slightly quartzose, and is finely to medium crystalline; appears brecciated in part; yellowish grey with orange mottling, and weathering greyish orange; looks medium- to thick-bedded; moderate to poor induration; porous; recessive	45	721
20	Covered interval, except for small exposure 25 feet from top, consisting of limestone, same as unit 21; recessive	40	676
19	Sandstone and dolomite; sandstone quartzose, very calcareous, and is fine- to medium-grained; dolomite slightly sandy in part, and is finely to very finely crystalline, and occupies lower 15 feet; dolomite laminated to banded; unit yellowish grey, and weathering same; indistinctly bedded; moderate induration; recessive	25	636
18	Sandstone and dolomite; sandstone, quartzose, calcareous and dolomitic, and very fine- to fine-grained; dolomite slightly quartzose, and is finely crystalline; yellowish grey to greyish orange, and weathering same; medium-bedded, up to 2 feet thick; fine to coarse, wavy laminations; sandstone moderate induration and slightly porous; dolomite dense and well indurated; unit forms probable base of Charlie Lake Formation; slightly recessive	63	611
	Sulphur Mountain Formation (Incomplete)		
	Llama Member (Incomplete)		
17	Sandstone, quartzose, very dolomitic; very fine-grained; yellowish grey to moderate yellowish brown, and weathering orange-brown; indistinctly bedded; dense and well-indurated; resistant	25	548
16	Siltstone, quartzose, very dolomitic; slightly ferruginous; medium grey to pale yellowish brown, and weathering orange-brown; medium- to thick-bedded; fine to coarse, regular to wavy lenticular laminations in upper 20 feet; dense and well-indurated; slightly recessive to resistant	70	523

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
15	Siltstone, quartzose, calcareous, dolomitic slightly ferruginous; carbonate finely crystalline; greyish orange to pale yellowish brown, and weathering orange-brown; medium- to thick-bedded; mottled in part; dense and well-indurated; partly covered; unit forms sharp contact with underlying siltstone-limestone lithofacies; slightly recessive	23	453
14	Siltstone to very fine-grained sandstone, and limestone, interbedded; siltstone-sandstone, quartzose, very calcareous, dolomitic; limestone slightly quartzose and dolomitic, and mainly bioclastic, consisting of fragmented ammonite, pelecypod-brachiopod shells, and crinoid columnals; medium to medium dark grey with brown tinting, and weathering same with orange-brown mottling; medium-bedded, up to 18 inches thick; Daxatina canadensis McLearn, Paratrachyceras sutherlandi McLearn, and Nathorstites mcconnelli (Whiteaves) collected from upper 9 feet, GSC Loc. 84265; fossil fragments in part replaced by pyrite; Lingula sp. throughout upper 9 feet; dense and well-indurated; strata display "nodular" appearance; weathers rubbly in part; resistant	43	430
13	Limestone to sandstone, quartzose, dolomitic, slightly pyritiferous; carbonate finely crystalline to bioclastic, latter consisting of fragmented pelecypod-brachiopod shells, crinoid debris, and echinoid spines; medium grey, and weathering same to brownish orange; medium- to thick-bedded; bedding wavy to lenticular; orange-brown colour mottling; minor intra-formational conglomerate in lower 20 feet; fossil fragments replaced in part by pyrite; well-indurated; slightly recessive to resistant	40	387
12	Siltstone and minor sandy to silty limestone; siltstone quartzose, dolomitic, slightly calcareous; limestone same as unit 13; medium to medium dark grey, and weathering orange-brown; medium-bedded; fine, regular to lenticular laminations in part; micro-cross-laminated in part; weathers flaggy; dense and well-indurated; resistant	22	347

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
11	Sandstone and minor bioclastic limestone, quartzose, dolomitic, sandstone very calcareous, and very fine-grained; yellowish grey, and weathering greyish yellow; medium- to thick-bedded; upper 5 feet crossbedded; well-indurated; resistant	8	325
10	Siltstone, quartzose, very dolomitic, and may in part be classed as silty dolomite, very calcareous in part; carbonate finely crystalline; medium grey with slight blue tint, and weathering brownish orange; indistinctly bedded; fine to medium, regular to wavy laminations; micro-cross-laminations in part; scattered brachiopod shell fragments; dense and well-indurated; weathers flaggy in part; slightly recessive to resistant	40	317
9	Siltstone to sandstone, quartzose, very calcareous in part, and may be classed as sandy bioclastic limestone; very dolomitic; medium grey to yellowish grey with orange tinting, and weathering brownish orange; medium- to thick-bedded, up to 3 feet thick; well-developed simple cross-bedding; large fragmented pelecypod shells, and crinoid debris; fossil fragments replaced in part by pyrite, well-indurated; resistant	20	277
8	Covered interval, except for small exposure in centre consisting of dolomitic, very fine-grained, quartz sandstone, similar to unit 9; crossbedded; weathers brownish orange; recessive	20	257
7	Siltstone, quartzose, calcareous, dolomitic, slightly pyritiferous; carbonate finely crystalline; medium grey, and weathering brownish orange; indistinctly bedded; fine to medium, regular to wavy laminations; dense and well-indurated; weathers flaggy in part; partly covered; recessive	20	237
6	Covered interval, except for minor outcrop at top, middle, and base, consisting of calcareous, and dolomitic quartz siltstone, similar to unit 7; outcrop and talus weathers bright brownish orange; talus samples contain ripple marks, flute clasts, and small load casts; unit forms sharp contact with underlying terebratulid limestones	42	217

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
5	Siltstone, and bioclastic limestone; siltstone quartzose, dolomitic, very calcareous in part; limestone slightly quartzose and dolomitic, and consists of compressed, whole and fragmented brachiopod shells; medium to medium dark grey, and weathering greyish orange; thin- to medium-bedded, up to 2 feet thick; limestone weathers shaly to flaggy; fine to coarse, wavy to lenticular laminations in part; slightly recessive to resistant	20	175
4	Siltstone, quartzose, calcareous, dolomitic, possibly argillaceous; carbonate finely crystalline; medium dark grey, and weathering greyish orange; indistinctly bedded; weathers flaky, recessive	10	155
3	Covered interval	83	145
2	Limestone, slightly silty, very carbonaceous-argillaceous; bioclastic, consisting of compressed fragmented, pelecypod shells; dark grey, and weathering medium to light grey; slight fetid odour upon fracture; unit forms sharp contact with underlying massive siltstones; recessive	2	62
1	Siltstone and minor silty limestone, quartzose, dolomitic; slightly carbonaceous-argillaceous; limestone very carbonaceous-argillaceous; in part; and is finely crystalline to bioclastic; medium dark grey, and weathering brownish orange to medium grey; medium- to thick-bedded, up to 4 feet thick; dense and well-indurated; limestone occurs as thick lenses, and lenticular interbeds; resistant, and cliff-forming	60	60

Section 2: West Burnt River; section measured up and along ridge, on west side of Burnt River Valley, 10 miles southeast of Mount Hunter (55°12 3/4'N; 122°12 3/4'W). Stratigraphic field section GK-69-9.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Pardonet Formation (Incomplete)		
71	Limestone and siltstone, quartzose, very carbonaceous-argillaceous; limestone very silty in part, and bioclastic, consisting of whole and fragmented pelecypod shells; medium dark grey, and weathering same to brownish grey; siltstone very dense and well indurated, and breaks with subconchoidal fracture; fetid odour upon fracture; Monotis cf. subcircularis Gabb, and Monotis cf. ochotica densestriata Teller, collected from upper 5 feet and lower 10 feet, respectively, GSC loc. 84234 and 84229; slightly recessive; unit forms highest exposure in area	20	3,043
70	Siltstone, quartzose, calcareous, slightly dolomitic and carbonaceous-argillaceous; medium dark to dark grey, and weathering medium grey; indistinctly bedded; very dense and well indurated; weathers rubbly; few indeterminate pelecypod shell fragments; slightly recessive	20	3,023
69	Covered interval	25	3,003
68	Limestone, slightly silty, very carbonaceous-argillaceous, slightly dolomitic; bioclastic, consisting of recrystallized, fragmented, pelecypod shells; medium dark grey, and weathering light to medium grey; thin- to medium-bedded; fine, wavy, crenulated laminations throughout; vertebrate bone fragments at base; fetid odour upon fracture; resistant to slightly recessive	20	2,978
67	Siltstone and limestone, quartzose, carbonaceous-argillaceous, slightly dolomitic; limestone very silty in part, and is medium crystalline to bioclastic, latter consisting of fragmented compressed, pelecypod shells; siltstone in part only slightly calcareous; medium dark grey and weathering light to medium grey; fine, wavy to crenulated laminations in part; limestone has		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	small fracture filled with black, vitreous, pyrobitumen residues in part; thin- to medium-bedded, up to 2 feet thick; siltstones dense and well indurated; slightly recessive to resistant	45	2,958
66	Siltstone, quartzose, calcareous, carbonaceous-argillaceous, slightly dolomitic; medium dark grey, and weathering same to yellowish brown in part; thin- to medium-bedded; fine, regular laminations in part; slight fetid odour upon fracture; Oxytoma sp., GSC loc. 84242, collected 15 feet from base; black, vitreous, pyrobitumen residues filling small vugs, and fractures; weathers shaly to flaggy in part; strata atypical of Pardonet Formation; slightly recessive	60	2,913
65	Siltstone and minor limestone; siltstone same as above unit except more calcareous; limestone silty, and very carbonaceous-argillaceous; medium dark grey with brown tint, and weathering medium grey; unit thin- to medium-bedded, up to 1 foot thick; laminated in part; scattered pelecypods throughout; resistant	20	2,853
64	Limestone, and minor siltstone, quartzose, very carbonaceous-argillaceous, slightly dolomitic; limestone bioclastic, consisting of compressed shells of Halobia sp.; shell material forms fine, wavy crenulated laminations, typical of formation; siltstone fossiliferous in part, and is confined to lower part, where it occurs as thin to medium, well-indurated, interbeds; unit dark grey, and weathering light grey; fetid odour upon fracture; weathers shaly in part; resistant; unit forms base of typical Pardonet lithology	60	2,833
	Baldonnel Formation (40 feet)		
63	Limestone, very carbonaceous-argillaceous, slightly silty, dolomitic, and phosphatic; finely to medium crystalline to bioclastic, consisting mainly of fragmented brachiopod-pelecypod shells; medium dark to dark grey, and weathering medium to light grey; thin- to medium-bedded, up to 1 foot thick; Goniotites sp., GSC loc. 84232,		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	collected 10 feet from base; scattered ooliths and pisoliths throughout; black, vitreous, pyrobitumen residues filling some vugs and fractures; strong fetid odour upon fracture; few shaly-weathering intervals in lower half; unit base of Baldonnel facies, resistant	40	2,773
	Ducette Member (43 feet)		
62	Siltstone, quartzose, calcareous, carbonaceous-argillaceous, slightly dolomitic; medium dark grey, and weathering same to light grey; medium to thick-bedded, up to 3 feet thick; light and dark grey banding, up to 6 inches thick in upper 5 feet; fine laminations in part; dense and well-indurated, and breaks with subconchoidal fracture; resistant	24	2,733
61	Dolomite and siltstone, quartzose, slightly carbonaceous-argillaceous; carbonate, finely crystalline; siltstone dolomitic and slightly calcareous; unit medium to medium dark grey, and weathering medium grey; medium- to thick-bedded; dolomite contains fragmented pelecypod shells; unit forms sharp contact with underlying Charlie Lake Formation; resistant	19	2,709
	Charlie Lake Formation (863 feet)		
60	Dolomite, slightly silty, argillaceous, and calcareous; finely crystalline; medium grey with yellow-grey mottling in part, and weathering very light grey; minor intraformational breccia in upper 15 feet; medium-bedded; siliceous mottling in lower 20 feet; some of carbonate looks granular but has undergone recrystallization obliterating original framework; dense and well-indurated; weathers rubbly; resistant to slightly recessive	55	2,690
59	Dolomite, slightly silty, cherty, possibly argillaceous; very finely crystalline; medium grey to pale yellowish brown, and weathering medium grey; medium-bedded; some dolomite looks microbrecciated; white chert mottling and chert-filled vugs; only partial exposure; dense and well-indurated; slightly recessive to recessive	43	2,635

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
58	Covered interval	42	2,592
57	Dolomite, same as unit 59, except more finely crystalline; white quartz- and chert-filled vugs in upper 5 feet; indistinctly bedded; resistant	20	2,550
56	Covered interval, talus similar to unit 57; recessive	25	2,530
55	Dolomite, slightly calcareous, possibly argillaceous; very finely crystalline to aphanitic; very light grey to pale yellowish brown, and weathering light brownish grey; indistinctly bedded; white quartz-filled vugs, and siliceous mottling in upper 5 feet; resistant	20	2,505
54	Covered interval	25	2,485
53	Dolomite and minor dolomitic siltstone; carbonate silty in part and is very fine to finely crystalline; siltstone slightly calcareous; pale yellowish brown, and weathering light grey; white quartz-filled vugs, and siliceous mottling throughout; medium-bedded; fine, regular to lenticular laminations in siltstone, and some dolomite; dense and well-indurated; resistant	31	2,460
52	Siltstone, quartzose, very dolomitic and may in part be classed as silty dolomite, calcareous; carbonate finely crystalline; pale yellowish brown, and weathering medium grey; thick-bedded; abundant calcareous crinoid and pelecypod-brachiopod shell fragments in part; dense and well-indurated; resistant	19	2,429
51	Limestone, slightly quartzose, and dolomitic; bioclastic, consisting of recrystallized crinoid and brachiopod-pelecypod shell fragments; yellowish grey to pale yellowish brown, and weathering medium grey to brownish grey; white quartz-filled vugs and irregular banding throughout; medium-bedded, up to 1 foot thick; dense and well-indurated; slightly recessive to resistant	29	2,410

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
50	Dolomite, slightly quartzose, possibly argillaceous; very finely to finely crystalline; yellowish grey to pale yellowish brown, and weathering light grey to yellow-grey; medium-bedded, up to 1 foot thick; fine to coarse silt to sand laminations in part; wavy colour banding and mottling in part; dense and well-indurated; slightly recessive	8	2,381
49	Covered interval, except for sporadic outcrop in upper half consisting of sandstone, quartzose, dolomitic, very fine-grained; yellowish grey with orange tinting, and weathering orange-brown; indistinctly bedded; fine wavy laminations; well-indurated; recessive	55	2,373
48	Siltstone and minor silty dolomite; quartzose, carbonate finely crystalline; yellowish grey, and weathering orange-brown; medium-bedded, up to 1 foot thick; fine regular, to wavy lenticular laminations; micro-cross-laminations in part; well-indurated; slightly recessive to resistant	17	2,318
47	Siltstone to dolomite, quartzose; carbonate finely crystalline; yellowish grey, and weathering same; medium-bedded, up to 15 inches thick; white siliceous mottling in part; dense and well-indurated; resistant	18	2,301
46	Limestone and dolomite, slightly siliceous; bioclastic to finely crystalline; limestone dolomitized in part, and consists of fragmented crinoid columnals, and brachiopod-pelecypod shells; dolomite contains same clastic content; pale yellowish brown, and weathering same; medium-bedded; scattered white quartz- and chert-filled vugs; resistant	10	2,283
45	Dolomite, and minor dolomitic limestone; dolomite very silty, and in part may be classed as dolomitic siltstone; carbonate finely crystalline, except for limestone which is bioclastic consisting of crinoid columnals and brachiopod-pelecypod shell fragments; yellowish grey to pale yellowish brown, and weathering same; medium- to thick-bedded; white quartz- and chert-filled vugs and irregular lenses throughout; dense and well-indurated; limestone forms lower 5 feet; resistant	34	2,273

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
44	Covered interval	170	2,259
43	Limestone breccia, dolomitic, quartzose, possibly argillaceous; unit consists of angular clasts of yellowish grey sandy to silty limestone, dolomite, up to 1 inch in diameter in a matrix and cement of sandy to silty finely to medium crystalline limestone; unit yellowish grey, and weathering same; indistinctly bedded; breccia is of intra-formational solution type; some breccia has been subjected to pressure solution; poorly indurated; weathers rubbly; slightly recessive to resistant	30	2,069
42	Covered interval	75	2,039
41	Dolomite breccia, and minor sandy dolomite, quartzose, possibly argillaceous, calcareous; breccia consists of yellowish grey, angular clasts of silty to sandy dolomite, up to 1 inch in diameter, in a pale yellowish brown, finely crystalline, calcite matrix and cement; unit greyish yellow to yellowish grey, and weathering same to medium grey; indistinctly bedded; dolomite, finely crystalline; unit porous, and weathers rubbly; resistant	20	1,964
40	Dolomite, and minor dolomite breccia; dolomite very sandy to silty, and may in part be classed as dolomitic very fine-grained sandstone, possibly argillaceous; breccia same as unit 41, and occupies upper 10 feet; unit yellowish grey, and weathering same; medium-bedded, up to 1 foot thick; fine to coarse, regular to lenticular, quartz laminations; in part crossbedded; some sandy porous dolomite beds; slightly recessive to recessive	31	1,944
39	Sandstone to siltstone, quartzose, very dolomitic; yellowish grey, and weathering same to yellowish orange; thin- to medium-bedded; fine, regular laminations and cross-laminations in part; upper half slightly porous, lower half dense and well-indurated; weathers flaggy; recessive	47	1,913

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
38	Siltstone to very fine-grained sandstone, quartzose, very dolomitic, and may in part be classed as silty dolomite, possibly argillaceous; yellowish grey, and weathering same; indistinctly bedded, but looks medium to thick; fine, regular laminations in part; slight porosity in part; well-fractured and weathers rubbly; unit forms probable base of Charlie Lake Formation; slightly recessive to recessive	39	1,866
	Sulphur Mountain Formation (1,827 feet)		
	Llama Member (1,169 feet)		
37	Siltstone to very fine-grained sandstone, quartzose, dolomitic; carbonate finely crystalline pale yellowish brown, and weathering yellowish grey to yellowish orange; medium- to thick-bedded; fine regular dark grey laminations in upper 10 feet; micro-cross-laminations in upper 10 feet; unit dense and well-indurated; weathers flaggy in part; slightly recessive to resistant	65	1,827
36	Siltstone to very fine-grained sandstone, similar to unit 37, with beds over 3 feet thick; unit forms sharp contact with underlying calcareous and darker-weathering strata; lithology may be transitional facies to more typical Sulphur Mountain strata below; resistant and cliff-forming	80	1,762
35	Siltstone to very fine-grained sandstone, and minor limestone; siltstone-sandstone, quartzose, dolomitic and calcareous; limestone very finely crystalline and slightly carbonaceous; medium dark yellowish brown, and weathering greyish brown to light grey; thin- to medium-bedded; scattered terebratulids throughout; lower 5 feet consists of limestone containing light and dark grey weathering chert nodules, up to 3 inches in diameter; colour mottling in part; resistant	39	1,682

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
34	Siltstone and minor silty limestone, quartzose, very dolomitic; carbonate finely crystalline; and very quartzose, and may in part be classed as calcareous siltstone; pale yellowish brown to medium grey, and weathering orange-brown to medium grey; medium-bedded, up to 10 inches thick; limestone occurs as dense, well-indurated, dark-weathering interbeds, replete with terebratulid and spiriferid brachiopods; resistant	34	1,643
33	Siltstone, quartzose, very calcareous and dolomitic; pale yellowish brown to olive-grey, and weathering orange-brown; indistinctly bedded but looks thick; scattered terebratulids throughout; "cannon" ball concretions 20 feet from base; lower 14 feet partly covered; upper 20 feet resistant	34	1,609
32	Siltstone, quartzose, very calcareous, dolomitic; pale yellowish brown, and weathering brownish orange to mottled medium grey; indistinctly bedded, but appears thin to medium; few compressed brachiopods; dense and well-indurated; well-fractured, weathers rubbly in part; some siltstone may be classed as very silty limestone; lower 20 feet shaly to flaggy; slightly recessive to resistant; unit forms base of prominent orange-brown weathering siltstone lithofacies	83	1,575
31	Limestone, very quartzose in part and may be classed as very calcareous siltstone, dolomitic, slightly carbonaceous-argillaceous; very finely crystalline; medium dark grey, and weathering same to light orange-brown; medium-bedded, up to 8 inches thick; very dense and well-indurated, breaks with subconchoidal fracture; unit may represent base of equivalent Liard Formation north of Pine Pass; unit partly covered; slightly recessive to resistant	65	1,492
30	Covered interval	14	1,427

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
29	Siltstone, quartzose, calcareous, dolomitic, slightly carbonaceous-argillaceous; medium dark grey, and weathering same to orange-grey; indistinctly bedded, looks medium to thick; dense and well-indurated; weathers shaly to flaggy in part; lower 20 feet partly covered; slightly recessive	40	1,413
28	Covered interval	40	1,373
27	Siltstone, quartzose, very calcareous, and may in part be classed as silty limestone, dolomitic, slightly carbonaceous-argillaceous; medium dark grey, and weathering same to brownish grey; indistinctly bedded; Daonella elegans McLearn, Paratrachyceras cf. sutherlandi McLearn collected 30 feet from base, GSC loc. 84226; unit weathers flaggy; lower half partly covered; recessive	34	1,333
26	Covered interval	36	1,299
25	Siltstone, quartzose, very calcareous and dolomitic; carbonate finely crystalline; medium grey to pale yellowish brown, and weathering greyish orange to medium grey; indistinctly bedded; fine to medium, regular to lenticular laminations; weathers flaggy; upper half partly covered; slightly recessive to recessive	40	1,263
24	Siltstone, quartzose, dolomitic, very calcareous and may in part be classed as silty limestone, carbonaceous-argillaceous; carbonate finely crystalline; medium dark grey, and weathering greyish orange; indistinctly bedded; fine to medium laminations in part; Daonella sp., GSC loc. 84231 collected 10 feet above base, and Oxytoma? sp., GSC loc. 84238 collected 52 feet from base; weathers shaly to flaggy; slightly recessive to resistant	83	1,223
23	Siltstone, quartzose, dolomitic, very calcareous, carbonaceous-argillaceous; medium to medium dark grey, and weathering same to orange-brown; indistinctly bedded; fine to medium, regular to lenticular laminations; scattered pelecypod shell fragments; weathers shaly to flaggy; partly covered; recessive	61	1,140

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
22	Siltstone, same as unit 23, except weathers more shaly; recessive	60	1,079
21	Covered interval	23	1,019
20	Siltstone, same as unit 22; weathers very shaly and is soft and friable; slightly recessive	11	996
19	Covered interval, except for minor, sporadic ribs of very calcareous, carbonaceous-argillaceous siltstone; recessive	20	985
18	Siltstone and minor silty bioclastic limestone, quartzose, dolomitic, carbonaceous-argillaceous; bioclastic limestone consists of thin-shelled, fragmented pelecypods; medium dark grey, and weathering brownish grey; indistinctly to thin-bedded; lenticular laminations in part; minor well-rounded grains phosphate; weathers shaly to flaggy; exposure sporadic, with large talus covered intervals; recessive	94	965
17	Covered interval, talus same as unit 16; very recessive	13	871
16	Siltstone and minor limestone, quartzose, dolomitic, slightly carbonaceous-argillaceous; siltstone very calcareous, limestone silty, and bioclastic consisting of whole, and fragmented pelecypod shells; medium dark grey, and weathering brownish grey to medium grey; indistinctly to medium-bedded, up to 6 inches thick; limestone interbeds wavy and in part lenticular; fine to medium, regular to wavy lenticular laminations; Daonella sp., D. tryolensis group GSC loc. 84228, collected 55 feet from base, and Daonella cf. subarctica Popov GSC loc. 84235, collected 13 feet above base; weathers shaly to flaggy; resistant to slightly recessive	60	858
15	Siltstone and minor silty, bioclastic limestone, same as unit 16; very carbonaceous-argillaceous, and slightly phosphatic in part; partly talus covered; slightly recessive to recessive	80	798

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
14	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, very calcareous in part, and may be classed as silty limestone; dark grey, and weathering greyish brown to orange-brown; indistinctly bedded, fine to coarse, regular to wavy laminations throughout; few compressed indeterminate ammonites; weathers flaggy; unit represents probable base of Llama Member; slightly recessive to recessive	60	718
	Whistler Member (245 feet)		
13	Covered interval, except for minor outcrop in centre, consisting of calcareous, dolomitic, carbonaceous-argillaceous siltstone, similar to unit 12; recessive	20	658
12	Siltstone, quartzose, very dolomitic, carbonaceous-argillaceous, very calcareous in part; dark grey, and weathering same; thin- to medium-bedded; fine, regular to lenticular, light grey laminations; compressed ammonites in part; fragmented pelecypod shells in some beds forming coquina; upper 20 feet partly covered; slightly recessive to recessive	80	638
11	Covered interval	95	558
10	Siltstone to silty shale, quartzose, very dolomitic, very carbonaceous-argillaceous, phosphatic, calcareous in part; dark grey, and weathering same to dark brownish grey; indistinctly bedded; fine to coarse, regular to wavy lenticular light grey calcite laminations in lower half; thin zone phosphatic pebble conglomerate at base, with pebbles up to 1 1/2 inches in diameter; compressed ammonites throughout; weathers shaly to flaggy; recessive; unit represents base of member	50	463

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Vega Siltstone Member (180 feet)		
9	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly calcareous in part; dark grey, and weathering dark orange-brown; indistinctly bedded; fine, regular laminations in part; upper 10 feet contain few thin lenticles black phosphate; unit less carbonaceous than overlying strata of Whistler Member; dense and well-indurated; resistant	20	413
8	Siltstone, quartzose, dolomitic, slightly calcareous and carbonaceous-argillaceous; dark grey, and weathering same to orange-brown; medium- to thin-bedded; fine, regular to lenticular, light grey laminations in part; few indeterminate compressed ammonites; weathers flaggy; dense,and well-indurated; few lingulid shell fragments; resistant to slightly recessive	100	393
7	Siltstone, quartzose, dolomitic, slightly carbon-aceous-argillaceous; dark grey, and weathering orange-brown to brownish grey; thin- to medium-bedded, up to 1 foot thick; fine, regular to lenticular, light grey laminations, in thin beds, thicker beds faintly to non-laminated; compressed indeterminate ammonites in part; dense and well-indurated; weathers flaggy; resistant	40	293
6	Siltstone, quartzose, dolomitic. carbonaceous-argillaceous; dark grey, and weathering greyish brown to orange-brown; thin- to medium-bedded; fine to coarse, regular to wavy lenticular, light grey laminations; well-indurated, weathers flaggy; unit forms probable base of Vega Member; resistant	20	253

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Phroso Siltstone Member (233 feet)		
5	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly ferruginous; dark grey, and weathering dark grey-brown; thin-bedded; fine to medium regular to lenticular, light grey laminations; Posidonia sp., 15 feet from base GSC loc. 84227; few lenticles black phosphate in lower 20 feet; weathers very flaggy, in 1/4 to 1 inch plates; resistant and cliff-forming, unit gradational with overlying Vega Member	60	233
4	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, very calcareous in part, and may be classed as silty limestone; dark grey, and weathering same to brownish grey; thin- to medium-bedded, up to 8 inches thick; fine, regular, light grey laminations throughout; undetermined bivalves 20 feet from base, GSC loc. 84237; weathers flaggy; few porous horizons in lower 20 feet; resistant	80	173
3	Siltstone, and bioclastic limestone; siltstone, same as unit 2; limestone consists of fragmented, recrystallized shells, forming lenticular beds up to 8 inches thick; limestone contains fractures and small vugs, filled with black, vitreous, pyrobitumens; limestones weather light grey; resistant to slightly recessive	20	93
2	Siltstone and minor bioclastic limestone; siltstone, quartzose, dolomitic, carbonaceous-argillaceous, and very calcareous in part; limestone, same as in unit 3, except slightly siliceous in part; unit dark grey, and weathering same to dark brownish grey to orange-brown; thin- to medium-bedded; fine to medium, regular, light grey, laminations; pyrite laminations up to 1/8 inch thick in lower 20 feet; 27 feet from base limestone concretions up to 10 inches in diameter containing vertebrate bone fragments and Paranorites sp., GSC loc. 84225; weathers flaggy in 1/4 to 1/2 inch plates; slightly recessive	40	73
1	Covered interval; unit forms unconformable contact with Permian Fantasque Formation	33	33

Section 3: Watson Peak; section measured along steep ridge on west side of cirque valley below Watson Peak (55°14 1/4'N; 122°06 1/4'W). Stratigraphic field section GK-69-10.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Sulphur Mountain Formation (Incomplete)		
	Llama Member (551 feet plus)		
27	Siltstone, quartzose, dolomitic, calcareous, slightly carbonaceous-argillaceous; medium grey with slight olive tint, and weathering dull orange-brown; indistinctly bedded; bioturbate mottling in part; upper 75 feet only slightly calcareous; minor silty limestone interbeds in lower 40 feet; no obvious porosity; weathers flaky; upper half consists of sporadic en echelon exposure; recessive	135	1,225
26	Siltstone, quartzose, very dolomitic, slightly calcareous, slightly carbonaceous-argillaceous; may in part be classed as very fine-grained sandstone; carbonate finely crystalline; medium dark grey, and weathering orange-brown; medium- to thick-bedded, up to 4 feet thick; bioturbate mottling in part; dense and well-indurated; weathers flaky in part; resistant	31	1,090
25	Covered interval, talus same as unit 24	28	1,059
24	Siltstone, quartzose, dolomitic, very calcareous, slightly carbonaceous-argillaceous; medium dark grey, and weathering orange-brown; bioturbate mottling in part; medium- to thick-bedded, up to 3 feet thick; dense and well-indurated; slightly recessive to resistant	40	1,031
23	Siltstone, same as unit 24, except contains few thin limestone interbeds in lower 5 feet; resistant	40	991

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
22	Siltstone and limestone, dolomitic, carbonaceous-argillaceous; siltstone very calcareous; limestone bioclastic, consisting of whole and fragmented pelecypod shell impressions, and ammonites; medium dark grey, and weathering medium grey to orange-brown; medium-bedded, up to 15 inches thick; Arcestes sp., Daonella sp. Protrachyceras sikanianum McLearn, and Silenticeras n. sp., collected in lower 10 feet, GSC locs. 84245 and 84246; crenulated laminations in part; limestone occurs as wavy interbeds throughout lower 20 feet; weathers rubbly; resistant	40	951
21	Siltstone, and minor silty limestone, quartzose, dolomitic, very carbonaceous-argillaceous in part; siltstone very calcareous; carbonate finely crystalline to granular; medium dark grey, and weathering orange-brown to medium grey; medium- to thick-bedded, up to 3 feet; limestone interbeds contain whole and fragmented pelecypods and ammonites; limestone concretions up to 6 inches in diameter, 35 feet from base, some containing Protrachyceras sikanianum McLearn, and Daonella sp., GSC loc. 84248; dense and well-indurated; massive in part, resistant	75	911
20	Siltstone and limestone; siltstone quartzose, dolomitic, very calcareous, carbonaceous-argillaceous; limestone, quartzose and dolomitic in part, and very carbonaceous; mainly bioclastic consisting of whole and fragmented pelecypods, and ammonites; medium dark grey, and weathering same to dull orange-brown; medium- to thick-bedded, up to 4 feet thick; concretions up to 10 inches in diameter containing Progonoceratites poseidon Tozer, Protrachyceras sikanianum McLearn, and Daonella cf. longobardica Kittl, GSC locs. 84250, 84247, collected at base and 30 feet from base; upper 30 feet very dense and well-indurated, lower 10 feet very shaly	41	836

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
19	Siltstone and minor limestone, very carbonaceous-argillaceous; siltstone quartzose, very calcareous and dolomitic; limestone, quartzose, dolomitic, and mainly bioclastic, consisting of whole and fragmented pelecypod shells; medium dark to dark grey, and weathering same to brownish grey; medium- to thick-bedded, up to 3 feet thick; limestone occurs as thin interbeds in upper 20 feet; Daonella cf. longobardica Kittl, from upper 10 feet, GSC loc. 84251; moderate induration; weathers shaly in part; lithology gradational to Whistler Member; slightly recessive to resistant	81	795
18	Siltstone, quartzose, dolomitic, very calcareous, very carbonaceous-argillaceous; dark grey, and weathering same to orange-brown; medium- to thick-bedded, up to 3 1/2 feet thick; thinner beds finely laminated, thicker beds non-laminated; spheroidal weathering in part; scattered compressed indeterminate ammonites in part; interzones of shaly- to flaggy-weathering siltstones in lower 20 feet; rest of unit dense and well-indurated; unit represents base of Llama Member; resistant and cliff-forming	40	714
	Whistler Member (280 feet)		
17	Siltstone, quartzose, calcareous, very dolomitic, very carbonaceous-argillaceous; carbonate finely crystalline; dark grey, and weathering same; thin- to medium-bedded; moderate induration; recessive	13	674
16	Siltstone, quartzose, very dolomitic, very calcareous in part; very carbonaceous-argillaceous; carbonate finely crystalline to bioclastic, latter consisting of fragmented pelecypod? shells; dark grey, and weathering same; thin- to medium-bedded; fine to medium, light grey, wavy laminations in part; indeterminate compressed ammonites throughout; well-indurated; resistant	26	661

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
15	Siltstone, quartzose, very dolomitic, very calcareous in part and may be classed as silty bioclastic limestone, very carbonaceous-argillaceous, possibly phosphatic; dark grey, and weathering same; indistinctly bedded; fine to coarse, wavy to crenulated, light grey laminations in part; compressed indeterminate ammonites; siltstone contains fragmented pelecypod shells in part; weathers flaky; recessive	32	635
14	Siltstone, quartzose, very dolomitic, slightly calcareous in part, carbonaceous-argillaceous; dark grey, and weathering greyish brown to orange-brown; indistinctly bedded; faint trace fine, light grey, regular laminations; penecontemporaneous slump structures at base; compressed ammonites; spheroidal weathering in part; resistant	16	603
13	Siltstone, and minor silty bioclastic limestone; quartzose, very carbonaceous-argillaceous, dolomitic; carbonate slightly phosphatic, and consists of whole and fragmented pelecypod shells, and few ammonite impressions; siltstone very calcareous in part; medium dark to dark grey, and weathering same to yellowish grey; thin- to medium-bedded; fine to medium, wavy to crenulated, light grey laminations; limestone concretions up to 10 inches in diameter in lower 5 feet containing Daonella sp. (americana or dubia), Longobardites cf. canadensis McLearn, Gymnotoceras sp., GSC loc. 84240; some concretions contain fractures filled with black, vitreous, pyrobitumens; weathers shaly to flaggy; slightly recessive to resistant	26	587
12	Siltstone, quartzose, calcareous, very dolomitic, carbonaceous-argillaceous, slightly phosphatic; calcareous content attributed to thin-shelled pelecypod fragments; dark grey, and weathering same; thin- to medium-bedded, up to 8 inches thick; thin, siliceous phosphate lenticles in lower half; indeterminate compressed ammonites; weathers shaly to flaggy in part; slightly recessive to resistant	40	561

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
11	Covered interval, talus contains lenticles and nodules of phosphate; possible tight fold within unit duplicating part of thickness; recessive	82	521
10	Siltstone, quartzose, dolomite, calcareous, very carbonaceous-argillaceous, possibly phosphatic; dark grey, and weathering same to brownish grey; medium- to thin-bedded; compressed fossil fragments, attenuated in part into crenulated light grey laminations; recessive	10	439
9	Covered interval	15	429
8	Siltstone, quartzose, calcareous, dolomitic, very carbonaceous-argillaceous, phosphatic; dark grey, and weathering same; indistinctly bedded; fine to medium, regular to lenticular laminations; black, angular and well-rounded clasts and grains of phosphate up to 1 inch in diameter; angular clasts in lower two feet; moderate induration; unit marks base of Whistler Member; recessive	20	414
	Vega-Phroso Siltstone Members (394 feet)		
7	Siltstone, quartzose, very dolomitic, slightly calcareous, carbonaceous-argillaceous; carbonate finely crystalline; dark grey, and weathering same to brownish grey to orange-brown; thin- to thick-bedded, up to 4 feet thick; fine, regular to lenticular, light grey laminations; lower 10 feet partly covered; few thin shaly-weathering interzones; weathers flaggy; resistant and cliff-forming	32	394
6	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly calcareous in part; medium dark grey, and weathering same to dull orange-brown; thin- to medium-bedded, up to 10 inches thick; fine, regular to slightly lenticular laminations throughout; alternation of resistant-recessive weathering strata typical of Vega Member; recessive zones weather shaly; resistant zones dense and well-indurated; micro-cross-laminations in part; thicker beds only faintly laminated; resistant	80	362

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
5	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly pyritiferous and phosphatic; dark grey, and weathering same to greyish to orange-brown; thin- to medium-bedded, up to 6 inches thick; fine, regular to slightly lenticular, light grey laminations; scattered dark grey to black lenticles phosphate throughout unit; alternation in part of resistant-recessive weathering zones; weathers shaly to flaggy; resistant; unit ends Vega-like facies	40	282
4	Siltstone, same as unit 5, except calcareous in lower 10 feet; few lenticular beds up to 3 inches thick; Pseudomonotis occidentalis (Whiteaves), and Xenoceltites sp. collected from lower 5 feet, GSC loc. 84239; weathers shaly; recessive and partly covered	40	242
3	Siltstone and limestone; siltstone, quartzose, dolomitic, very calcareous, carbonaceous-argillaceous; limestone slightly silty, and dolomitic, partly silicified; bioclasts, consist of whole and fragmented pelecypod shells; unit medium to dark grey, and weathering same to orange-brown; thin- to medium-bedded, up to 6 inches thick; limestone beds wavy and lenticular; siltstone laminated as above; Posidonia mimer Oeberg, and Arctoceras sp., GSC loc. 84241, collected 5 feet from base; moderate induration; weathers shaly to flaggy; slightly recessive to resistant	39	202
2	Siltstone and minor limestone, mainly as above, except limestone more dolomitic and silty and occurs in minor proportions; scattered calcareous siltstone concretions, some containing indeterminate bivalves; scattered small pyrite cubes throughout; siltstone calcareous in part and contains fine to coarse, regular to wavy lenticular, light and dark grey laminations; weathers shaly to flaggy; slightly recessive to resistant	60	163
1	Covered interval; 50 feet from base concretions in talus containing Meekoceratids, and fish fragments, GSC loc. 84243; unit forms unconformable contact with underlying Permian Fantasque Formation; recessive	103	103

Section 4: Wolverine-Sukunka Rivers; section measured from Permian contact westward up ridge to axis of syncline (54°58 1/4'N; 121°37'W). Stratigraphic field section GK-70-7.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Sulphur Mountain Formation (1,459 feet plus)		
	Llama Member (1,015 feet plus)		
20	Sandstone, quartzose, dolomitic; very fine-grained, carbonate finely crystalline; pale yellowish brown, and weathering light grey-brown; indistinctly bedded; coarse, wavy laminations in part; worm tubes in upper 20 feet; dense and well-indurated; unit represents last outcrop below synclinal axis; resistant	40+	1,459+
19	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, very calcareous in lower half; dark grey, and weathering dark grey-brown; medium-bedded, up to 15 inches thick; fine to coarse, wavy lenticular laminations in part; bioturbate mottling in lower 60 feet; worm? trails on some bedding surfaces; lingulid shells and shell fragments in lower 10 feet; unit forms sharp contact with lighter weathering sandstones above, and underlie lighter weathering thicker bedded siltstones to sandstones; weathers flaky in part; slightly recessive	97	1,419
18	Siltstone to very fine-grained sandstone, quartzose, dolomitic, calcareous, slightly carbonaceous-argillaceous; carbonate finely to medium crystalline; medium to medium dark grey, and weathering greyish brown; thick-bedded, up to 3 feet thick; fine to coarse, wavy to lenticular laminations in part; upper 10 feet partly cross-bedded; bioturbate mottling throughout; diagenetic calcareous mottling and lenses in part; dense and well-indurated; resistant	85	1,322
17	Siltstone, similar to unit 18, except finer grained, and contains carbonaceous plant ? films parallel to stratification; bioturbate mottling throughout; few lingulid shells in upper 20 feet; calcareous mottling and lenses throughout; resistant	80	1,237

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
16	Siltstone and minor silty limestone, quartzose, dolomitic, slightly carbonaceous-argillaceous; siltstone very calcareous in part; carbonate very finely to medium crystalline; medium dark grey to pale yellowish brown, and weathering greyish brown with slight orange tint; medium- to thick-bedded, up to 4 feet thick; fine to coarse, lenticular to discontinuous, dark grey laminations in part; bioturbate mottling; trace carbonaceous plant ? films on bedding surfaces in lower 20 feet; diagenetic calcareous lenses and pseudonodules in lower 20 feet; dense and well-indurated; resistant	98	1,157
15	Siltstone and minor silty limestone, similar to unit 16, except bioturbate mottling and lenticular discontinuous laminations more common; limestone similar to above, occurring as lenses and pseudonodules, bioclastic in part; very carbonaceous-argillaceous in part; dense and well-indurated; resistant	80	1,059
14	Siltstone, quartzose, dolomitic, very calcareous, and may in part be classed as silty limestone, carbonaceous-argillaceous; carbonate finely to medium crystalline; dark grey to olive-grey, and weathering grey-brown with orange tint; medium- to thick-bedded to indistinctly bedded; coarse, lenticular discontinuous light grey laminations; bioturbate mottling in part; carbonaceous plant ? films parallel to stratification and worm burrows in upper 20 feet; weathers flaky; slightly recessive to resistant	60	979
13	Siltstone to very fine-grained sandstone, and minor silty limestone, quartzose, dolomitic, carbonaceous-argillaceous; carbonate finely to medium crystalline to bioclastic,latter consisting of fragmented pelecypod shells; dark grey, and weathering light grey to brownish grey; indistinctly bedded, looks medium to thick; limestone occurs as lenticular interbeds, lenses and nodules; 30 feet from top Nathorstites n. sp., and Meginoceras cf. meginae McLearn (GSC loc. 85584) collected from limestone; minor bioturbate mottling in upper 40 feet; slightly recessive to resistant; partly covered in lower 60 feet	100	919

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
12	Covered interval	20	819
11	Siltstone, quartzose, dolomitic, calcareous, carbonaceous-argillaceous; dark grey, and weathering greyish to orange-brown; indistinctly bedded; bioturbate mottling in part; carbonaceous plant? films parallel to stratification; unit partly talus covered; slightly recessive	55	799
10	Siltstone and minor limestone, quartzose, dolomitic, carbonaceous-argillaceous; limestone bioclastic, consisting of fragmented pelecypod shells; siltstone calcareous; dark grey, and weathering greyish to orange-brown; thick- to medium-bedded; limestone occurs as lenticular interbeds up to 8 inches thick; minor lenticular laminations; dense and well-indurated; minor calcareous mottling, weathering light grey; resistant to slightly recessive	100	744
9	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, very calcareous in part; carbonate finely crystalline; dark grey, and weathering greyish to orange-brown; indistinctly bedded, looks medium to thick; calcareous strata composed of thin fragmented pelecypod shells; dense and well indurated; resistant	80	644
8	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, very calcareous and may in part be classed as silty limestone; carbonate finely crystalline to bioclastic, latter consisting of fragmented pelecypod shells; dark grey, and weathering same to greyish brown; indistinctly bedded, looks medium to thin; fine to medium, regular to wavy lenticular, light grey laminations in part; calcareous strata occur as interbeds throughout unit; and may represent interfingering facies of Whistler Member; weathers flaggy; resistant to slightly recessive; unit represents probable base of Member	120	564

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Whistler Member (100 feet)		
7	Siltstone and minor silty limestone, quartzose, dolomitic, very carbonaceous-argillaceous, phosphatic at base; limestone finely to medium crystalline to bioclastic, latter consisting of thin fragmented pelecypod shells; dark grey, and weathering same; thin- to medium-bedded, up to 1 foot thick; fine, regular to wavy crenulated, light grey laminations; lowest 6 inches consist of well-rounded, coarse- to very coarse-grained phosphate some of which is oolitic; limestone emits fetid odour upon fracture; siltstone becomes less calcareous toward top; unit forms sharp contact with underlying member; resistant to slightly recessive	100	444
	Phroso-Vega Siltstone Member (344 feet)		
6	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, calcareous in part; carbonate finely crystalline to fine-grained; dark grey, and weathering same to orange-brown; thin- to medium-bedded; fine, regular to lenticular light grey laminations; very calcareous siltstone concretion 3 feet from base containing Posidonia cf. mimer Oeberg (GSC loc. 85580); weathers shaly to flaggy; medium beds form dense resistant, orange-brown weathering siltstone interbeds; resistant to slightly recessive	72	344
5	Siltstone, similar to unit 6, except contains "Pseudomonotis" occidentalis kindli McLearn, and Xenoceltites sp. (GSC loc. 85581) in lenticular carbonaceous-argillaceous limestone interbed in lower 5 feet; resistant to slightly recessive	60	272
4	Siltstone to silty shale and minor limestone, quartzose, dolomitic, carbonaceous-argillaceous; slightly pyritiferous; limestone slightly silicified in part and is finely to medium crystalline to bioclastic, with latter consisting of fragmented pelecypod shells; dark to medium dark grey, and weathering same to orange-brown; thin- to medium-		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	bedded, up to 10 inches thick; fine to coarse, regular to wavy lenticular, light grey laminations; limestone occurs as lenticular interbeds and large concretions up to 3 feet in diameter; Posidonia mimer Oeberg (GSC locs. 85579 and 85566) collected from concretions and limestone beds 28 and 35 feet from base; alternation of resistant siltstone and shaly to fissile-weathering siltstone in lower 20 feet; concretions developed only in lower 40 feet; slightly recessive to resistant	72	212
3	Siltstone to silty shale, and minor limestone, similar to unit 4, except no concretions; limestone occurs as thin 2-inch interbeds; weathers shaly to flaggy; slightly recessive to resistant	20	140
2	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly calcareous in part; carbonate finely to medium crystalline; dark grey, and weathering same to orange-brown; mainly thin-bedded, but few dense, orange-weathering, less carbonaceous siltstone interbeds up to 1 foot thick; fine, regular to lenticular, light grey laminations; weathers shaly to flaggy, latter in 1/2- to 1-inch plates; slightly recessive	40	120
1	Siltstone to silty shale, quartzose, dolomitic, carbonaceous-argillaceous; carbonate finely crystalline; dark grey, and weathering same to greyish brown; thin-bedded; fine, regular to lenticular, light grey laminations; good alternation of recessive fissile, shaly weathering and more resistant flaggy-weathering siltstone beds; scattered vertebrate fragments in upper 20 feet; unit forms unconformable contact with underlying Permian strata; recessive	80	80

Section 5: Hook-Murray; section measured from top to bottom along top of ridge to Permian contact (54°49 1/2'N; 121°20'W). Stratigraphic field section GK-70-6.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Sulphur Mountain Formation (Incomplete)		
	Llama Member (754 feet, plus)		
20	Siltstone to very fine-grained sandstone, quartzose, very dolomitic, slightly calcareous; carbonate finely to medium crystalline; medium dark grey to pale yellowish brown, and weathering greyish brown; medium- to thick-bedded; few fine regular to wavy discontinuous dark grey carbonaceous laminations; bioturbate mottling in part; dense and well-indurated; resistant and cliff-forming	100+	1,233+
19	Siltstone, quartzose, dolomitic, very calcareous in part, slightly carbonaceous-argillaceous; carbonate finely crystalline; medium dark grey, and weathering greyish brown; medium- to thick-bedded; bioturbate mottling in part; dark grey, carbonaceous plant? films on bedding surfaces; few blue-black phosphatic lingulid shell fragments; scattered lenticular and nodular, very calcareous interbeds in lower 40 feet; dense and well-indurated; resistant	88	1,133
18	Siltstone, quartzose, dolomitic, very calcareous, and may in part be classed as silty limestone, carbonaceous-argillaceous; carbonate finely to medium crystalline; medium to medium dark grey, and weathering greyish brown; medium-bedded, up to 1 foot thick; bioturbate mottling; weathers shaly to flaggy; slightly recessive to recessive	41	1,045
17	Siltstone to very fine-grained sandstone, quartzose, dolomitic, very calcareous, slightly carbonaceous-argillaceous; medium dark grey, and weathering grey-brown; medium- to thick-bedded, up to 3 1/2 feet thick; fine, lenticular to discontinuous laminations; unit mottled in part; carbonaceous plant? films parallel to bedding; dense and well-indurated; resistant	46	1,004

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
16	Siltstone, and minor silty limestone, quartzose, dolomitic, carbonaceous-argillaceous; medium dark to dark grey, and weathering greyish brown; limestone finely to medium crystalline to bioclastic, latter consisting of whole and fragmented pelecypod shells; medium- to thick-bedded; wavy discontinuous laminations throughout, bioturbate mottling; Daonella sp. cf. D. subarctica (GSC loc. 85592) collected from silty limestone interbed 35 feet from top; carbonaceous plant? films parallel to stratification; scattered indeterminate brachiopods in upper half; dense and well-indurated; diagenetic limestone-siltstone mottling in upper half; resistant to slightly recessive	100	958
15	Siltstone and limestone, quartzose, dolomitic, carbonaceous-argillaceous; limestone finely crystalline to bioclastic, and comprises 25% of strata; siltstone very calcareous in part; dark to medium dark grey, and weathering same to brownish grey with orange tint; medium- to thick-bedded; wavy to discontinuous laminations throughout siltstone; bioturbate? mottling in part; Meginoceras n. sp., Silenticeras n. sp., Lobites sp. and Protrachyceras sp. (GSC loc. 85588) collected from wavy to lenticular limestone interbeds 15 feet from top carbonaceous plant? films on bedding surfaces; few vertebrate bone fragments in upper 20 feet; dense, with moderate induration; slightly recessive	60	858
14	Siltstone, similar to unit 15, except contains only trace of limestone interbeds 40 feet from base; siltstone very calcareous; carbonaceous plant? films decrease in concentration toward base; carbonaceous-argillaceous concentration increases toward base; slightly recessive to recessive	120	798

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
13	Siltstone, quartzose, dolomitic, calcareous, carbonaceous-argillaceous; carbonate finely crystalline; dark grey, and weathering same to greyish brown; mainly indistinctly bedded, but looks medium to thick; trace of fine, regular to lenticular, light grey laminations; scattered shaly weathering zones throughout; slightly recessive to resistant	120	678
12	Siltstone, quartzose, very calcareous, dolomitic, carbonaceous-argillaceous, slightly pyritiferous; carbonate finely to medium crystalline, to bioclastic in part; dark grey, and weathering same to greyish brown; thin- to medium-bedded, up to 2 feet thick; fine, regular to wavy lenticular, light grey laminations in thinner beds; Daonella sp., Ptychites sp., and Longobardites sp. collected 19 feet from top (GSC loc. 85572), Celtites? sp., Daonella cf. moussoni and Longobardites sp. collected 32 feet from top (GSC loc. 85587), Gymnotoceras sp. and Longobardites sp. collected 61 feet from top (GSC loc. 85600), and Ptychites sp. and Daonella cf. dubia collected 78 feet from top (GSC loc. 85589) shaly to flaggy in part giving strata resistant-recessive weathering cycle; unit contains tongues or lenses of Whistler strata; generally dense and well-indurated; unit forms probable base of Llama Member	79	558
	Whistler Member (213 feet)		
11	Siltstone and minor limestone, quartzose, dolomitic, carbonaceous-argillaceous; siltstone very calcareous; carbonate finely crystalline to bioclastic, latter consisting of fragmented pelecypod shells; dark grey and weathering same to dark grey-brown; thin- to medium-bedded, to indistinctly bedded; fine, regular to wavy crenulated, light grey laminations throughout; limestone bed in lower 1 foot contains "Arcestes" sp. (GSC loc. 85599) and vertebrate bone fragments; limestone emits fetid odour upon fracture; resistant to slightly recessive	20	479

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
10	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, very calcareous, and in part may be classed as silty limestone; carbonate finely crystalline to bioclastic as above; dark grey and weathering same; indistinctly bedded; fine to medium, wavy-crenulated, light grey laminations throughout; compressed ammonites on bedding surfaces; weathers shaly to flaggy; fetid odour upon fracture; slightly recessive to recessive	40	459
9	Siltstone, similar to unit 10, except very phosphatic in lower 1 foot, with siltstone containing intraformational elongate clasts? and/or lenses up to 2 inches long and 3/4 inch thick; flattened concretions between 6 and 10 inches in diameter containing Gymnotoceras sp. and Daonella sp. (GSC loc. 85594) in lower 5 feet; slightly recessive to recessive	13	419
8	Siltstone, quartzose, dolomitic, calcareous, carbonaceous-argillaceous, slightly pyritiferous; carbonate finely crystalline with few pockets thin-shelled fragmented pelecypods; dark grey, and weathering same to dark grey-brown; thin- to medium-bedded, up to 2 feet; fine, regular to lenticular, light grey laminations; micro-aggregates of weathered pyrite; Anagymnotoceras sp. and Trigonodus sp. (GSC loc. 85570) collected 32 feet from top; weathers shaly to flaggy in part; upper half recessive, remainder slightly recessive to resistant	40	406
7	Siltstone, quartzose, dolomitic, calcareous, carbonaceous-argillaceous, phosphatic in parts; carbonate finely crystalline to bioclastic; dark grey, and weathering same to dark grey-brown; thin- to medium-bedded; fine to coarse, wavy crenulated, light grey laminations throughout; dense limestone concretions up to 9 inches in diameter containing Parapopanoceras selwyni (GSC loc. 85573) in upper 1 foot; oolitic and granular phosphate interbeds in upper half of unit; weathers shaly to flaggy; slightly recessive	15	366

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
6	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly phosphatic, very calcareous, and may in part be classed as silty limestone; carbonate similar to above unit; dark grey, and weathering same; fine, regular to crenulated, light grey laminations; phosphate occurs as lenticles, and pockets of well-rounded grains and oolites; compressed indeterminate ammonites throughout crenulated laminated strata; weathers flaggy in part; resistant	40	351
5	Siltstone, and minor limestone, quartzose, dolomitic, very carbonaceous-argillaceous, slightly phosphatic and pyritiferous; siltstone very calcareous in part; carbonate finely crystalline; dark grey, and weathering same; thin- to thick-bedded, up to 3 feet; fine, regular to lenticular, light grey laminations in part; minor crenulated wavy laminae; limestone interbeds in lower half, some containing dark grey chert lenses; lowest bed contains phosphatic grains and clasts up to 1/2 inch in diameter; few scattered compressed ammonites; weathers shaly to flaggy; unit represents probable base of Member; resistant to slightly recessive	45	311
	Vega-Phroso Siltstone Member (266 feet)		
4	Siltstone, quartzose, very dolomitic, carbonaceous-argillaceous, slightly calcareous, pyritiferous, and phosphatic; carbonate finely crystalline; dark grey, and weathering same to grey-brown to orange-brown; thin- to medium-bedded; fine to medium, regular to slightly lenticular, light grey laminations; weathers shaly to flaggy, except for few dense, orange-brown weathering interbeds; lower 10 feet partly covered; resistant to slightly recessive, except for lower 40 feet which are recessive	95	266

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
3	Siltstone and minor limestone, quartzose, dolomitic, carbonaceous-argillaceous, slightly pyritiferous; siltstone only slightly calcareous; limestone in part very silty, dolomitic and carbonaceous-argillaceous; dark grey, and weathering same; thin- to medium-bedded; fine to medium, regular to lenticular, light grey laminations throughout; limestone occurs as lenticular bioclastic interbeds, and as ovoid concretions up to 2 feet in diameter; "Pteria" sp. (GSC loc. 85576) collected from limestone bed 30 feet from base; interval partly talus covered; strata weather shaly to flaggy; recessive	70	171
2	Siltstone to silty shale, quartzose, dolomitic, carbonaceous-argillaceous, calcareous in part; carbonate finely crystalline; dark grey, and weathering same to greyish brown to orange-brown; mainly thin-bedded, but few dense orange-brown weathering interbeds up to 6 inches thick; fine, regular to lenticular, light grey laminations throughout; weathers fissile to shaly to flaggy; recessive	60	101
1	Covered interval, except for sporadic ribs of outcrop near Permian contact, consisting of dark grey, finely laminated dolomitic siltstone similar to unit 2; base is drawn above chert pebble conglomerate, up to 2 feet thick, which represents probable erosional remnants of Permian Fantasque Formation	41	41

Section 6: Mount Becker; section measured from good Permian contact up ridge with offsets southwest along strike for better and more accessible strata (54°30 3/4'N; 120°39 1/2'W). Stratigraphic field section GK-70-4.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Whitehorse Formation (Incomplete)		
	Starlight Evaporite Member (Incomplete)		
41	Dolomite, quartzose, slightly calcareous; finely to medium crystalline; quartz fine grained; yellowish grey, and weathering same; medium- to thin-bedded; micro-vugs throughout, giving strata slight porosity; well-indurated; unit represents end of outcrop; slightly recessive	15	1,897
40	Covered interval	8	1,882
39	Sandstone and sandy dolomite, quartzose; sandstone very dolomitic, and very fine- to fine-grained; carbonate medium crystalline to oolitic; yellowish grey with slight orange tint in part, and weathering same; indistinctly bedded, looks medium; oolitic dolomite forms 2 to 3 foot zone in lower 10 feet; vuggy in part; sandstone well indurated; resistant	30	1,874
38	Dolomite, slightly quartzose; very finely to finely crystalline; yellowish grey to light olive-grey, and weathering same; medium-bedded, up to 10 inches thick; fine, regular to wavy laminations in part; subconchoidal fracture in part; resistant	10	1,844
37	Covered interval, talus consists of medium to coarsely crystalline, vuggy limestone, and yellow-grey weathering dolomite; recessive	15	1,834
36	Dolomite, quartzose, slightly calcareous, possibly argillaceous; very finely to finely crystalline; quartz fine to medium grained; yellowish grey to pale yellowish brown, and weathering light grey; medium-bedded, up to 1 foot thick; sand-silt mottling in part; micro-vugs lined with clear calcite; dense and well-indurated, with subconchoidal fracture in part; resistant and cliff-forming	25	1,819

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
35	Covered interval, base of Whitehorse Formation, estimated to occur at base of interval, using talus colour change as main criterion	40	1,794
	Sulphur Mountain Formation (1,754 feet)		
	Llama Member (846 feet)		
34	Covered interval, talus cover similar to underlying sandstone; recessive	40	1,754
33	Sandstone and minor siltstone, quartzose, dolomitic; sandstone very fine grained; carbonate finely crystalline; yellowish grey with green and orange tinting, and weathering orange-brown; medium-bedded, up to 1 foot thick; siltstone finely laminated; dense, and well-indurated; sandstone-siltstone mottling in part; resistant; underlying 300 feet in line of measured section represents fault or fold repetition of strata equivalent to that now described below unit 32, base of faulted or folded sequence in line of measured section is marked by 140-foot covered interval	21	1,714
32	Siltstone to very fine-grained sandstone, quartzose, very dolomitic, slightly calcareous in part; carbonate finely crystalline; greyish yellow to yellowish grey, and weathering same; thin-bedded, up to 3 inches thick; fine, regular to wavy laminations in part; minor cross-laminations in sandstone; worm? burrows perpendicular to bedding; bioturbate mottling in some siltstones; 10 feet from base blue-black lingulid shells and shell fragments; slightly recessive to resistant	17	1,693
31	Siltstone, quartzose, dolomitic, slightly calcareous near base, slightly ferruginous; carbonate finely to medium crystalline; pale yellowish brown to yellowish grey, and weathering orange-brown; thin- to medium-bedded, up to 6 inches thick; fine, regular to wavy lenticular, dark grey laminations; thicker beds cross-laminated in part; upper 20 feet contains carbonaceous plant? films parallel to stratification; weathers flaggy with few shaly interzones near base; unit forms base of flaggy orange-brown weathering siltstone-sandstone facies; resistant	63	1,676

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
30	Siltstone to very fine-grained sandstone, and minor limestone, quartzose, dolomitic; siltstone calcareous in part; limestone silty to sandy, finely crystalline to bioclastic, latter consisting of thin, fragmented pelecypod and/or brachiopod shells; yellowish grey to medium grey, and weathering dull orange-brown to light grey; medium- to thick-bedded; fine, regular to lenticular laminations in upper 20 feet; diagenetic limestone and bioturbate mottling, and calcareous pseudonodules scattered throughout; carbonaceous plant? stem films parallel to bedding; worm burrows perpendicular to bedding; phosphatic vertebrate bone fragments 30 feet from top; well-indurated; resistant	106	1,613
29	Siltstone, and minor limestone, similar to unit 30, except higher concentration of limestone mottling, lenses, and pseudonodules; limestone lenses in upper and lower 20 feet contain poorly preserved terebratulid brachiopods and gastropods; bioturbate mottling in siltstones; carbonaceous plant? films on bedding surfaces in lower 10 feet; weathers rubbly in part; resistant	78	1,507
28	Covered interval (snow); recessive	50	1,429
27	Siltstone, quartzose, dolomitic, very calcareous in upper half and may in part be classed as silty limestone, carbonaceous-argillaceous; carbonate finely to medium crystalline; medium dark grey with slight brown tint, and weathering dark orange-brown; medium-bedded, up to 10 inches thick; bioturbate mottling throughout; calcareous mottling and lenses in upper 40 feet; resistant	87	1,379
26	Covered interval, talus similar to unit 27	44	1,292
25	Siltstone, quartzose, dolomitic, calcareous, slightly carbonaceous-argillaceous; medium dark grey to pale yellowish brown, and weathering yellowish to orange-grey; medium-bedded; bioturbate mottling; upper half partly covered, lower half weathers as resistant rib; section continues northeast along strike for better exposure	40	1,248

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
24	Siltstone, quartzose, dolomitic, slightly calcareous, carbonaceous-argillaceous; carbonate finely to medium crystalline; medium dark to dark grey, and weathering greyish brown to orange-brown; medium-bedded, up to 15 inches thick; thin to thick, discontinuous, lenticular light grey laminations throughout; bioturbate? mottling in part; dense and well-indurated; weathers flaky in part; resistant	70	1,208
23	Siltstone, similar to unit 24, except thicker bedded, up to 3 feet; fine to coarse, regular to wavy lenticular, laminations throughout; resistant to slightly recessive	40	1,138
22	Covered interval	28	1,098
21	Siltstone, and minor limestone, quartzose, dolomitic, carbonaceous-argillaceous; siltstone very calcareous in part; carbonate finely to medium crystalline to bioclastic; dark grey, and weathering brownish grey; medium- to thick-bedded; limestone occurs as thin lenticular interbeds and ovoid concretions in lower 20 feet; Ptychites sp., Gymnotoceras sp., and Daonella cf. dubia collected from concretions at base of unit (GSC loc. 85598); weathers flaky in part; slightly recessive to resistant; unit represents base of Llama Member	62	1,070
	Whistler Member (70 feet)		
20	Siltstone and silty limestone, quartzose, dolomitic, very carbonaceous-argillaceous, slightly phosphatic and pyritiferous; carbonate finely crystalline to bioclastic, latter consisting of thin fragmented pelecypod shells; dark grey, and weathering same; thin- to medium-bedded, up to 1 foot thick; fine, wavy to crenulated, light grey laminations; compressed, indeterminate ammonites in part; weathered pyrite cubes and micro-aggregates throughout; limestone emits fetid odour upon fracture; slightly recessive to resistant	50	908

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
19	Siltstone and minor phosphatic sandstone, quartzose, dolomitic, carbonaceous-argillaceous, calcareous in part; sandstone fine- to medium-grained, and composed of well-rounded grains and ooliths of phosphate in a dolomitic to calcareous cement and matrix; dark grey, and weathering same; indistinctly bedded; siltstone contains fine, regular light grey laminations; phosphatic sandstone occupies lower 2 1/2 feet; pockets of black, well-rounded phosphate clasts up to 1/2 inch in diameter in centre of unit; weathers shaly to flaggy; unit forms base of member; recessive	20	858
	Vega-Phroso Siltstone Member (838 feet)		
18	Siltstone, quartzose, dolomitic, slightly calcareous, carbonaceous-argillaceous; medium dark grey, and weathering greyish brown; appears to form single massive bed; fine, wavy to lenticular, light grey laminations; very dense and well-indurated; resistant	8	838
17	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, very calcareous in part; carbonate finely crystalline; dark grey, and weathering same; thin- to medium-bedded; fine to medium, regular to lenticular light grey laminations; weathers shaly to flaggy; resistant	45	830
16	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly calcareous in lower 20 feet; dark grey, and weathering grey-brown to orange-brown; thin- to medium-bedded, up to 15 inches thick; fine, regular to lenticular laminations throughout; scattered dense orange-brown weathering siltstone interbeds throughout; unit weathers flaggy, in 1/4- to 1/2-inch thick plates; resistant except for upper 15 feet which are recessive	96	785
15	Siltstone, similar to unit 16, except resistant and cliff-forming, but weathers into 1/4- to 1/2-inch thick plates; orange-brown weathering siltstone interbeds more common than above	80	689

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
14	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly calcareous in part; carbonate finely crystalline; medium dark grey, and weathering greyish brown; thin-bedded, with few dense orange-brown weathering interbeds up to 15 inches thick; fine to medium, regular to lenticular, light grey laminations; weathers flaggy; resistant	40	609
13	Siltstone, similar to unit 14, except contains Posidonia sp. (GSC loc. 85596) in lower 5 feet; very few orange-brown weathering siltstone interbeds; resistant	60	569
12	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous; carbonate finely crystalline; dark grey, and weathering brownish grey to orange-brown; thin- to medium-bedded, up to 1 foot thick; fine, regular light grey laminations; weathers shaly to flaggy; slightly recessive to resistant	61	509
11	Covered interval, talus consists of shaly to flaggy weathering siltstone	16	448
10	Siltstone, similar to unit 12, but contains distinctive orange-brown weathering dense siltstone bed, 1 1/2 feet thick at base, which serves as marker bed across cliff face; slightly recessive to resistant	24	432
9	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly calcareous; dark grey, and weathering same; indistinctly bedded; fine, regular to lenticular, light grey laminations; upper half partly covered; recessive	26	408
8	Siltstone, and minor silty limestone, quartzose, dolomitic, carbonaceous-argillaceous; siltstone slightly calcareous; carbonate finely to medium crystalline to bioclastic; dark grey, and weathering grey-brown to rusty brown; thin- to medium-bedded; limestone occurs as lenticular interbeds, and as flat concretions up to 1 foot in diameter, some of which contain pelecypods and ammonites; Posidonia mimer and Xenoceltites sp. from lower 5 feet (GSC		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	loc. 85562), and Posidonia mimer and "Pseudomonotis" occidentalis from upper 13 feet (GSC loc. 85595); limestone dense and well-indurated; siltstone shaly to flaggy; recessive	33	382
7	Siltstone, quartzose, dolomitic, very calcareous in part, and may be classed as silty limestone, slightly carbonaceous-argillaceous; medium to medium dark grey, and weathering greyish to rusty brown; thin- to medium-bedded, up to 15 inches thick; beds wavy and lenticular in part; fine, regular to wavy lenticular, laminations in thin beds, thicker beds faintly to non-laminated; micro-cross-laminations in part; Posidonia mimer Oeberg, and vertebrate bones (GSC loc. 85586), collected 15 feet from top; good alternation of dense, resistant and recessive, platy- to shaly-weathering siltstones, typical of Vega Member; resistant to slightly recessive	60	349
6	Siltstone, and minor silty limestone, quartzose, dolomitic, carbonaceous-argillaceous; siltstone only slightly calcareous; carbonate finely crystalline to bioclastic; dark grey, and weathering grey-brown; thin- to medium-bedded, up to 6 inches thick; limestone in lenticular beds; 7 and 10 feet from base Posidonia mimer Oeberg and Gervillia sp. (GSC locs. 85583, 85569), were collected; siltstones contain fine, regular to lenticular, light grey laminations; weathers shaly to flaggy; slightly recessive to resistant	21	289
5	Siltstone, quartzose, dolomitic, slightly calcareous in part; light olive-grey to dark grey, and weathering orange-brown; medium- to thick-bedded, up to 3 1/2 feet thick; lower 10 feet contain finely laminated, dark-weathering siltstone interbeds; rest of unit faintly to non-laminated; dense and well-indurated; unit forms distinctive marker facies; resistant	55	268

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
4	Siltstone, quartzose, dolomitic, calcareous in part, carbonaceous-argillaceous; carbonate finely to medium crystalline; dark grey, and weathering same to grey-brown; thin- to medium-bedded, up to 10 inches thick; thicker beds slightly calcareous and lenticular; Gervillia? sp. (GSC loc. 85558) collected from lower 5 feet, and Xenoceltites? sp. collected 15 feet above base from very calcareous concretions; fish scales and bone fragments throughout lower half; fine, regular to lenticular, light grey laminations; weathers shaly to flaggy; resistant to slightly recessive	126	213
3	Siltstone, similar to unit 4, except entirely thin-bedded; weathers shaly to flaggy; recessive	40	87
2	Covered interval, talus same as unit 1	27	47
1	Siltstone to silty shale, quartzose, dolomitic, carbonaceous-argillaceous; dark grey, and weathering same; indistinctly bedded; fine, regular to lenticular light grey laminations throughout; weathers shaly; unit forms sharp contact with underlying Permian sandstone; recessive and partly covered	20	20

Section 7: Muinok-Belcourt; section measured southwest along top of ridge from good Permian contact (54°21'N; 120°29 3/4'W). Stratigraphic field section GK-70-11.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Sulphur Mountain Formation (Incomplete)		
	Llama Member (574 feet plus)		
23	Siltstone to very fine-grained sandstone and minor bioclastic limestone, quartzose, dolomitic; carbonate mainly medium crystalline except for limestone; pale yellowish brown to medium grey, and weathering orange-brown to light grey for limestone; thin- to thick-bedded, with thicker beds confined to lower 10 feet; fine, regular to wavy laminations in thin beds; limestone consists of silicified and dolomitized pelecypod and/or brachiopod shell fragments, and is found in upper 7 feet; weathers shaly to flaggy in part; resistant to slightly recessive; unit overlain by faulted Mississippian strata	33+	1,301+
22	Sandstone and minor limestone, quartzose, dolomitic, possibly argillaceous; sandstone very calcareous, and very fine-grained; limestone medium crystalline to bioclastic; medium dark grey, and weathering greyish yellow to greyish orange; thin- to medium-bedded, up to 2 feet thick; sandstone contains fine to coarse, wavy and lenticular laminations; bioclastic limestone interbeds in upper 5 feet; diagenetic calcareous light grey weathering pseudoconcretions throughout; blue-black phosphatic lingulid shells in lower half; dense and well-indurated; slightly recessive to resistant	40	1,268
21	Sandstone, quartzose, calcareous; very fine-grained; pale yellowish brown, and weathering dark grey-brown; indistinctly bedded; carbonaceous plant? films throughout, parallel to stratification; dense and well-indurated; resistant	14	1,228

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
20	Sandstone, quartzose, dolomitic, very calcareous in part, and may be classed as sandy limestone, slightly carbonaceous-argillaceous; very fine-grained, and may in part be classed as siltstone; carbonate medium crystalline; medium dark grey to pale yellowish brown, and weathering greyish brown with orange tinting, to light grey; medium- to thick-bedded; calcareous facies occurs as diagenetic mottling, and pseudonodules throughout the sandstone; terebratulid brachiopods 10 feet from base; carbonaceous plant? films throughout parallel to stratification; dense and well-indurated; resistant	82	1,214
19	Siltstone to very fine-grained sandstone, quartzose, dolomitic, very calcareous in part; carbonate medium crystalline; pale yellowish brown to medium dark grey, and weathering greyish brown to light grey; medium- to thick-bedded, up to 5 feet thick; diagenetic calcareous mottling and pseudonodules in upper and lower 20 feet; blue-black orbiculoidid shells and shell fragments; scattered terebratulids in calcareous facies; dark grey carbonaceous plant? films parallel to stratification throughout; dense and well-indurated; resistant	55	1,132
18	Siltstone to very fine-grained sandstone, similar to unit 19, except more calcareous in part, and may be classed as silty carbonaceous limestone; poorly preserved indeterminate ammonites and pelecypods in lower 4 feet; carbonaceous plant? films, and diagenetic calcareous mottling and pseudonodules throughout; few terebratulids in upper 10 feet; resistant	60	1,077
17	Siltstone to very fine-grained sandstone, quartzose, very calcareous, dolomitic, slightly carbonaceous-argillaceous; carbonate finely to medium crystalline; medium dark to olive-grey, and weathering orange-brown to greyish brown; medium- to thick-bedded; coarse, wavy laminations in part; diagenetic calcareous mottling in part; scattered carbonaceous plant? films parallel to stratification; scattered fossil shell fragments throughout; dense and well-indurated; resistant	70	1,017

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
16	Siltstone to very fine-grained sandstone, similar to unit 17, except unit more carbonaceous-argillaceous; fine to coarse, wavy to lenticular light grey laminations throughout; carbonaceous plant? films throughout; resistant	80	947
15	Siltstone, quartzose, dolomitic, very calcareous in part, carbonaceous-argillaceous; carbonate finely to medium crystalline; medium dark to dark grey, and weathering orange-brown to medium grey; medium- to thick-bedded; fine to coarse, wavy to lenticular light grey laminations; diagenetic calcareous mottling and pseudonodules in part; carbonaceous plant? films parallel to stratification; flaggy in part; resistant	60	867
14	Siltstone, similar to unit 15, except more coarse grained in part and may be classed as very fine-grained sandstone; beds up to 4 feet thick; diagenetic calcareous mottling and pseudonodules throughout; scattered indeterminate ammonites in calcite facies in lower 20 feet; dense and well-indurated; resistant	60	807
13	Siltstone and minor limestone, quartzose, dolomitic, carbonaceous-argillaceous; carbonate finely crystalline to bioclastic; siltstone very calcareous; medium light to dark grey, and weathering same to orange-brown; medium-bedded; fine to coarse, regular to slightly wavy light grey laminations; Gymnotoceras sp., juv. Ptychites sp., Parapopanoceras cf. vernueili, and Daonella cf. dubia (GSC loc. 85534) collected from concretions up to 1 foot in diameter, in upper foot; fossil shell fragments scattered throughout siltstone; unit dense and well indurated; slightly recessive, unit forms probable base of Llama Member	20	747
	Whistler Member (57 feet)		
12	Siltstone to silty limestone, quartzose, dolomitic, carbonaceous-argillaceous, slightly phosphatic; limestone bioclastic consisting of thin fragmented pelecypod shells; dark grey, and weathering same; indistinctly bedded; fine to medium, wavy crenulated light grey laminations in limestone;		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	siltstone has fine, regular to lenticular light grey laminations; indeterminate compressed ammonites and pelecypods in lower 20 feet; weathers shaly to flaggy; recessive	32	727
11	Covered interval, talus similar to unit 12, except contains some phosphatic pebble conglomerate, with pebbles up to 1 inch in diameter near lower contact Gymnotoceras sp. indet., and Daonella sp. indet. collected from talus (GSC loc. 85539); unit represents base of member; recessive	25	695
	Vega-Phroso Siltstone Member (670 feet)		
10	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly pyritiferous and calcareous in part; carbonate finely to medium crystalline; dark grey, and weathering greyish brown with orange tint; mainly thin-bedded, but few beds to 15 inches thick; fine to medium, regular to lenticular light grey laminations throughout; weathers flaggy in 1/2- to 1/inch plates; slightly recessive to recessive	65	670
9	Siltstone, similar to unit 10, except appears more carbonaceous, and weathers shaly to flaggy in part; scattered lenticular pyrite laminations and micro-aggregates; slightly recessive	80	605
8	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly calcareous in part; dark grey, and weathering greyish brown to orange-brown; mainly thin-bedded, but few prominent dense, slightly calcareous orange-brown weathering siltstone interbeds up to 2 feet thick; fine, regular to lenticular light grey laminations; weathers flaggy in 1/2- to 1-inch plates; shaly in part; dense and generally well-indurated; resistant to slightly recessive	80	525
7	Siltstone, similar to unit 8, except orange-brown weathering; slightly calcareous, dense, siltstone interbeds more common; few poorly preserved pelecypods and compressed ammonites in lower 20 feet; weathers flaggy; unit represents base of orange-weathering interbed facies; resistant	120	445

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
6	Siltstone, quartzose, dolomitic, calcareous in part, carbonaceous-argillaceous; carbonate finely crystalline to granular in part; dark grey, and weathering same to greyish brown; mainly indistinctly bedded, but few beds to 15 inches thick in upper half; fine, regular light grey laminations throughout; two-5 foot dark grey, shaly-weathering horizons in upper 10 feet; weathers shaly to flaggy; recessive to slightly recessive	40	325
5	Siltstone and minor limestone, quartzose, carbonaceous-argillaceous in part, slightly pyritiferous; siltstone dolomitic and very calcareous; carbonate finely to medium crystalline to bioclastic, latter consisting of whole, and fragmented ammonite, pelecypod, brachiopod, and gastropod shells; medium dark to dark grey, and weathering greyish brown to rusty brown; thin- to medium-bedded, up to 6 inches thick; beds wavy to lenticular with similar laminations in part; "Pseudomonotis" occidentalis kindli, "Pseudomonotis" occidentalis (Whiteaves) and Xenoceltites subevolutus (GSC locs. 85541 and 85542), and fish fragments collected from limestone interbeds and concretions - latter up to 10 inches in diameter, 15 feet from top; weathers shaly to flaggy; slightly recessive to resistant	25	285
4	Siltstone, and minor silty limestone, quartzose, dolomitic, carbonaceous-argillaceous; siltstone very calcareous in part; limestone bioclastic, consisting of slightly silicified whole and fragmented pelecypod shells; medium to medium dark grey, and weathering grey-brown to rusty brown in part; thin- to medium-bedded, up to 1 foot thick; thicker beds less carbonaceous, more calcareous, and contain fine to coarse, lenticular to micro-cross-laminations; some thicker beds have small flute and load casts on lower surfaces; Posidonia mimer Oeberg, and Arctoceras sp. (GSC loc. 85549) collected from thin siliceous limestone interbed in upper 5 feet; alternation of dense, rusty-weathering beds and shaly grey-brown weathering beds; slightly recessive to resistant	40	260

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
3	Siltstone, similar to unit 4, except less calcareous, and more dolomitic and carbonaceous-argillaceous; few light grey weathering very calcareous interbeds; thin beds contain fine, regular to lenticular, light grey laminations, thicker beds only faintly laminated; resistant	60	220
2	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly calcareous in part; carbonate finely crystalline to pseudo-oolitic in part; dark grey, and weathering same to greyish brown to orange-brown; thin- to medium-bedded, up to 1 foot thick; fine, regular to slightly lenticular, light grey laminations throughout; thicker beds slightly calcareous in part, dense, and weather orange-brown; unit weathers flaggy; fish scales and other vertebrate fragments in lower and upper 20 feet; resistant and cliff-forming	100	160
1	Siltstone to silty shale, quartzose, dolomitic, very carbonaceous-argillaceous, slightly calcareous in upper 40 feet; carbonate finely crystalline to pseudo-oolitic; dark grey and weathering same to orange-brown in part; mainly thin-bedded, but few dense orange-brown weathering siltstone interbeds up to 6 inches thick in upper half; fine, regular to lenticular light grey laminations throughout; lower 20 feet partly covered; weathers shaly to flaggy; unit underlain by Permian sandstone; recessive	60	60

Section 8: Meosin Mountain; base of section measured up ridge on south side of cirque basin to Whistler Member contact, and continues along strike in centre of cirque up cliff face to Whitehorse Formation (54°16 1/2'N; 120°19'W). Stratigraphic field section GK-70-12

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Whitehorse Formation (Incomplete)		
	Starlight Evaporite Member (Incomplete)		
39	Dolomite, slightly silty, and calcareous; very finely crystalline; light olive-grey, and weathering light grey; indistinctly bedded; scattered empty to calcite-lined vugs, up to 1 inch in diameter throughout; breaks with subconchoidal fracture; unit ends controllable outcrop below faulted and folded strata, slightly recessive	15	1,459
38	Limestone and minor limestone breccia; medium crystalline to granular, with breccia consisting of greyish yellow angular clasts up to 1/2 inch in diameter, in medium crystalline calcite matrix and cement; unit yellowish grey, and weathering same; medium-bedded up to 6 inches thick; moderate induration and appears porous; partly talus-covered; slightly recessive	8	1,444
37	Siltstone to very fine-grained sandstone, quartzose, calcareous and dolomitic; siltstone very dolomitic; sandstone very calcareous and occupies upper 5 feet; pale yellowish brown to greyish orange, and weathering yellowish orange; medium-bedded; sandstone moderate induration and slightly porous; siltstone contains minor, white calcite-filled vugs up to 1/4 inch in diameter; siltstone well indurated; resistant to slightly recessive	18	1,436
36	Dolomite, limestone, limestone breccia, and minor very fine to fine-grained sandstone; quartzose; carbonate very finely to medium crystalline, with breccia consisting of angular limestone clasts up to 1/2 inch in diameter, in a medium crystalline matrix and cement; sandstone very dolomitic; light olive-grey to pale yellowish brown, and weathering greyish yellow; medium-bedded, up to 10 inches thick; dolomite very dense, and well		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	indurated but contains vugs up to 1 inch in diameter, lined in part with white calcite; limestone and sandstone moderate induration and slightly porous; slightly recessive	31	1,418
35	Covered interval	17	1,387
34	Sandstone, and dolomite, quartzose, possibly argillaceous in part; sandstone very calcareous and dolomitic in part, and is fine to very fine grained; carbonate very finely to medium crystalline; pale yellowish brown to greyish orange, and weathering buff to very light grey; indistinctly bedded, but looks medium; sandstone brecciated in part with yellow, angular sandstone clasts up to 1/2 inch in diameter; sandstone moderately indurated and porous; dolomite colour mottled in part, and is dense and well indurated; slightly recessive to recessive	21	1,370
33	Sandstone, quartzose, very calcareous, possibly argillaceous; fine- to medium-grained; lower 3 feet consists of coquina of silicified fragmented pelecypod shells, with minor intraformational conglomerate throughout lowest 1 foot, with subangular carbonate clasts up to 1/4 inch in diameter; greyish orange to pale yellowish brown, and weathering same to light grey; medium-bedded, up to 15 inches thick; moderate to poor induration with good porosity in part; unit forms probable base of Whitehorse Formation; resistant to slightly recessive	13	1,349
	Sulphur Mountain Formation (1,336 feet)		
	Llama Member (571 feet)		
32	Siltstone, quartzose, dolomitic; carbonate finely crystalline; medium grey to yellowish grey, and weathering light orange-brown; medium-bedded up to 15 inches thick; fine to medium, regular to cross-laminations throughout; dense and well-indurated; resistant	8	1,336

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
31	Siltstone, quartzose, dolomitic, slightly carbonaceous-argillaceous; pale yellowish brown, and weathering dark orange-brown; thin-bedded, up to 3 inches thick; fine, wavy to lenticular, dark grey carbonaceous laminations throughout, with good ripple cross-laminations in part; weathers flaggy; well-indurated; resistant to slightly recessvie	15	1,328
30	Siltstone to very fine-grained sandstone, quartzose, very dolomitic, slightly carbonaceous-argillaceous; carbonate finely crystalline; pale yellowish brown to medium dark grey, and weathering dull orange-brown; medium-bedded, up to 1 foot thick; fine, regular to wavy lenticular laminations; ripple cross-laminations, and white calcite-lined and -filled vugs in upper 5 feet; worm tubes and carbonaceous plant? films throughout on bedding surfaces; desiccation? cracks in part; dense and well-indurated; resistant	21	1,313
29	Siltstone and minor very fine-grained sandstone, quartzose, very dolomitic; carbonate finely crystalline; pale yellowish brown, and weathering dark grey-brown to orange-grey-brown; thin- to medium-bedded, up to 6 inches thick; bedding wavy in part; fine, wavy to lenticular dark grey carbonaceous laminations; micro-cross-laminations in part; worm? burrows perpendicular to bedding; well-indurated; recessive	16	1,292
28	Sandstone and minor dolomite, quartzose; very fine-grained; carbonate finely crystalline; pale yellowish brown with slight orange tint, and weathering greyish yellow to greyish orange; indistinctly bedded; blue-black phosphatic lingulids 5 feet from base; upper 5 feet very porous; dolomite forms thin, slightly porous bed at base of unit; some vugs to 1/4 inch in diameter filled and lined with clear quartz crystals; resistant	9	1,276

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
27	Sandstone, quartzose, very dolomitic; very fine-grained, and may in part be classed as siltstone; carbonate finely to medium crystalline; pale yellowish brown to greyish orange, and weathering dark orange-brown; medium-bedded; minor coarse, wavy dark grey laminations; blue-black phosphatic lingulid shells 34 feet from base; scattered carbonaceous plant? films on bedding surfaces; dense and well-indurated; resistant and cliff-forming	41	1,267
26	Siltstone to very fine-grained sandstone, quartzose, very dolomitic, slightly calcareous in part; medium dark grey to pale yellowish brown, and weathering dark greyish brown; thin- to medium-bedded, up to 15 inches thick; fine to coarse, very wavy to lenticular laminations throughout; bioturbate mottling in part; weathers shaly to flaggy; recessive; unit represents probable base of orange-weathering sandy facies	36	1,226
25	Siltstone to very fine-grained sandstone, quartzose, very dolomitic, slightly calcareous in part, slightly carbonaceous-argillaceous; carbonate finely to medium crystalline; medium grey to pale yellowish brown, and weathering greyish brown; colour mottled in part; medium- to thick-bedded; fine, very wavy carbonaceous laminations; carbonaceous plant? films on bedding surfaces; where rock calcareous has "rotten" and porous appearance; scattered lingulid phosphatic shell fragments; dense and well-indurated; resistant	38	1,190
24	Siltstone to very fine-grained sandstone, and minor sandy dolomite near top and bottom; siltstone-sandstone similar to unit 25; dolomite medium crystalline and contains blue-black phosphatic lingulid shell fragments and empty vugs; dense and well-indurated; carbonaceous plant? films on bedding surfaces; slightly recessive	67	1,152

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
23	Sandstone, quartzose, very dolomitic, slightly carbonaceous-argillaceous; very fine-grained with high proportion silt-size grains; carbonate finely to medium crystalline; medium grey to pale yellowish brown, and weathering same; medium- to thick-bedded, up to 3 feet thick; fine, dark grey carbonaceous, wavy laminations; bioturbate mottling in part; minor white calcite-lined vugs up to 1/4 inch in diameter; carbonaceous plant? films on bedding surfaces; dense and well-indurated; slightly recessive to resistant	40	1,085
22	Siltstone to very fine-grained sandstone, similar to unit 23, except finer grained and more carbonaceous-argillaceous; scattered plant? films on bedding planes; minor bioturbate mottling; resistant, and cliff-forming	60	1,045
21	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly calcareous in lower 10 feet, slightly phosphatic in upper 20 feet; carbonate medium crystalline; medium dark to dark grey, and weathering greyish brown; thick- to medium-bedded, up to 4 feet thick; dark grey discontinuous to lenticular carbonaceous laminations; scattered subrounded phosphatic clasts in upper 20 feet and lower 10 feet; minor carbonaceous plant? films on bedding surfaces; scattered black phosphatic brachiopod lingulid shell fragments; minor leached fossil zones in lower 20 feet; dense and well-indurated; resistant	80	985
20	Siltstone, similar to unit 21, with beds up to 3 1/2 feet thick; dense and well-indurated; resistant	20	905
19	Siltstone, quartzose, very dolomitic and calcareous, carbonaceous-argillaceous; carbonate finely to medium crystalline; dark grey, and weathering same to dark greyish brown; medium- to thick-bedded, up to 3 feet thick; fine to coarse, regular to lenticular, light grey laminations; calcareous interbeds throughout, but concentrated mainly between 30 and 40 feet above base; very dense and well-indurated; resistant	60	885

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
18	Siltstone, similar to unit 19, except only upper half calcareous; resistant and cliff-forming	40	825
17	Siltstone and minor silty limestone, quartzose, dolomitic, very carbonaceous-argillaceous in part; siltstone dolomitic to calcareous; carbonate finely to medium crystalline to bioclastic; medium dark to dark grey, and weathering greyish orange-brown to light grey for limestone; thick- to medium-bedded; limestone occurs in lower 10 feet as concretions up to 10 inches in diameter and as lenticular interbeds; limestone contains Parapopanoceras sp., Gymnotoceras cf. chischa (GSC loc. 85550) and whole and fragmented pelecypod shells; siltstone faintly laminated; dense and well-indurated; unit forms base of member; resistant	20	785
	Whistler Member (118 feet)		
16	Siltstone and minor limestone, quartzose, dolomitic, carbonaceous-argillaceous; siltstone very calcareous, limestone same as unit 17, occurring as concretions and lenticular interbeds; dark grey, and weathering same to grey-brown; indistinctly bedded, but looks medium to thick; lithology gradational with overlying unit; dense and well-indurated; weathers flaggy in part; slightly recessive to resistant	39	765
15	Siltstone to silty limestone, quartzose, dolomitic, very carbonaceous-argillaceous, slightly pyritiferous and phosphatic; carbonate finely to medium crystalline to bioclastic; dark grey, and weathering same to medium grey; thin- to medium-bedded, up to 10 inches thick; fine, wavy to crenulated laminations; limestone consists of coquina of thin-shelled pelecypods; fetid odour upon fracture; weathers shaly to flaggy; recessive to slightly recessive	59	726

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
14	Siltstone and silty limestone, similar to unit 15, except limestone occurs as distinctive wavy crenulated interbeds, and as ovoid concretions containing Anagymnotoceras sp., Parapopanoceras sp. cf. P. selwyni (GSC loc. 85548) and pelecypods, collected 7 feet from base; lenticles of black phosphate in lower 10 feet; limestone emits fetid odour upon fracture; weathers shaly to flaggy; unit forms probable base of member; recessive	20	667
	Vega-Phroso Siltstone Member (647 feet)		
13	Siltstone, quartzose, dolomitic, slightly calcareous, carbonaceous-argillaceous, slightly phosphatic and pyritiferous; carbonate finely to medium crystalline; dark grey, and weathering same to grey-brown; thin-bedded; fine to medium, regular to lenticular light grey laminations; small indeterminate brachiopods (GSC loc. 85551) from upper 1 foot; upper bedding surface contains irregular "blebs" black phosphate; weathered pyrite micro-aggregates in part; weathers shaly to flaggy; slightly recessive to resistant	46	647
12	Siltstone, quartzose, dolomitic, slightly calcareous in part, carbonaceous-argillaceous; strata may in part be classed as very fine-grained sandstone; medium to medium dark grey, and weathering greyish brown; thin- to medium-bedded, up to 1 foot thick; fine, wavy to lenticular laminations throughout; weathers flaggy; slightly porous in upper half; resistant	46	601
11	Siltstone, quartzose, very dolomitic, slightly calcareous, carbonaceous-argillaceous; carbonate finely to medium crystalline; dark grey, and weathering same to greyish brown; thin- to medium-bedded, with most beds ranging between 1/2 to 1 inch thick; fine to medium, regular to lenticular light grey laminations; Posidonia mimer (GSC loc. 85540) collected 10 feet from top; compressed indeterminate ammonites in lower half; weathers shaly to flaggy; slightly recessive to resistant	40	555

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
10	Siltstone to silty shale, quartzose, dolomitic, slightly calcareous, carbonaceous-argillaceous; dark grey, and weathering same to medium grey to brownish grey; mainly thin-bedded, but scattered orange-brown weathering interbeds in upper 40 feet up to 10 inches thick; fine, regular to lenticular light grey laminations; weathers shaly to flaggy; slightly recessive	80	515
9	Siltstone to silty shale, similar to unit 10, except dense orange-brown weathering siltstone interbeds more common; slightly recessive to recessive	60	435
8	Siltstone and minor limestone, quartzose, dolomitic, carbonaceous-argillaceous, slightly pyritiferous; siltstone mainly dolomitic but slightly calcareous in part; limestone dolomitic, silty, and bioclastic consisting of thin, fragmented and whole pelecypod shells and ammonites; medium to medium dark grey, and weathering same to greyish brown; thin- to medium-bedded, up to 10 inches thick; fine, regular to wavy lenticular light grey laminations; limestone occurs as lenticular interbeds and ovoid concretions and nodules; Anasibirites sp., "Pseudomonotis" occidentalis, and Posidonia mimer (GSC loc. 85547) collected 5 feet below top; weathers shaly to flaggy; slightly recessive	42	375
7	Siltstone, quartzose, very dolomitic, carbonaceous-argillaceous, very calcareous in part, and may be classed as silty limestone; carbonate finely crystalline to bioclastic in part; dark grey, and weathering same to rusty brown; thin- to medium-bedded, up to 10 inches thick, thin beds finely laminated, thicker beds only faintly laminated; alternation of resistant and recessive strata; very calcareous strata occur as lenses in upper 10 feet, and consist of fragmented thin-shelled pelecypods; oscillation ripple-marks in part; slightly recessive to resistant	17	333

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
6	Siltstone, quartzose, dolomitic, calcareous, carbonaceous-argillaceous; carbonate finely to medium crystalline; medium dark to dark grey, and weathering same to greyish brown to rusty brown; thin- to medium-bedded, up to 15 inches thick; fine, regular to lenticular light and dark grey laminations throughout thinner beds, thicker beds only faintly laminated; micro-cross-laminations in part; some less carbonaceous lighter coloured beds very calcareous; alternation of resistant-recessive strata; beds in part wavy to lenticular; thicker beds dense and well indurated; weathers flaggy; slightly recessive to resistant	80	316
5	Siltstone to very fine-grained sandstone, quartzose, dolomitic, slightly calcareous in part; carbonate medium crystalline; medium dark to dark grey and weathering yellowish grey; medium- to thick-bedded, up to 4 feet near base; trace very fine, wavy to lenticular laminations in part; very dense and well-indurated; few blue-black phosphatic lingulid shell fragments in lower 20 feet; unit forms distinctive marker in area; resistant and cliff-forming	64	236
4	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, very calcareous in part, and may be classed as silty carbonaceous limestone; dark grey, and weathering same to brownish grey; thin- to medium-bedded, up to 6 inches thick; fine, regular to lenticular light grey laminations; calcareous interbeds very lenticular, and appear to consist in part of well-rounded pseudo-oolitic grains and fragmented, recrystallized pelecypod shells; weathers shaly to flaggy; slightly recessive	47	172
3	Siltstone to silty shale, quartzose, dolomitic, carbonaceous-argillaceous slightly pyritiferous; carbonate finely crystalline; dark grey, and weathering same to brownish grey; mainly thin-bedded, but few beds up to 6 inches thick; fine, regular to lenticular light grey laminations throughout; weathers flaggy to shaly; slightly recessive to recessive	60	125

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
2	Covered interval, talus similar to unit 3	50	65
1	Siltstone to silty shale, similar to unit 3, except all thin-bedded; unit underlain unconformably by Permian sandstone; unit recessive	15	15

Section 9: Lick Creek; section begins in creek bottom and measured to top of Llama Member, then continues up west side and over top of ridge to Fernie contact. Winnifred Member thickness measured along top of ridge on east side of creek (54°11 1/2'N; 119°44'W). Stratigraphic field section GK-70-9.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Whitehorse Formation (430 feet)		
	Winnifred Member (135 feet)		
26	Dolomite, slightly silty; very finely to finely crystalline; yellowish grey to medium light grey, and weathering greyish yellow; indistinctly bedded; fine to coarse, wavy to crenulated laminations in upper foot; pyrobitumen? mottling in part; unit in contact with siliceous phosphatic pebble conglomerate of Jurassic Fernie Formation; resistant	5	1,040
25	Limestone, very dolomitic in part, slightly silty; finely to medium crystalline; medium dark to dark grey, and weathering same; medium-bedded; minor fossil fragments; medium grey chert lenses and nodules up to 6 inches long; dense and well-indurated, with subconchoidal fracture in part; resistant	10	1,035
24	Dolomite to siltstone to very fine-grained sandstone, quartzose; carbonate very finely to finely crystalline; yellowish grey with medium dark grey mottling, and weathering buff; indistinctly bedded; dense and well-indurated; resistant to slightly recessive	25	1,025
23	Covered interval; unit forms probable base of member; recessive	95	1,000
	Brewster Limestone Member (65 feet)		
22	Limestone; very finely crystalline; yellowish grey, and weathering light grey; indistinctly bedded; pelecypod, and/or brachiopod shell fragments throughout, all recrystallized; appear silicified in part; small solution vugs throughout, lined with clear calcite crystals; stylolitic; dense and well-indurated, breaks with subconchoidal fracture; slightly recessive	5	905

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
21	Covered interval, talus similar to unit 20	20	900
20	Limestone and minor dolomite, slightly siliceous; limestone slightly dolomitic, very finely to finely crystalline to bioclastic; yellowish grey to pale yellowish brown, and weathering same to light grey; bioclastic limestone consists of rounded pelecypod and/or brachiopod shell fragments, and crinoid columnals; brown organic algal-like fibres in upper half; light grey chert nodules and lenses, scattered in upper 20 feet; poorly preserved Elegantinia sp. (GSC loc. 85543) collected 5 feet from base; finely crystalline laminated dolomite interbeds in lower 5 feet; dolomite contains evaporite pseudomorphic crystals on beddings surface; unit dense and well indurated, with subconchoidal fracture in part; indistinctly bedded, looks medium; scattered vugs throughout up to 1/2 inch in diameter, lined with white to clear calcite and minor purple fluorite; resistant and cliff-forming; unit forms probable base of Member	40	880
	Starlight Evaporite Member (230 feet)		
19	Covered interval	108	840
18	Dolomite to siltstone, quartzose; carbonate very finely to finely crystalline; yellowish grey to light olive-grey, and weathering buff; indistinctly bedded; coarse, wavy laminations in part; white quartz and calcite-lined and -filled vugs, up to 1 inch in diameter in lower half; intraformational breccia in lower 15 feet; unit weathers flaggy; only sporadic ribs of exposure; slightly recessive	32	732
17	Covered interval, with talus where not grass covered, consisting of limestone collapse breccia, with greyish orange angular coarsely crystalline clasts up to 3/4 inch in diameter in medium crystalline sandy calcite matrix and cement; recessive; on basis of talus, unit represents probable base of Whitehorse Formation	90	700

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Sulphur Mountain Formation (Incomplete)		
	Llama Member (210 feet)		
16	Covered interval, talus consists of slightly dolomitic, very fine- to fine-grained sandstone	10	610
15	Sandstone, quartzose, dolomitic, slightly carbonaceous-argillaceous; carbonate finely to medium crystalline; medium to medium dark grey, and weathering orange-brown; indistinctly bedded, appears medium; fine to coarse, regular to lenticular, dark grey carbonaceous laminations; micro-cross-laminations in part; worm burrows perpendicular to laminations; dense and well-indurated; resistant	5	600
14	Covered interval, talus similar to unit 15	13	595
13	Sandstone, quartzose, dolomitic, slightly carbonaceous-argillaceous and ferruginous; very fine-grained; carbonate medium crystalline; medium dark grey with slight brown tint, and weathering dark grey-brown; medium-bedded; fine to coarse, regular laminations in part; small conical worm tubes covering some bedding surfaces, with tubes up to 15 mm long by 2 mm wide; larger worm? burrows in part up to 15 mm wide in lower half; dense and well-indurated; resistant	12	582
12	Siltstone to very fine-grained sandstone, quartzose, very dolomitic, slightly carbonaceous-argillaceous; carbonate medium crystalline; medium to medium dark grey, and weathering greyish brown; indistinctly bedded; fine, regular dark grey carbonaceous laminations in part; blue-black lingulid shells up to 20 mm long in lower 20 feet; micro-vugs filled with white calcite in part; moderate induration with slight vuggy porosity; slightly recessive	40	570

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
11	Sandstone, quartzose, very dolomitic, slightly calcareous and phosphatic in part; fine-grained; carbonate medium crystalline; medium grey to pale yellowish brown, and weathering brownish yellow; medium-bedded; fine, wavy dark grey carbonaceous laminations in part; blue-black phosphatic lingulid shell fragments throughout; minor spiriferid brachiopod shells and shell fragments in lower half; replaced by white calcite; dense and well-indurated; resistant	40	530
10	Siltstone and minor very fine- to fine-grained sandstone, quartzose, very dolomitic, carbonaceous-argillaceous; carbonate finely to medium crystalline; medium dark grey to olive-grey, and weathering grey-brown; medium-bedded, up to 2 feet thick; wavy dark grey carbonaceous laminations in part; sandstone confined to upper 10 feet of unit; bioturbate mottling throughout; slight vuggy porosity in upper 20 feet; few phosphatic lingulid shell fragments in lower 10 feet; dense and well-indurated; slightly recessive to resistant; unit represents probable base of member	80	490
	Whistler Member (60 feet)		
9	Covered interval	50	410
8	Siltstone and minor conglomerate, quartzose, dolomitic, phosphatic, carbonaceous-argillaceous; lowest foot consists of dense, black phosphate and conglomerate, phosphate coarse grained to oolitic; conglomerate consists of black, angular phosphate clasts up to 1 inch in diameter, in a dolomitic siltstone matrix and cement; strata dark grey, and weathering same; indistinctly bedded; only sporadic exposure; few fossil fragments in conglomerate, mainly crinoid columnals; slightly recessive to recessive; unit forms base of member	10	360

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Vega-Phroso Siltstone Member (Incomplete)		
7	Siltstone, quartzose, dolomitic, slightly carbonaceous-argillaceous; carbonate finely to medium crystalline, olive-grey to medium grey, and weathering grey-brown; only 50% exposure; indistinctly bedded but appears as thin-bedded; fine regular to lenticular laminations; weathers flaggy; slightly recessive to recessive	39	350
6	Siltstone to very fine-grained sandstone, quartzose, dolomitic, slightly pyritiferous; medium to medium light grey, and weathering yellowish to orange-brown; thin- to medium-bedded, up to 10 inches thick; fine, regular to slightly wavy, dark grey laminations in thin beds, thicker beds faintly to non-laminated; dense and well-indurated; resistant	25	311
5	Siltstone, quartzose, dolomitic, slightly calcareous in part; carbonate finely crystalline; medium grey to pale yellowish brown, and weathering yellowish grey to rusty brown; thin- to medium-bedded, up to 8 inches thick; fine, regular to wavy lenticular dark grey laminations; thicker beds faintly to non-laminated; micro-cross-laminations in part; alternation of shaly-weathering beds, and thicker, denser, flaggy-weathering strata; slightly recessive to resistant	80	286
4	Covered interval	44	206
3	Siltstone, quartzose, very dolomitic, slightly carbonaceous-argillaceous, and pyritiferous; medium light grey, with dark grey regular to wavy lenticular carbonaceous laminations, and weathering dark grey to rusty brown; thin- to medium-bedded, up to 5 inches thick; beds wavy to lenticular; micro-cross-laminations in part; weathers shaly to flaggy; slightly recessive to resistant	42	162

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
2	Siltstone, similar to unit 3, except slightly calcareous in part, becoming slightly more carbonaceous-argillaceous toward base; unit ends good alternation of flaggy- and shaly-weathering strata; mainly thin-bedded; slightly recessive to resistant	40	120
1	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous, slightly pyritiferous; carbonate finely crystalline; medium dark to dark grey, and weathering same; thin-bedded; fine, regular to wavy lenticular laminations; micro-cross-laminations in part; pyrite cubes and micro-aggregates in lower 20 feet; weathers shaly to flaggy; unit represents base of exposure in section; slightly recessive	80	80

Section 10: Casket Mountain; section measured up and along ridge at west end of mountain (53°49'N; 119°58 1/2'W). Stratigraphic field section GK-70-14.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Sulphur Mountain Formation (1,472 feet)		
	Llama Member (520 feet)		
23	Siltstone to very fine-grained sandstone, and minor sandy to silty limestone: quartzose, dolomitic; carbonate finely crystalline, and occurs as distinctive mottling in siltstone; medium to medium light grey, and weathering same to orange-brown; indistinctly bedded, looks medium; fine to coarse sand laminations; crossbedded in part; good worm burrows; moderate induration; interval partly talus covered; appears to form probable contact with overlying yellow-weathering dolomite facies of Whitehorse Formation; slightly recessive	70	1,472
22	Siltstone to very fine-grained sandstone, and sandy to silty limestone; mainly same as above, except interval has only partial exposure; slightly recessive to resistant	75	1,402
21	Covered interval	5	1,327
20	Siltstone, quartzose, dolomitic, very calcareous in part; carbonate finely crystalline; medium dark grey to pale yellowish brown, and weathering medium grey to greyish brown; medium- to thick-bedded; bioturbate mottling in part; diagenetic calcareous mottling and pseudonodules throughout; dense and well-indurated; slightly recessive to resistant	30	1,322
19	Siltstone, quartzose, dolomitic, very calcareous, and may in part be classed as silty limestone; medium dark grey with slight brown tint, and weathering medium grey to greyish brown; calcareous facies occurs as diagenetic mottling and lenses; medium- to thick-bedded; upper 1 foot replete with whole and fragmented brachiopod shells; unit partly covered; siltstone bedding surfaces containing carbonaceous plant? films; slightly recessive	40	1,292

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
18	Siltstone and minor silty limestone, quartzose, dolomitic, slightly carbonaceous-argillaceous in part; siltstone very calcareous in part; limestone very silty, dolomitic and consists mainly of thin fragmented pelecypod and/or brachiopod shells; medium to medium dark grey with brown tint in part; and weathering greyish brown to medium grey; medium- to thick-bedded; coarse, wavy to lenticular, discontinuous light grey laminations in part; diagenetic calcareous mottling and pseudo-concretions throughout, but decreasing in frequency toward base; carbonaceous plant? films on bedding surfaces in upper half of unit; siltstone becomes denser and finer grained toward base; unit forms top of cliff; resistant	140	1,252
17	Siltstone and minor limestone, quartzose, dolomitic, very carbonaceous-argillaceous, especially limestone; carbonate finely crystalline to bioclastic; siltstone very calcareous in part; medium dark to dark grey, and weathering greyish brown; medium- to thick-bedded, up to 3 feet thick; coarse to fine, wavy, lenticular discontinuous light grey laminations; limestone occurs as minor thin to medium lenticular interbeds, consisting mainly of thin-shelled fragmented pelecypods and/or brachiopods; minor blue-black phosphatic lingulid shell fragments; dense and well-indurated; weathers flaggy to shaly in part; resistant	80	1,112
16	Siltstone, and minor limestone, same as unit 17, except limestone interbeds more numerous, up to 1 foot thick, and 10 feet from base unit contains Gymnotoceras sp. and Protrachyceras sp. aff. P. subasperum (GSC loc. 85533); limestone very silty and carbonaceous-argillaceous; dense and well-indurated; resistant	40	1,032

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
15	Siltstone, and minor limestone, quartzose, dolomitic, carbonaceous-argillaceous; carbonate finely crystalline to bioclastic, latter consisting of fragmented pelecypod and/or brachiopod shells and compressed ammonites; siltstone very calcareous in part; dark grey, and weathering same to greyish brown; medium- to thick-bedded, up to 3 feet thick; fine to medium, regular to wavy lenticular light grey laminations; scattered concretions, up to 10 inches in diameter near base, containing ammonites; very dense and well-indurated; unit represents probable base of Llama Member; resistant	40	992
	Whistler Member (58 feet)		
14	Siltstone, quartzose, dolomitic, very calcareous in part and may be classed as silty limestone, very carbonaceous-argillaceous; dark grey, and weathering same; medium- to thin-bedded, up to 2 feet thick; fine, wavy to crenulated laminations in part; Gymnotoceras? sp. undet. and Daonella dubia (GSC locs. 85528, 85546, and 85532) collected from concretions and lenticular limestone beds in centre of unit; fetid odour upon fracture; well-indurated; resistant	30	952
13	Siltstone, quartzose, dolomitic, calcareous, carbonaceous-argillaceous; carbonate finely crystalline to bioclastic; dark grey and weathering same; thin- to medium-bedded; fine to medium, regular to wavy lenticular light grey laminations; scattered grains and lenticular laminations of pyrite; recessive	18	922
12	Siltstone to silty limestone, and minor conglomerate; quartzose, dolomitic, phosphatic, carbonaceous-argillaceous, slightly pyritiferous; carbonate finely crystalline to bioclastic; dark grey, and weathering light to medium grey; medium- to thin-bedded; lowest 1 foot consists of phosphatic pebble conglomerate, with black phosphatic pebbles up to 1 inch in diameter, in a matrix of dolomitic quartz siltstone, very fine-grained sandstone, granular phosphate, and minor disseminated pyrite; limestone occurs as thin		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	interbeds up to 2 inches thick, and contains zones of oolitic phosphate; fetid odour upon fracture; minor purple fluorite and black vitreous pyrobitumen matter filling and lining vugs; few vertebrate bone fragments; slightly recessive to resistant; unit forms base of member	10	904
	Vega-Phroso Siltstone Member (894 feet)		
11	Siltstone, quartzose, very dolomitic, slightly calcareous, and carbonaceous; trace disseminated pyrite; carbonate finely crystalline; medium dark to dark grey, and weathering greyish brown; mainly indistinctly bedded, but few distinct beds to 4 inches thick; fine to coarse, wavy to discontinuous, lenticular light grey laminations throughout; minor micro-cross-laminations and bioturbate mottling; weathers flaggy in 1/2 to 1 inch thick plates; small normal faults in upper half; resistant	95	894
10	Siltstone, similar to unit 11, with lenticular, wavy to discontinuous light grey laminations throughout; micro-cross-laminations; weathers flaggy; resistant	60	799
9	Siltstone, quartzose, dolomitic, carbonaceous-argillaceous; slightly calcareous in lower 20 feet; medium dark to dark grey, and weathering greyish brown; indistinctly bedded, except for minor interbeds of dense orange-brown weathering siltstone up to 10 inches thick; fine to coarse, regular to lenticular light grey laminations throughout; micro-aggregates of pyrite scattered throughout; weathers flaggy in 1/2- to 1-inch plates; poorly preserved pelecypod impressions in lower 20 feet; resistant	126	739
8	Siltstone, similar to unit 9, weathering very flaggy; prominent dense, orange-weathering 15-inch siltstone bed 20 feet from base; resistant and cliff-forming	80	613

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
7	Siltstone and minor bioclastic limestone, quartzose, carbonaceous-argillaceous; siltstone very dolomitic but slightly calcareous in part; carbonate mainly finely crystalline; medium dark to dark grey, and weathering greyish brown to light grey for limestone; thin-bedded, up to 3 inches thick; fine, regular to wavy lenticular light grey laminations; limestone occurs as slightly siliceous lenticular beds of fragmented and whole pelecypod shells; Posidonia mimer (GSC loc. 85544) collected from lower 10 feet; weathers shaly to flaggy in part; resistant and cliff-forming	60	533
6	Siltstone, and minor limestone, similar to unit 7, except limestone interbeds slightly more siliceous and forms beds up to 6 inches thick; indeterminate pelecypods 15 feet above base; siltstone very dolomitic and weathers very flaggy, in plates up to 1/2 inch thick; resistant and cliff-forming; unit forms base of lenticular bioclastic limestone interbeds	85	473
5	Siltstone, quartzose, very dolomitic, carbonaceous-argillaceous, slightly calcareous near base; carbonate finely crystalline; dark grey, and weathering grey-brown, to orange-brown; mainly thin-bedded, but few dense, orange-brown weathering interbeds, up to 1 foot thick; fine, regular to slightly lenticular light grey laminations; lithology typical of Phroso Siltstone facies; weathers shaly to flaggy; resistant to slightly recessive	118	388
4	Siltstone, quartzose, dolomitic, very carbonaceous-argillaceous, calcareous and slightly pyritiferous in part; carbonate finely crystalline, with calcite occurring mainly as very well-rounded oolitic-like grains; medium dark to dark grey, and weathering greyish brown; mainly thin-bedded, but few dense interbeds up to 6 inches thick; fine, regular to slightly wavy, light grey laminations throughout; prominent 1-inch pyrite band 15 feet from base; weathers shaly to flaggy; resistant	80	270

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
3	Siltstone, similar to unit 4, except contains more calcareous interbeds with calcite consisting of fragmented shells and rounded grains and/or oolites; wavy to lenticular laminations more common; 30 feet from base is 6-inch thick calcareous, phosphatic, fine-grained sandstone bed; weathers shaly to flaggy; resistant and cliff-forming	80	190
2	Siltstone, to silty shale, quartzose, very dolomitic, carbonaceous-argillaceous, slightly pyritiferous; carbonate finely crystalline; dark grey, and weathering same to greyish brown; thin-bedded, with occasional dense bed up to 6 inches thick; fine to coarse, regular to wavy lenticular light and dark grey laminations throughout; weathers shaly to flaggy; slightly recessive to recessive; Claraia stachei Bittner (GSC loc. 85531) collected from talus samples	100	110
1	Covered interval, talus same as unit 2, recessive; unit forms sharp contact with underlying Permian sandstone	10	10