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A Progress Report on Stratigraphic Investigations of the Lowermost Succession of Proterozoic Rocks, Northern Wernecke Mountains, Yukon Territory

by

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Introduction

The recent discovery of several significant breccia-hosted uranium occurrences (Bell and Delaney, 1977; Laznicka, 1977a, b; Morin, 1977; Bell, 1978; Delaney et al in press) has prompted a renewed interest in the lowermost succession of Proterozoic rocks which are exposed in the Wernecke and Ogilvie Mountains (Green, 1972; Blusson, 1974; Norris, 1975; Delaney in Young et al in press). As a corollary to these exploration ventures, detailed stratigraphic studies are being undertaken on exposures of these rocks in the Northern Wernecke Mountains. Six weeks of reconnaissance studies completed during the summer of 1976 have been complemented by an additional two and one-half months of detailed studies during the summer of 1977. Further field work is planned for 1978. This study will form the basis for a Ph.D. thesis by G. Delaney at the University of Western Ontario, London.

It is the purpose of this preliminary report to summarize the main characteristics of the stratigraphic subdivisions recognized in the lowermost succession of Proterozoic in the northern Wernecke Mountains. An appendix to this report contains 19 representative stratigraphic sections which illustrate the main features of these rocks.

On the basis of information gathered to-date, the stratigraphy of the Proterozoic rocks exposed in the northern Wernecke Mountains (Green, 1972; Blusson, 1974; Norris, 1975) has been revised (Bell and Delaney, 1977), and an informal stratigraphic nomenclature is proposed for these rocks. Three divisions at the group level are defined. These are informally named "Fairchild Lake Group", "Quartet Group", and "Gillespie Lake Group" (Figs. 1 and 2) from oldest to youngest. In addition, several subdivisions of formational status have been recognized within each of these groups. As this entire succession has long been referred to as either Wernecke-type Proterozoics (Archer, 1977) or the Wernecke Assemblage (Eisbacher, 1978), and because it is composed of three major divisions of the group level, it is given the informal name, "Wernecke Supergroup".

Fairchild Lake Group

The Fairchild Lake Group consists of at least 4 km of light grey weathering, thinly bedded to laminated siltstone, slate and argillite with some intercalated carbonate. This group is composed of at least four and possibly five distinct subdivisions of formational status. The Fairchild Lake Group is named after Fairchild Lake, in the immediate vicinity of which are found the best exposures of these rocks.

The Fairchild Lake Group occurs as thin, locally deformed and altered strips along the Bonnet Plume River or as thin re-entrants to this main zone (Fig. 1). The only nearly complete sequence of this group is found southwest of Fairchild Lake, where an apparently continuous succession of about 3,500 m of overturned strata have been measured. It is in this area that representative sections for subdivisions F-1 (GD - 106C - 77-4), F-2 (GD - 106C - 77 - 5) and F-3 (GD - 106C - 77- 6) are located (Figs. 1 and 3).

The lowest subdivision in the Fairchild Lake Group, F-1, consists of up to 1800 m of light grey to greenish grey weathering siltstone, slate and argillite. Unit F-1 also contains a few isolated limestone beds which range in thickness up to 15 cm. Lenticular bedding is the most common bedding style, although some units exhibit wavy bedding and others are characterized by even, parallel laminations. Load structures, commonly produced by piled, load casted ripples, are present throughout F-1. Cross bed data collected from this unit suggests that these sediments were deposited by south-westerly flowing currents. The base of subdivision F-1 has not been defined.

Unit F-2 conformably overlies unit F-1, and consists of 400 m of light grey weathering argillite, siltstone and limestone. Several of the members in F-2 are characterized by rhythmically alternating, thin beds[1] of siltstone and limestone which weather in a distinctive ribbed fashion. Locally within F-2 there are medium thick limestone beds which contain broken and contorted laminae and thin beds of siltstone. Intercalated with the ribbed weathering siltstone-limestone units are members consisting of lenticular, to wavy bedded, to even, parallel laminated siltstone which locally contain medium thick beds of fine-grained, cross laminated sandstone. The contact of the uppermost ribbed weathering siltstone-limestone member of F-2 with a sequence of even, parallel laminated to lenticular bedded siltstone also marks the contact between F-2 and F-3.

Subdivision F-3 weathers light grey to light greenish grey and consists of up to 2,000 m of siltstone, slate and argillite with a few thin beds of limestone. Lenticular bedding is common throughout F-3 and locally flute moulds are preserved on the lower bedding plane surfaces. Paleocurrent data suggest that this unit was deposited by south to southeasterly flowing currents. This unit is dissected by vertical dykes of granulated sedimentary rock which contain veins of specularite.

Northeast of Fairchild Lake is a 500 m-thick fault wedge (GD - 106C - 77 - 3) of strata of the Fairchild Lake Group which is unlike any of the subdivisions described above. This unit, F(N), consists of grey weathering medium to thick beds of siltstone and fine-grained sandstone which have small-scale parallel to lunate ripple marks on many of the bedding plane surfaces. Cross bed and ripple mark orientations suggest that this unit was deposited by westerly flowing currents. The relationship of F(N) with the other subdivisions of the Fairchild Lake Group is uncertain although it could perhaps be a facies equivalent of F-3 or F-1.

The uppermost subdivision in the Fairchild Lake Group, F-4, is a sequence of 300 to 500 m of grey to dark grey weathering slate, siltstone and argillite with intercalated carbonate. A representative stratigraphic section (GD - 106C - 77- 2) containing F-4 is located immediately west of Fairchild Lake (Fig. 3). Although a continuous sequence has not been measured between F-3 and F-4, there is no evidence for a significant stratigraphic break between these two units.

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[1] The terminology for thickness of beds and laminae used in this report is that proposed by Ingram (1954) and Campbell (1967).

Thin beds of grey weathering shaly siltstone compose the lower portion of F-4. The transition to the upper carbonate of F-4 is marked by the appearance of thin interbeds of recessive, orange brown weathering dolostone. The upper portion of F-4 consists of pockets of light grey weathering dolostone with thin interbeds of dark grey weathering, commonly pyritic slate. Near the top of F-4 is a 4 to 14 m thick unit of white weathering thin bedded limestone. In exposures along the Bonnet Plume River, this limestone unit serves as a good marker horizon for the top of unit F-4. Overlying the white limestone marker horizon is a sequence of light grey weathering, thin bedded dolosiltite with thin interbeds of dark grey weathering shaly dolostone. This unit is in turn succeeded by a succession of dark grey weathering slates which contain thin interbeds of dolostone which decrease in number and proportion upwards. The last carbonate bed marks the contact between the Fairchild Lake Group and the overlying Quartet Group.

Generally rocks of the Fairchild Lake Group have been regionally metamorphosed to lower greenschist facies. In the vicinity of intrusive breccia complexes, these fine-grained rocks have been transformed into phyllites and schists which contain higher grade assemblages including chloritoid and chloritoid-garnet. Silicification is related to quartz veining and is sporadic in occurrence throughout the sequence. Coarse-grained, blade-like crystals of a member of the tremolite-actinolite series are found locally as coatings on joint surfaces of rocks in the Fairchild Lake Group.

Detailed correlation within the Fairchild Lake Group over any great distance is hindered by limited exposure, paucity of distinctive marker horizons, faulting and the effects of metamorphism.

Quartet Group

The Quartet Group consists of at least 5 km of dark grey weathering siltstone, slate and argillite with some fine-grained sandstone beds and minor dolostone. This group crops out over wide parts of the map area, in the southern Werneckes, and in the Ogilvie Mountains to the west (Green, 1972, Norris, 1975). The Quartet Group is named after Quartet Lakes, a topographic feature in the northern part of the map area, to the west and south of which are found good representative exposures of these rocks. Other good exposures of the Quartet Group are found northeast and west-southwest of Fairchild Lake. The following description is based on a composite section from all of these areas.

The contact between the Fairchild Lake Group and the Quartet Group is conformable. The lowest subdivision of the Quartet Group, Q-1, consists of two complete cycles of slate overlain by shaly siltstone. The upper of these two couplets, is pyritic and weathers a rusty dark grey colour. This member serves as a good marker horizon, particularly for mapping from aircraft. A representative stratigraphic section (GD - 106C - 77 - 2) containing Q-1 is located west of Fairchild Lake (Fig. 3).

The remainder of the Quartet Group above Q-1, Q-2, has not been subdivided because it is monotonous and contains few distinctive marker horizons. Immediately overlying Q-1 are several hundred metres of thin bedded, dark grey weathering siltstone characterized by alternating even, parallel, light grey and dark grey laminations. Above these beds, the proportion and thickness of siltstone beds increase. The main sedimentary style consists of wavy beds of alternating siltstone and shaly siltstone. Many of the siltstone beds contain small-scale cross laminations and some are graded. The thickness of the siltstone beds gradually increases up section so that about 400 m from the base of Q-2, there is a sequence of resistant, light-grey weathering, thick beds of siltstone to fine-grained sandstone with thin shaly interbeds. Many of these thick bedded siltstone units are slump folded. The thick bedded fine-grained sandstone beds are in turn followed by another succession of generally wavy to locally lenticular bedded siltstone with interbeds of coarse-grained siltstone to fine-grained sandstone. Thus, there is a cyclic thickening and coarsening upward of bedding and grain size in Q-2. Dispersed throughout Q-2 are medium to thick beds of massive silty shale which contain scattered granule to pebble size fragments of siltstone and discontinuous contorted lenses and thin beds of siltstone.

Sedimentary structures in Q-2 include load casts, shrinkage (synaersis?) cracks and simple assymetrical ripple marks. In the upper part of Q-2, complex "egg carton" interference ripples are common. This latter feature is suggestive of tidal or wave action. This hypothesis is borne out by cross bed measurements from the upper part of Q-2 which show a polymodal distribution pattern.

Approximately 300 m below the top of the Quartet Group, are a few thin to medium thick beds of orange to buff weathering dolomitic siltstone and dolosiltite. The beds are typically cross laminated.

The lack of distinctive marker horizons, coupled with the cyclical nature of these sediments, make it hard to correlate strata of the Quartet Group over any great distance.

Regionally the rocks of the Quartet group have been metamorphosed to the lower greenschist facies. In the vicinity of intrusive breccia complexes, these rocks have been transformed into phyllites and schists, some of which are characterized by the presence of coarse-grained porphyroblasts of chloritoid.

As with the Fairchild Lake Group, numerous faults including normal, reverse and thrust varieties cause a repetition of sequences and complicate stratigraphic reconstruction.

Gillespie Lake Group

The Gillespie Lake Group consists of more than 4 km of buff to orange to locally grey weathering dolostone with minor siltstone and sandstone. The contact between the Quartet Group and the Gillespie Lake Group is transitional. At least eight subdivisions of formational status are recognized in the Gillespie Lake Group. These are referred to as G-1 to G-8 in ascending order. These subdivisions are only tentative however due to the presence of structural complications. The Gillespie Lake Group is named after Gillespie Lake, immediately to the north of which is found the most complete and intact successions of these rocks. Rocks of the Gillespie Lake Group are widely exposed in both the Wernecke and Ogilvie Mountains.

Thickness and lithologic characteristics of the basal transitional unit, G-1, are quite variable. Immediately south of Gillespie Lake, the transition from the Quartet to the Gillespie Lake Group is rather abrupt with G-1 having a total thickness of less than 25 m. At other localities, such as north of the Bear River, 8 kilometres from Gillespie Lake, G-1 is approximately 350 m thick (GD - 106C - 76 - 1). Here, the base of G-1 is defined by the first regular appearance of beds of orange weathering dolosiltite in a sequence of laminated to wavy bedded siltstone and thick bedded fine-grained sandstone. The first dolostone units are 1 to 2 metres thick, thinly bedded, and contain small-scale cross laminations. The number and proportion of these dolostone units gradually increase over the first 50 metres so that G-1 gradually assumes a distinctive "striped" appearance, the stripes consisting of alternating grey weathering beds of siltstone and orange weathering beds of dolosiltite. Cross bed data collected from G-1 suggests that the dolosiltite in this unit was deposited by south to southeastward flowing currents.

G-2 overlies G-1 and is perhaps partly a facies equivalent. G-2 is a 400 to 600 m thick sequence of grey to buff to locally brown weathering shaly siltstone with some interbedded dolosiltite. G-2 is subdivided into two members. The lower 200 to 300 m of G-2 consist of laminated brownish grey to grey to tan weathering shaly siltstone with thin beds to discontinuous lenses of orange weathering, cross laminated dolosiltite. The upper 200 to 300 m of G-2 is composed of grey to brownish grey weathering silty shale which is weakly dolomitic in parts. Near the top of G-2, thin beds of greenish grey mudstone alternate with irregular lenses of coarse-grained siltstone. Cross bed data collected from the dolosiltite in the lower part of G-2 suggests that these sediments were deposited by southerly to southeasterly flowing currents. Representative stratigraphic sections containing G-2 are found north of the Bear River, 1 (GD - 106D - 77 - 6) and 5 (GD -106D - 77 - 5) kilometres northwest of Gillespie Lake (Fig. 3).

Subdivision G-3, which conformably overlies G-2, consists of approximately 50 m of medium to thick beds of buff weathering, even, parallel laminated dolosiltite. A representative stratigraphic section containing G-3 (GD - 106D - 77 - 5), is found north of the Bear River, 5 km northwest of Gillespie Lake (Fig. 3). G-3 is conformably overlain by strata of subdivisions G-4.

Subdivision G-4 of the Gillespie Lake Group comprises up to 450 m of buff to grey to brown weathering dolosiltite with some interbedded dolomitic shale. Grey to dark grey weathering chert occurs as thin interbeds and discontinuous lenses throughout most of G-4. G-4 can be subdivided into three members. The lower 200 to 250 m of G-4 consist of buff to brown to grey weathering thin to medium thick beds of dolosiltite. Sedimentary structures in these beds include small scale cross laminations and even, parallel laminations. Discontinuous lenses to thin beds of dark grey weathering chert locally constitute up to 15% of this lower member of G-4. Conformably overlying the lower part of G-4 is 150 m of buff to grey weathering, thin to medium to locally thick bedded dolosiltite. There is a cyclicity in the bedding thickness in this middle member from thin to thick bedded, over an interval of 20 to 30 metres. The upper part of G-4 consists of 100 m of generally thin bedded, buff weathering dolosiltite which contains thin beds and discontinuous lenses of grey chert. A fault break between G-4 and G-5 obscures the nature of the contact between these two units. A representative stratigraphic section (GD -106D - 77 - 4) containing unit G-4 is located north of the Bear River, 4 km northwest of Gillespie Lake (Fig. 3).

Unit G-5 consists of approximately 500 m of buff weathering dolosiltite, dolomitic shale, stromatolitic dolostone and flat-chip dolostone conglomerate. G-5 is subdivided into three members. The lower 175 m of G-5 is composed of buff to locally maroon weathering thin to medium thick beds of laminated dolosiltite with thin interbeds of buff to grey weathering dolomitic shale. The middle part of G-5 consists of between 100 and 150 m of light brown to light grey weathering, even, parallel laminated to wavy bedded dolosiltite which contains bioherms and biostromes of both bifurcating and isolated columnar stromatolites as well as thin to medium thick beds of algal debris. The upper member of G-5 comprises a maximum of 250 metres of buff to orange weathering, even, parallel laminated dolosiltite with some thin shale interbeds and lenses and thin beds of flat-chip conglomerate. Representative stratigraphic sections (GD - 106D - 77 - 4 and GD - 106C - 77 - 8) containing dubdivision G-5 are located in the vicinity of Gillespie Lake.

Subdivision G-6 is also separated from G-5 by a fault contact and thus its true thickness and the nature of its lower contact are masked. G-6 includes approximately 400 m of orange to buff to locally maroon weathering dolostone. In detail, G-6 consists of thick units of rhythmically alternating thin beds of dolomicrite and dolosiltite which weather in a distinctive ribbed fashion. Locally the dolosiltite is characterized by a "knotty" texture defined by ellipsoidal shaped cavities. These cavities are parallel to bedding and alternate with thin beds of massive weathering dolosiltite. Medium thick units of even, parallel laminated dolosiltite are interbedded with the sequence of ribbed to knotty weathering dolosiltite. Subdivision G-6 is transitional into G-7. Representative stratigraphic sections (GD - 106C - 77 - 9, 11) containing unit G-6 are located north of Gillespie Lake (Fig. 3).

Subdivision G-7 consists of 50 to 100 m of thin to medium thick beds of buff weathering, lenticular to wavy bedded dolosiltite with medium thick interbeds of grey weathering dolomitic shale. A representative stratigraphic section (GD -106C - 77 - 11) containing G-7 is located north of Gillespie Lake (Fig. 3).

The uppermost stratigraphic subdivision G-8, is composed of 400 to 700 m of orange to buff weathering shallow water dolostone. The main rock types in this succession include buff weathering, thin to medium thick beds of crinkly laminated dolostone, buff to grey weathering, thin to medium thick beds of oolitic and pisolitic dolostone, thin beds of even, parallel laminated to cross laminated dolostone and stromatolitic dolostone. Members composed of a series of thin beds of dark grey weathering carbonaceous shale are intercalated within this unit at intervals of 25 to 100 m. Molar tooth structure (Smith, 1968) is present throughout much of unit G-8. Stromatolites occur as both bioherms and biostromes; common varieties include isolated and branching columnar forms and large scale bulbous forms. Representative stratigraphic sections (GD - 106C - 77 -13, 14) containing subdivision G-8 are located 8 kilometers north of Gillespie Lake (Fig. 3).

Structure

Structural style in Proterozoic rocks of the northern Wernecke Mountains is characterized by open folds whose axes trend WNW. This relatively simple pattern is complicated however, by areas of complex folds, faults and the effect of intrusive breccia complexes.

An overturned sequence of at least 3.2 km of strata of the Fairchild Lake Group occurs southwest of Fairchild Lake (Fig. 1), across the Bonnet Plume River. Southwest of Quartet Mountain is an area of complex folding which contains recumbently folded rocks of the upper Fairchild Lake Group. A complex zone of folding and faulting between these two areas includes overturned strata of all three groups.

The northeastern boundary of the rocks of the Wernecke Supergroup (Fig. 1) is marked by the continuation of the Knorr Fault (Norris, 1975; Norris and Hopkins, 1977). Norris and Hopkins (ibid.) suggest that this fault has displayed not only right lateral strike slip displacement, but also differential vertical motion. They believe that at least 52 km of right lateral displacement has occurred along this fault since Rapitan time.

One of the most significant fault zones in the northern part of the map area follows the topographic expression of the Bonnet Plume River (Fig. 1). The trend of this fault zone is subparallel to that of the Knorr Fault and it too may represent a continuation of the Richardson Fault array (ibid.). The Bonnet Plume River Fault zone is important for a number of reasons: 1) the only known exposures of the Fairchild Lake Group (the oldest rocks in the Wernecke Mountains and perhaps the oldest rocks in the northern Cordillera) occur along a linear zone whose trend is defined by this structure (Fig. 1); 2) a zone of complex folds, including some which are overturned occur along part of the southern margin of this structure; 3) several mineralized breccia complexes occur along or in close proximity to this structure (Fig. 1; Bell, 1978, Fig. 59.1).

Another WNW trending fault zone occupies the Bear River - Gillespie Creek topographic lineament. Locally across this fault zone, vertical offset of hundreds of metres has been measured. This fault zone along with other WNW-trending faults illustrated in Fig. 1 is subparallel to the Knorr and Bonnet Plume Fault Zones and may also be related to the Richardson fault array (Norris and Hopkins, 1977). The importance of this structural trend as a control mechanism for the emplacement of intrusive breccia complexes can be appreciated by examining Figure 59.1 of Bell (1978). Whether this array of WNW trending faults persists into the southern part of the map area is uncertain and will require additional field studies.

At some localities, interconnecting faults have been defined between members of the WNW array described above (Fig. 1). These interconnecting faults appear to have a braided pattern similar to the anastomosing faults described by Norris and Hopkins (1978) in the Richardson array. In places where these intersecting faults cut strata of the Gillespie Lake Group, Pb and Zn mineralization have been observed.

Strata of the Wernecke Supergroup are also cut by a series of north trending moderate to high angle reverse and normal faults which exhibit lateral offset as well.

Numerous low angle thrust faults, further hinder stratigraphic correlation in rocks of the Wernecke Supergroup.

Regional Stratigraphic Relationships

East and northeast of Gillespie Lake, in the Rackla Range, strata of the Gillespie Lake Group are overlain with angular discordance by a basal conglomerate succeeded by red and green shale and argillite (Wheeler, 1954) which together comprise part of the Pinguicula Group (Eisbacher, 1978). On the basis of descriptions by Wheeler (1954), this unconformity was equated with that between the Rapitan Group and older formations[2] in the Mackenzie Mountains and the deformational event responsible for this unconformity was named the Racklan orogeny (Gabrielse, 1967). In the eastern Wernecke Mountains however, strata of the Pinguicula Group are unconformably overlain by those of the Rapitan Group (Eisbacher, 1978). Thus by equating the Rapitan-Mackenzie unconformity with the Pinguicula-Wernecke unconformity, two distinct deformational episodes were equated (Gabrielse, 1967; Eisbacher, 1978; Yeo et al, 1978). A discussion of this problem by Yeo et al, 1978) observed that the term Racklan orogeny has become entrenched in the literature as referring to the deformational event responsible for the unconformity separating the Rapitan and older strata. On this basis, Yeo et al (ibid.), suggested retaining the term Racklan orogeny for the younger deformational event (c.f. Eisbacher, 1978) and proposed that the older orogenic episode be named the Nadaleen orogeny. This problem of nomenclature still has to be resolved satisfactorily.

Young et al (in press) have divided the Proterozoic strata of the northern Cordillera into three major sequences separated by two significant unconformities. Sequence A, the oldest group of rocks, is between 1.7 and 1.2 b.y. old. Rocks of the Wernecke Supergroup constitute Sequence A in the northern Cordillera. Pre-Missoula Group rocks of the Belt Supergroup may represent Sequence A in the southern Cordillera. Sequence B, which is between 1.2 and 0.8 b.y. old includes rocks of the Mackenzie Mountains Supergroup and the Pinguicula Group in the northern Cordillera.

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[2]Young et al (in press) have proposed that the entire assemblage of pre-Rapitan Proterozoic rocks in the Mackenzie Mountains be named the "Mackenzie Mountains Supergroup".

Examples of strata of Sequence B in the southern Cordillera might include rocks of the Missoula Group of the Belt Supergroup. Sequence C contains Proterozoic rocks younger than 0.8 b.y. and includes rocks of the Ekwi Supergroup (Young *et al in press*; Yeo *et al*, 1978) in the northern Cordillera and those of the Windermere Supergroup and equivalents in the southern Cordillera.

Summary

This interim report has reviewed stratigraphic characteristics of the lowermost succession of Proterozoic rocks exposed in the northern Wernecke Mountains. This sequence of rocks, which is in excess of 13 km thick, is named the Wernecke Supergroup. The Wernecke Supergroup is composed of three groups which from oldest to youngest are given the informal names Fairchild Lake Group, Quartet Group and Gillespie Lake Group. Several tentative subdivisions of formational status have been described in each of these groups.

The Fairchild Lake Group is composed of at least 4 km of generally light grey weathering siltstones, slates and argillites. It is divided into four formations, two of which contain carbonate members: one formation near the middle of the group, contains ribbed weathering, thinly bedded, siltstone-limestone rhythmites; the other formation at the top of the group consists of interbedded shaly siltstone and dolostone with a distinctive white weathering limestone marker horizon. The Quartet Group, which conformably overlies the Fairchild Lake Group, consists of up to 5 km of monotonous dark grey weathering siltstone, argillite and slate with minor sandstone. The Quartet Group is transitional into the overlying Gillespie Lake Group which is composed of at least 4 km of buff to orange to locally grey weathering dolostone with minor siltstone and sandstone.

Metamorphism, faulting, complex folds, the monotonous and cyclical nature of stratigraphy, the lack of distinctive marker horizons and the possibility of facies changes have greatly hindered attempts at stratigraphic reconstruction in rocks of the Wernecke Supergroup. Thus much of the stratigraphic detail within the groups must be considered tentative in nature. Field investigations to be undertaken during the summer of 1978 will help to further refine the stratigraphic relationships outlined above.

Acknowledgments

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APPENDIX

The stratigraphic sections illustrated on the following pages were compiled from field observatons made during the summers of 1976 and 1977. Figure 3 shows the location of each of these sections.

Each section is represented diagramatically and the set of symbols used in this appendix are portrayed in the legend accompanying this open file. Marginal notes which accompany each section serve to illuminate its significant characteristics. Detailed sections are provided to illustrate specific features of individual sections. Section locations are given in terms of latitude and longitude as well as by aerial photograph co-ordinates using the method described by D.K. Norris (1972). All rock descriptions follow the Udden-Wentworth scale; the terminology for thickness of beds and laminae is adapted after Ingram (1954) and Campbell (1967).

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in prep: Precambrian evolution of the North American Cordillera.

SECTION GD - 106 C - 77- 4. SOUTHWEST OF FAIRCHILD LAKE ACROSS THE BONNET PLUME RIVER

Located on the western tributary of a small creek which drains easterly to the Bonnet Plume River, intersecting this river where its flow changes from northerly to westerly; Latitude 64°55'40" N, Longitude 133°52'20"W; aerial photograph A 20624 - 142; base of section at photo co-ordinates x = -7.02, y = +8.10; top of section at photo co-ordinates x = 5.20, y = +6.10. Measured and described by G. Delaney, July 3, 1977; through the lower part of the Fairchild Lake Group. On the basis of primary structures it has been determined that this entire sequence is overturned. Attitude of beds near base of section 049°/32° NW; attitude of beds near top of section 052°42 NW (data for stratigraphic top and stratigraphic base).

SECTION GD - 106 C - 77 - 5. SOUTHWEST OF FAIRCHILD LAKE ACROSS THE BONNET PLUME RIVER

Located on the eastern tributary of a small creek which drains easterly to the Bonnet Plume River, intersecting this river where its flow changes from northerly to westerly; Latitude 64°54'50" N, Longitude 133°51'00"W; aerial photograph A 20624 - 142; base of section at photo co-ordinates x = -4.90, y = +4.12; top of section at photo co-ordinates x = -3.20, y = +3.40. Measured and described by G. Delaney, July 4, 1977; through the middle part of the Fairchild Lake Group. On the basis of primary structures it has been determined that this entire sequence is overturned. Attitude of beds near base of section 054°/54° NW; attitude of beds near top of section 035°/62° NW (data for stratigraphic top and stratigraphic base).

SECTION GD - 106 C -77 - 6. SOUTHWEST OF FAIRCHILD LAKE ACROSS THE BONNET PLUME RIVER

Located on a small creek which drains eastward into the Bonnet Plume River; Latitude 64°53'30"N, Longitude 133°50'20"W; aerial photograph A 20624 - 192; base of section at photo co-ordinates x = -3.45, y = +1.62; top of section at photo co-ordinates x = -1.80, y = +0.20. Measured and described by G. Delaney, July 5, 1977; section in the upper part of the Fairchild Lake Group. On the basis of primary structures it has been determined that this entire sequence is overturned. Attitude of beds near the base of the section 050°/54° NW; attitude of beds near the top of the section 167°20° SW (data for stratigraphic top and stratigraphic base). Section cut by at least one major fault; the displacement across this fault is unknown.

SECTION GD - 106 D - 77 - 4. NORTHWEST OF GILLESPIE LAKE

This section was measured up the first range to the north of the small creek which branches east from the Bear river, approximately 5 kilometres northwest of Gillespie Lake; Latitude 64°47'00"N, Longitude 134°00'40"W; aerial photograph A 20694 -113; base of section at photo co-ordinates x = -4.10, y = +3.62; top of section at photo co-ordinates x = -3.50, y = +6.12. Measured and described by G. Delaney July 24, 1977; section is through the lower and middle portion of the Gillespie Lake Group. Attitude of beds at base of section 133°/37° NE; attitude of beds at top of section 130°/28° NE. Section may be cut by one or more faults. Base of section adjoins section GD -106 D - 77 -5.

SECTION GD - 106 D - 77 - 5. NORTHWEST OF GILLESPIE LAKE

This section was measured up the first range to the north of the small creek which branches east from the Bear River approximately 5 kilometres northwest of Gillespie Lake; Latitude 64°46'40"N, Longitude 134°02'40"W; aerial photograph A 20694 - 113; base of section at photo co-ordinates x = -7.92, y = +4.10; top of section at photo co-ordinates x = -7.37, y = +5.65. Measured and described by G. Delaney July 25, 1977; section is through the lower part of the Gillespie Lake Group. Attitude of beds at base of section 164°/37° NE; attitude of beds near top of section 104°/38° NE. A major fault near the top of this section has resulted in the juxtaposition of strata which may have been separated from each other by several hundred metres.

SECTION GD - 106 D - 77 - 6. NORTHWEST END OF GILLESPIE LAKE

Located on the first range of hills to the north of the valley at the northwest end of Gillespie Lake; Latitude 64°45'00"N, Longitude 134°00'50"W; aerial photograph A 20694 - 112; base of section at photo co-ordinates x = +1.10, y = +4.10; top of section at photo co-ordinates x = +0.10, y = +5.42. Measured and described by G. Delaney July 29, 1977; section is through the lower part of the Gillespie Lake Group. Attitude of beds near the bottom of section 000°/28° NE; attitude of beds near top of section 012°/34° NE. Continuity of section is broken by a major fault which cuts it near the top.

SECTION GD - 106 D - 76 - 1. 8 KILOMETRES NORTHEAST OF GILLESPIE LAKE

This section was measured up the first range to the north of the Bear River, 8 kilometres northeast of Gillespie Lake; Latitude 64° 48'30"N, Longitude 134°06'00"W; aerial photograph A 20694 - 85; base of section at photo co-ordinates x = -0.30, y = -2.72; top of section at photo co-ordinates x = +1.50, y = -2.78. Measured and described by G. Delaney July 13, 1976; section is through the upper part of the Quartet Group and the lower part of the Gillespie Lake Group. Average attitude of beds near the base of the section 037°/37° SE; average attitude of beds near the top of the section 044°/28° SE.

SECTION GD -106 C - 77 -8. NORTHEAST OF GILLESPIE LAKE

Near the junction of Gillespie Creek and its north fork; just SE of Gillespie Lake; Latitude 64°43'20"N. Longitude 133°51'00"W; aerial photograph A 20694 - 113; base of section at photo co-ordinates x = +2.22, y = -7.67; top of section at photo co-ordinates x = +3.35, y = -7.57. Measured and described by G. Delaney July 18, 1977; through the lower portions of the Gillespie Lake Group. Attitude of beds near the base of the section 169°/38° E; attitude of the beds near the top of the section 006°/34° E.

SECTION GD - 106 C - 77 - 9. NORTHEAST OF GILLESPIE LAKE

Located near the first major junction of the small creek which flows southerly joining Gillespie Creek 2 km southeast of Gillespie Lake; Latitude 64°44'00"N, Longitude 133°56'30"W; aerial photograph A 20694 - 113; base of section at photo co-ordinates x = +2.90, y = -5.10; top of section at photo co-ordinates x = +3.57, y = -4.17. Measured and described by G. Delaney July 22, 1977; through lower and middle parts of the Gillespie Lake Group. Attitudes of beds near the base of section 165°/30° E; attitude of beds near top of section 033°/19° SE.

SECTION GD - 106 C - 77 - 10. NORTH OF GILLESPIE LAKE

Section measured from the base of the glacier on Gillespie Mountain north along creekbed; Latitude 64°45'30"N, Longitude 133°54'00"W; aerial photograph A 20694 - 114; base of section at photo co-ordinates x = -4.01, y = -0.57; top of section at photo co-ordinates x = -3.07, y = +0.13. Measured and described by G. Delaney July 27, 1977. Section is through the middle portions of the Gillespie Lake Group. Attitude of beds near the bottom of the section 153°/30° NE; attitude of beds near the top of the section 138°/29° NE. Top of section adjoins section GD - 106 C - 77 - 11.

SECTION GD - 106 C - 77 - 11. NORTH OF GILLESPIE LAKE

Section measured along the gorge of the north flowing creek which drains the glacier on Gillespie Mountain; Latitude 64°46'00"N, Longitude 133°54'20"W; aerial photograph A 20694 - 114; base of section at photo co-ordinates x = -3.07, y = +0.13; top of section at photo co-ordinates x = -2.00, y = +1.83. Measured and described by G. Delaney, July 30, 1977; section is through the middle part of the Gillespie Lake Group. Attitude of beds at base of section 138°/27° NE; attitude of beds at top of section 135°/37° NE. Section is dissected by several faults, there may be some repetition of strata. Bottom of this section adjoins section GD - 106 C - 77 - 10.

SECTION GD - 106 C - 77 - 13. 9.6 KILOMETRES NORTH OF GILLESPIE LAKE

Measured up the south facing slope of this mountain located 9.6 kilometres north-northeast of Gillespie Lake; Latitude 64°48'45"N, Longitude 133°54'40"W; aerial photograph A 20694 - 83; base of section at photo co-ordinates x = -0.35, y = -2.43; top of section at photo co-ordinates x = -0.47, y = -1.37. Measured and described by G. Delaney August 1, 1977; section through the upper part of the Gillespie Lake Group. Average attitude of beds in this section 096°/19° N. The bottom of this section adjoins section GD - 106 C - 77 - 14.

SECTION GD - 106 C - 77 - 14. 9.6 KILOMETRES NORTH OF GILLESPIE LAKE

Measured up the south facing slope of this mountain located 9.6 kilometres north-northeast of Gillespie Lake; Latitude 64°48'20"N, Longitude 133°54'20"W; aerial photograph A 20694 - 83; base of section at photo co-ordinates x = + 1.17, y = -3.67; top of section at photo co-ordinates x = -0.35, y = -2.43. Measured and described by G. Delaney, August 5, 1977; section through the upper part of the Gillespie Lake Group. There may be some stratigraphic repetition in this section as it is cut by several parallel faults of unknown displacement. Attitude of beds near top of section 109°/49° N; attitude of beds near base of section 143°/29° NE. The top of this section adjoins section GD - 106 C -77 - 13.

SECTION GD - 106 C - 77 - 1. WEST OF FAIRCHILD LAKE (106 C)

Located immediately west of Fairchild Lake on the first ridge north of the Bonnet Plume River; Latitude 64°58'48"N, Longitude 133°50'40" W; aerial photograph A 20624 - 192; base of section at photo co-ordinates x = -1.05, y = +0.52; top of section at photo co-ordinates x = -0.50, y = +2.50. Measured and described by G. Delaney, June 9, 1977; section is most probably through the upper part of the Fairchild Lake Group. Much of this section is characterized by phyllites and schists and thus many of the primary features are masked. Average attitude of the beds in this section is 130°28° NE.

SECTION GD - 106 C - 77 - 2. WEST OF FAIRCHILD LAKE

Located on the western arm of the major cirque immediately west of Fairchild Lake and north of the Bonnet Plume River; Latitude 65°00'00"N, Longitude 133°52'00"W; aerial photograph A 20624 - 192; base of section at photo co-ordinates x = -3.20, y = +6.10; top of section at photo co-ordinates x = -4.00, y = +8.40. Measured and described by G. Delaney, June 10, 1977; from the top of the Fairchild Lake Group into the lower parts of the Quartet Group. Attitude of the beds near the base of the section 070°30° N; attitude of beds changes to 110°/40° N in the middle and upper parts of the section.

SECTION GD - 106 C - 77 - 3. NORTHEAST OF FAIRCHILD LAKE

Section was measured up the gorge of the westerly flowing creek which drains into the alluvial fan separating Fairchild Lake and a smaller unnamed lake which lies to the north; Latitude 64°59'40"N, Longitude 133° 44'30"W; aerial photograph A 20624 - 192; base of section at photo co-ordinates x = +8.37, y = +5.77; top of section at photo co-ordinates x = +6.55, y = +5.05. Measured and described by G. Delaney June 14, 1977; through the upper part of the Fairchild Lake Group. Attitude of beds near base of section is 137°/76° SW; attitude of beds near top of section is 130°/60° SW. Section is cut by one or more faults; the displacement across these faults is unknown.

SECTIONS GD - 106 F - 77 - 3, 4 & 5. 16 KILOMETRES EAST-NORTHEAST OF FAIRCHILD LAKE

Sections located on a small westward flowing creek which drains into a major tributary of Rapitan Creek; for sections 3 and 4: Latitude 65° 04'00"N, Longitude 133°31'30"W; for section 5: Latitude 65°03'50"N, Longitude 133°30'30"W; aerial photograph A 20639 - 19; base of sections 3 and 4 at photo co-ordinates x = +2.60, y = +3.30; top of sections 3 and 4 at photo co-ordinates x = +3.10, y = +4.40; base of section 5 at photo co-ordinates x = +4.43, y = +2.57; top of section 5 at photo co-ordinates x = +4.77, y = +3.17. Measured and described by G. Delaney July 13, 14 and 15, 1977; section is through the upper part of the Quartet Group, Average attitude of beds in sections 3 and 4 is 177°/54° NE; average attitude of beds in section 5 is 165°/34° NE. Section 3 adjoins section 4; the bottom of section 5 is a strike line projection from the top of section 4.

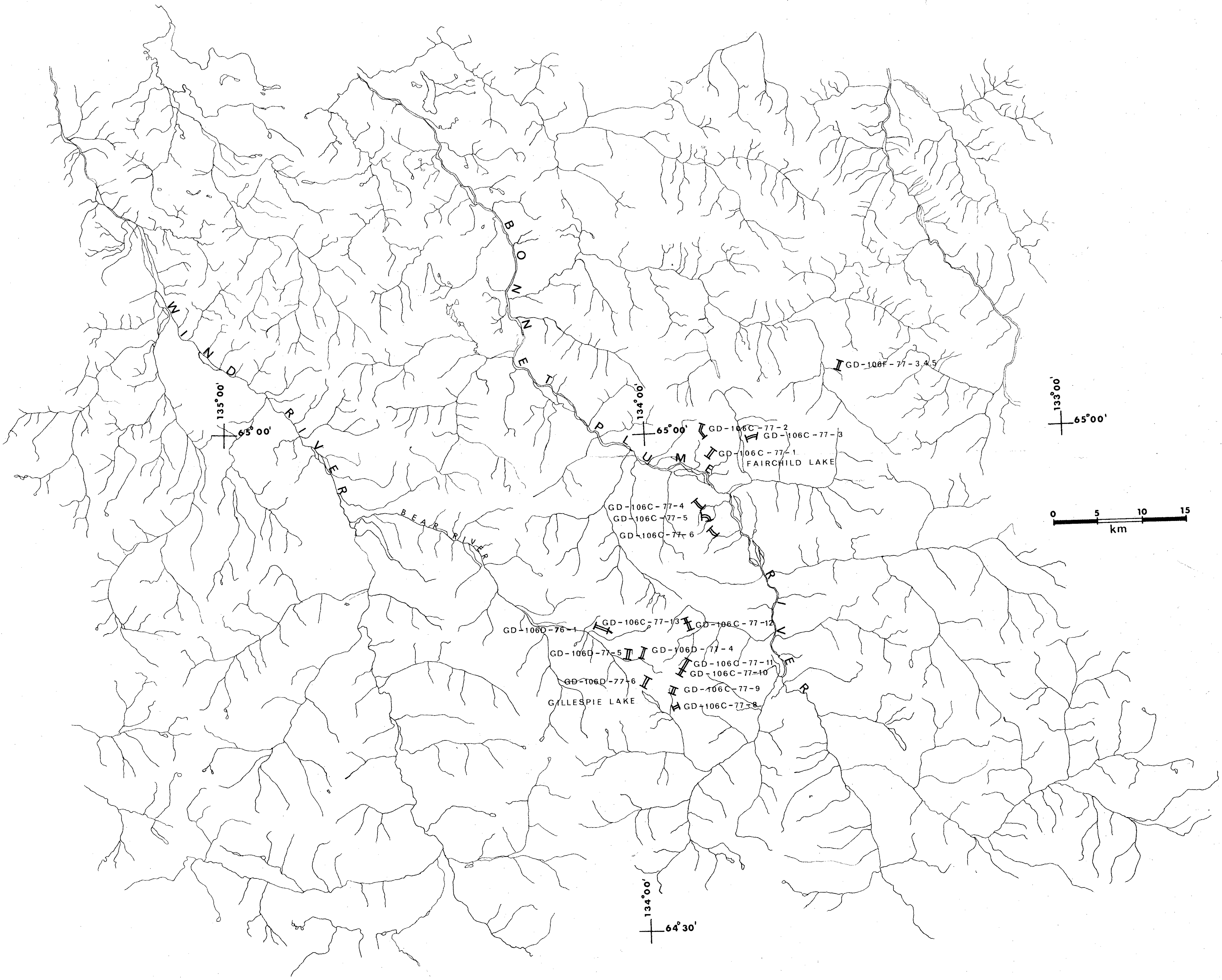
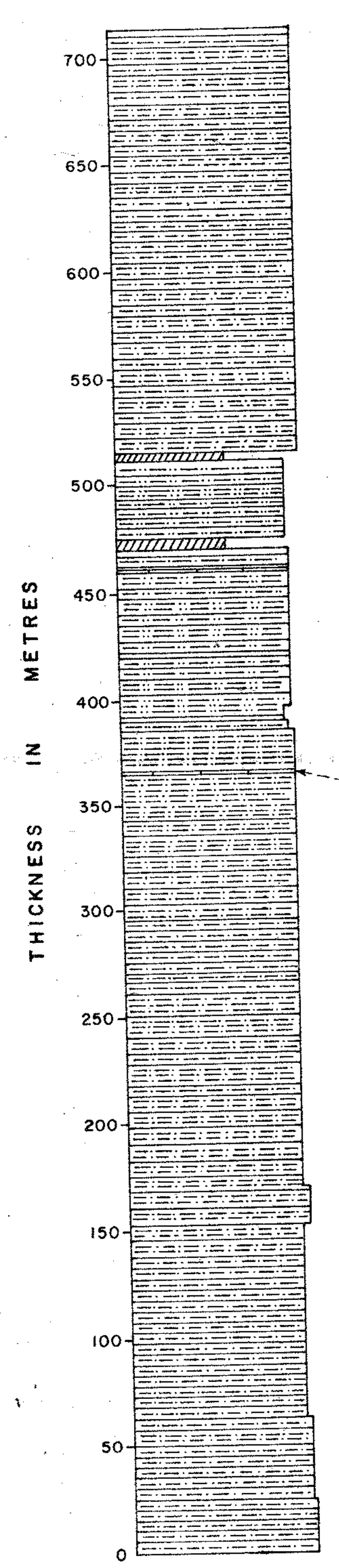


FIGURE 3 LOCATION DIAGRAM OF STRATIGRAPHIC SECTIONS

SECTION: GD-106 C-77-4. SOUTHWEST OF FAIRCHILD LAKE ACROSS BONNET PLUME RIVER



Siltstone: grey weathering laminated to locally lenticular bedded

Siltstone: light greenish-grey weathering; wavy bedded with lenticles of sand.

Siltstone: grey weathering, cross laminated.

Siltstone: grey weathering, cross laminated with some thin fine-grained sand beds. coarse-grained blades of tremolite. actinolite occur as coatings on some of the joint surfaces.

Siltstone: greenish-grey weathering with some cross-laminated sand lenticles.

Covered

Silty shale: grey weathering with some thin lenticles of silt.

Silty shale: grey weathering, recessive

Covered

Carbonate bed in a sequence of wavy bedded shaly-siltstone

Silty shale: recessive weathering, characterised by wavy bedding

Siltstone: wavy bedded

Several thin light-grey weathering beds of limestone occur in this part of the sequence

Limestone: light-grey weathering in a 15 cm thick bed

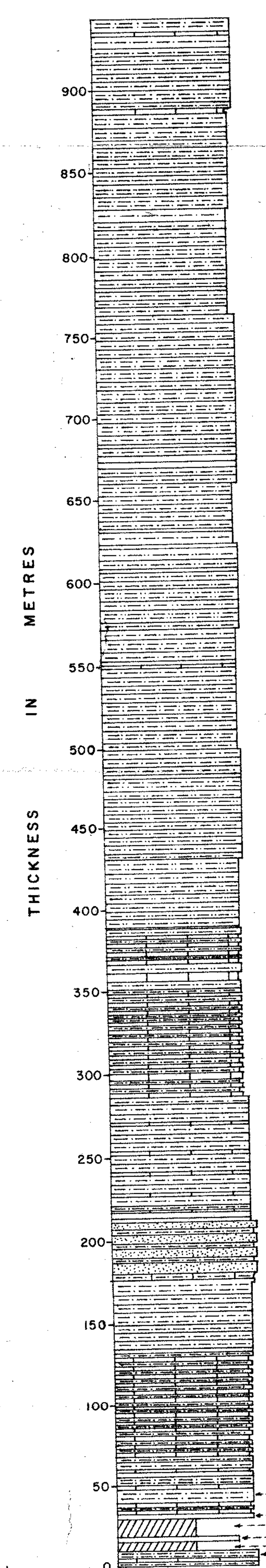
Siltstone: greenish-grey weathering; close-spaced bedding plane clevage and numerous close-spaced fractures often mask primary features

Siltstone: greenish-grey weathering, lenticular bedded

Siltstone: lenticular bedded; load structures on the soles of beds

Siltstone: light-grey weathering wavy to lenticular bedded.

SECTION: GD-106 C-77-5. SOUTHWEST OF FAIRCHILD LAKE ACROSS BONNET PLUME RIVER



Limestone: light-grey weathering

Siltstone: shaly siltstone buff to grey weathering

Medium grained to coarse-grained tremolite actinolite crystals developed on joint surfaces.

Shaly siltstone: greenish-grey weathering, with thin silt lenticles; flute casts on the soles of beds.

fine-grained sand lenticles in a siltstone

Siltstone: light-greenish grey weathering, lenticular bedded

Siltstone: light-greenish grey weathering, characterised by wavy to lenticular bedding.

Shaly siltstone: light greenish-grey weathering, planar-parallel laminated locally cross-bedded sand lenses are present.

Dark-grey weathering limestone interbed.

Siltstone: light greenish-grey weathering, thin bedded.

Siltstone: light greenish-grey weathering with a close-spaced bedding plane clevage.

Shaly siltstone: greenish-grey weathering with silt lenticles; locally carbonate veins cut across bedding.

Siltstone-shaly siltstone: planar-parallel laminated to locally lenticular bedded

Siltstone-limestone: ribbed weathering unit, limestone beds 1-2 cm. in thickness alternate with 7 to 10 cm. thick beds of siltstone. thickness of carbonate interbeds increases down section to 25 cm.

Siltstone-limestone: light-grey weathering, as thin rhythmically interbedded units, weathers in a ribbed fashion.

Siltstone, shaly siltstone: lenticular bedded

Siltstone-limestone: ribbed weathering

Siltstone: light greenish-grey weathering, lenticular to wavy bedding.

Siltstone: lenticular bedded

thin laminae of limestone decrease in size and number down section.

Sandstone, siltstone, shaly siltstone: thick beds of fine-grained cross-laminated sandstone interbedded with thin to medium thickness beds of wavy to planar-parallel laminated siltstone to shaly siltstone.

Carbonate beds: to 25 cm. with contorted and broken beds of siltstone

Siltstone: grey weathering, lenticular bedded, some beds are calcareous.

Siltstone-limestone: light-grey weathering, consists of alternating thin beds of siltstone and limestone; weathers in a ribbed fashion.

Siltstone-limestone: light-grey weathering, consists of alternating thin beds of siltstone and limestone, weathers ribbed.

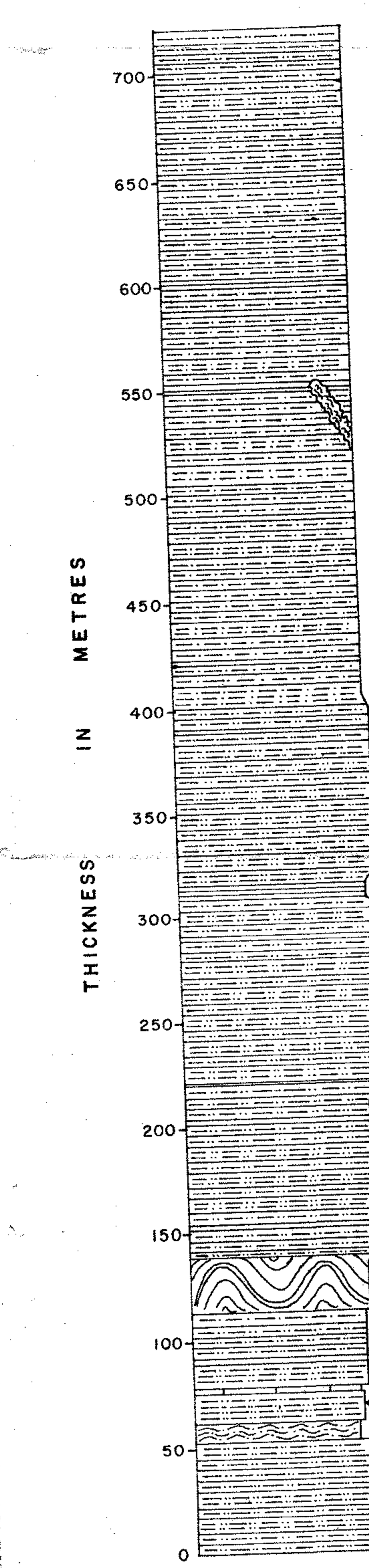
Siltstone: light greenish-gray weathering

Silty shale: with thin limestone interbeds

Covered

Siltstone: light greenish-grey weathering, wavy to lenticular bedding is the prominent style - some thin limestone interbeds.

SECTION: GD-106 C-77-6. SOUTHWEST OF FAIRCHILD LAKE ACROSS BONNET PLUME RIVER



Shaly siltstone: buff to grey weathering, laminated.

Shaly siltstone: planar-parallel laminated to locally leuticular laminated.

Siltstone: drab greenish-grey weathering

Siltstone: light grey weathering, planar-parallel laminated (1% lenticular bedding)

Siltstone: light grey weathering, characterised by lenticular bedding

Siltstone: light grey weathering, lenticular bedded - sole markings on many of the bedding surfaces (predominantly flute marks).

1 m. wide vertical dyke of granulated sediment specularite clots are present on several of the fracture surfaces in this structure.

Siltstone: light-grey weathering planar-parallel laminated locally with lenticular cross bedding, medium grained porphyroblasts of chloritiod are present on some bedding plane surfaces.

Siltstone: light greenish-grey weathering, lenticular bedded

Siltstone: light grey weathering, lenticular bedded, load structures developed throughout sequence.

Siltstone to shaly siltstone: light-grey weathering, thin bedded.

Shaly siltstone: light greenish-grey weathering, weathers in massive units planar-parallel laminated.

Shaly siltstone: greenish-grey weathering parallel-planar to wavy laminat

Some homogenuous shaly units 10 to 15 cm. in thickness

Shaly siltstone: light greenish-grey weathering, thick bedded; generally planar-parallel laminated but locally homogeneous.

Shaly siltstone: greenish-grey weathering, massive, thick bedded, gener planar-parallel laminated. locally with close-spaced bedding plane cle

Shaly siltstone

Wide fault zone - strata contorted

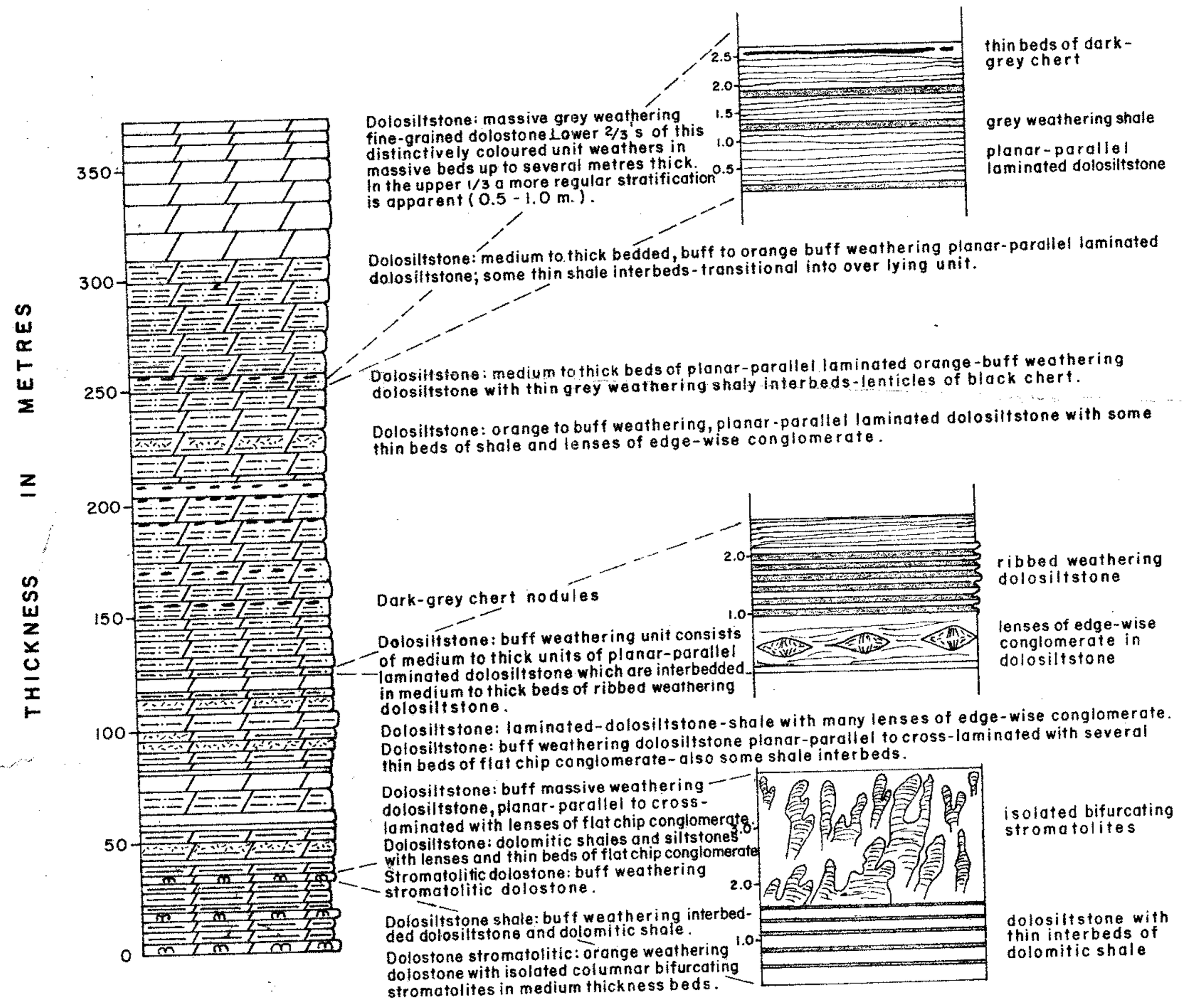
Shaly siltstone-siltstone: light-grey weathering, planar-parallel laminated, locally close-spaced bedding plane clevage masks primary features.

Limestone: light-grey weathering bed which contains several broken up siltstone lenses.

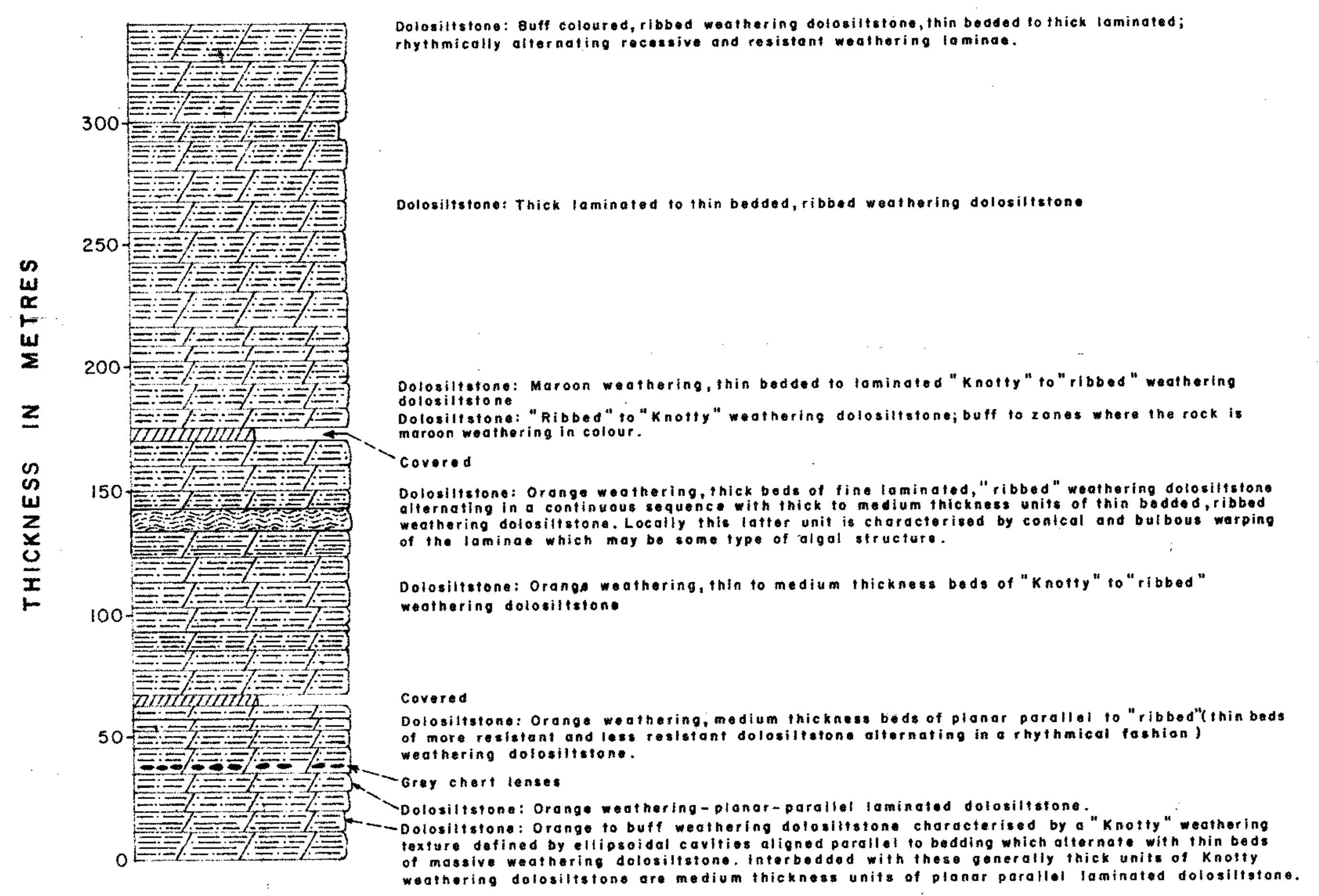
Shaly siltstone: light-grey weathering

Shaly siltstone: light-grey weathering planar-parallel laminated.

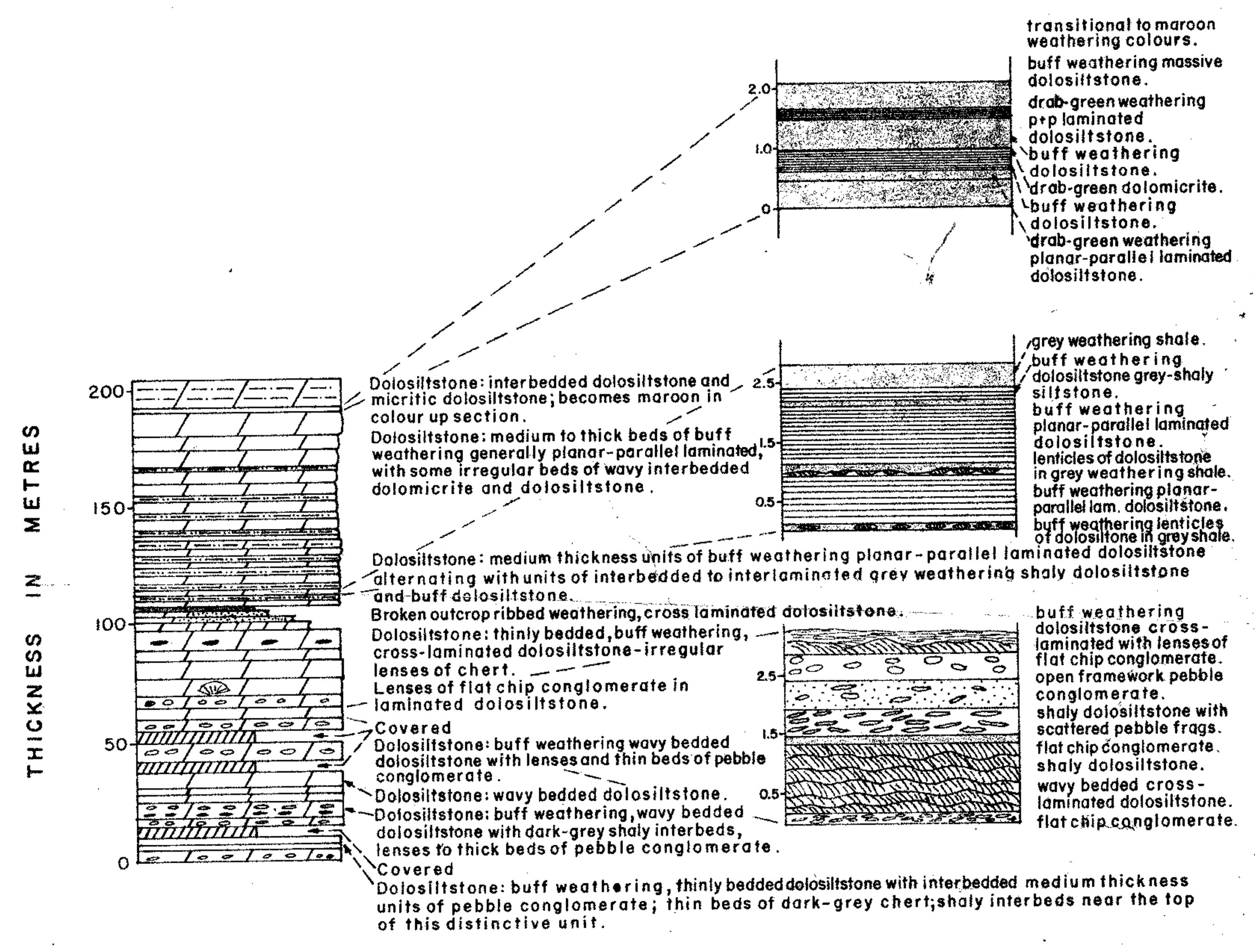
SECTION: GD-106 C-77-8. NORTHWEST OF GILLESPIE LAKE



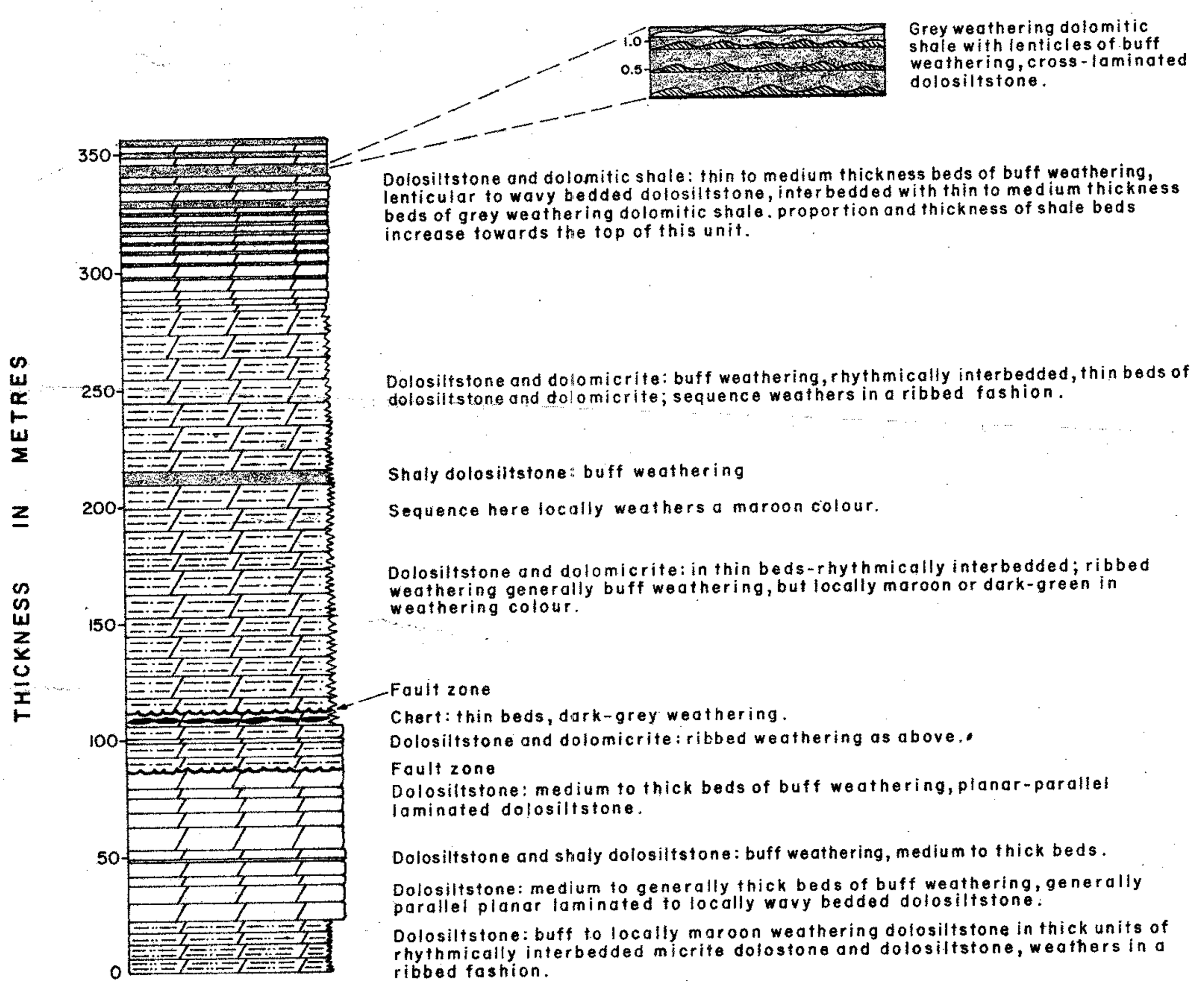
SECTION: GD-106 C-77-9. NORTHEAST OF GILLESPIE LAKE



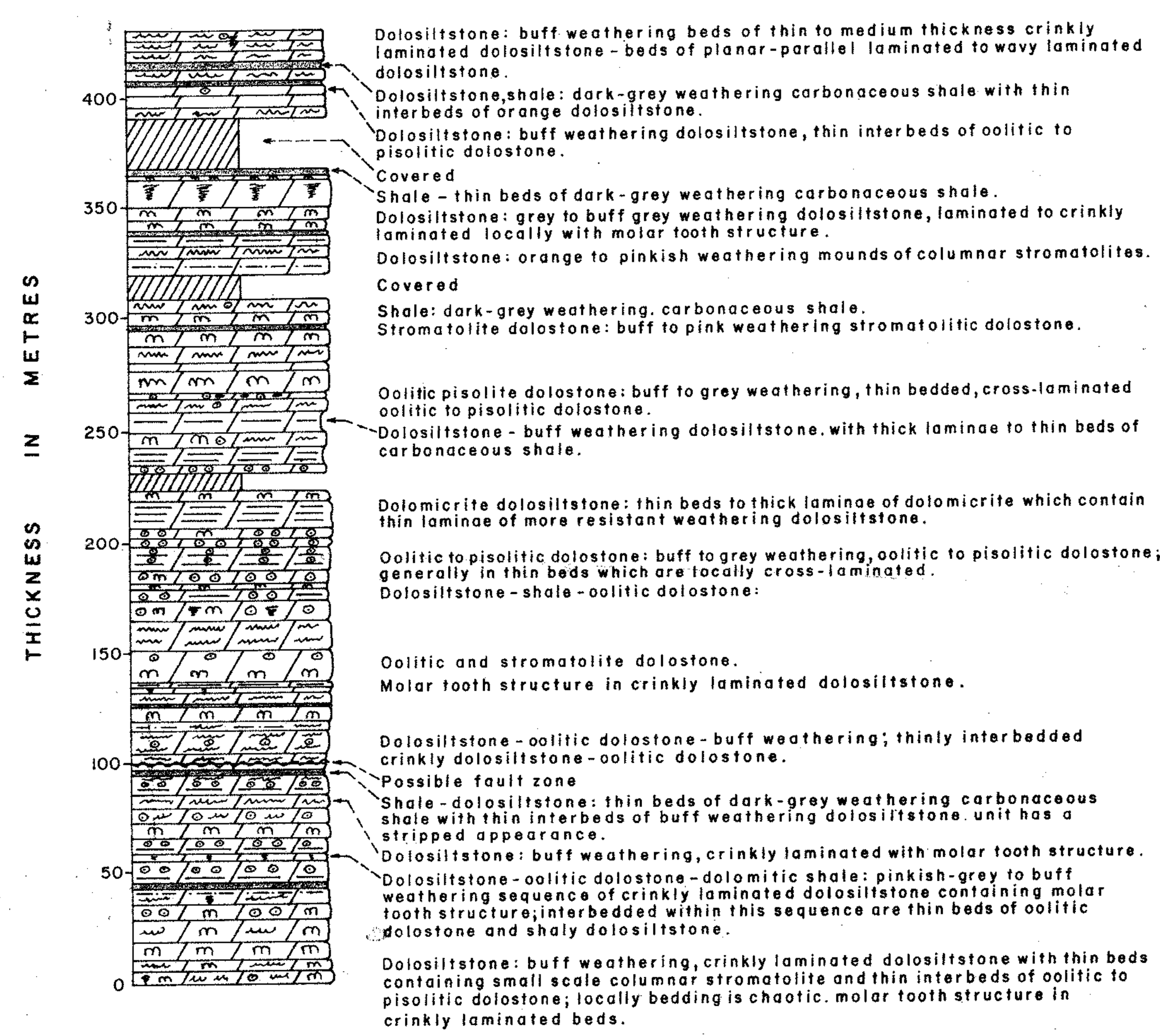
SECTION: GD-106 C-77-10. NORTH OF GILLESPIE LAKE



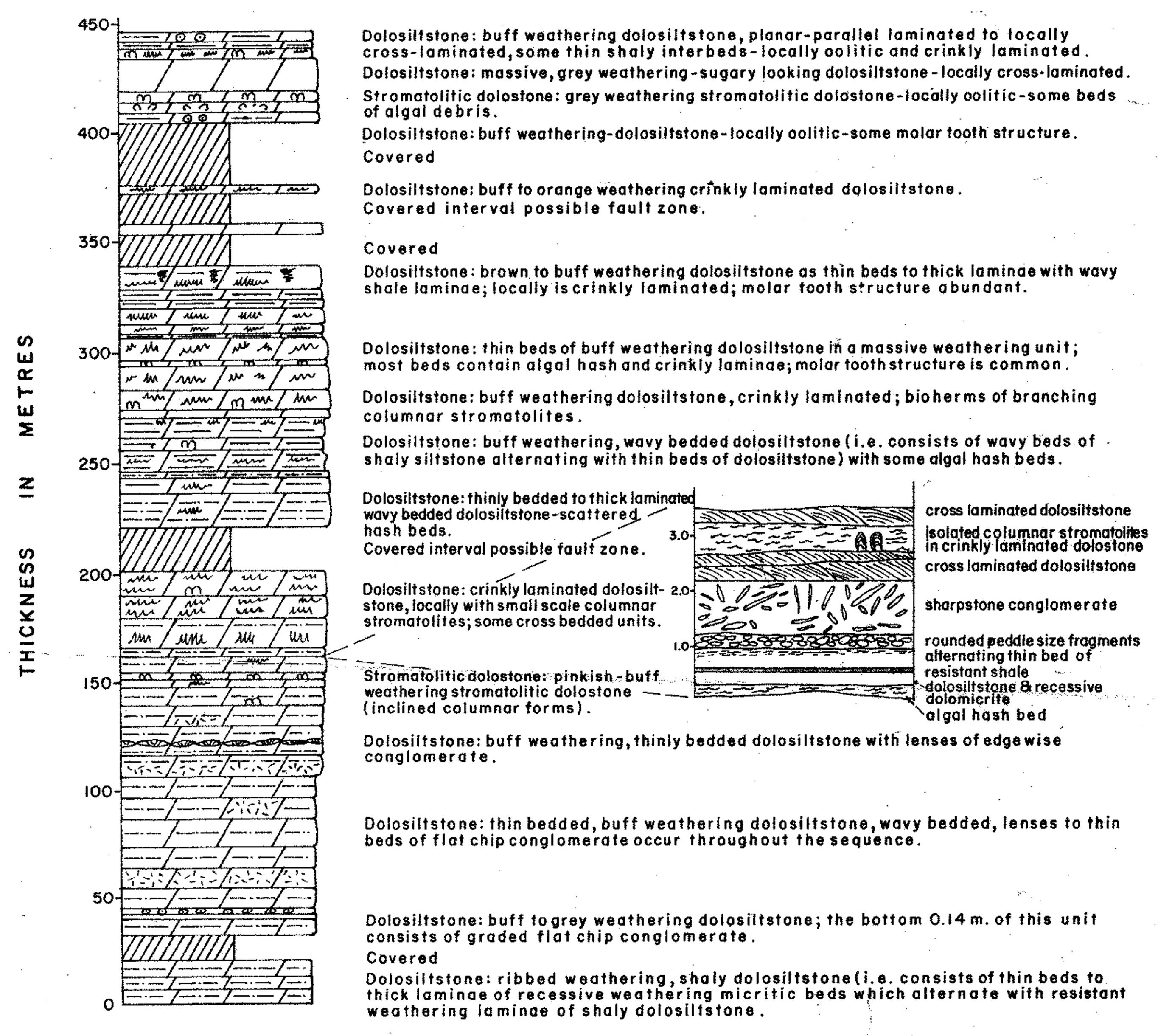
SECTION: GD-106 C-77-11. NORTH OF GILLESPIE LAKE



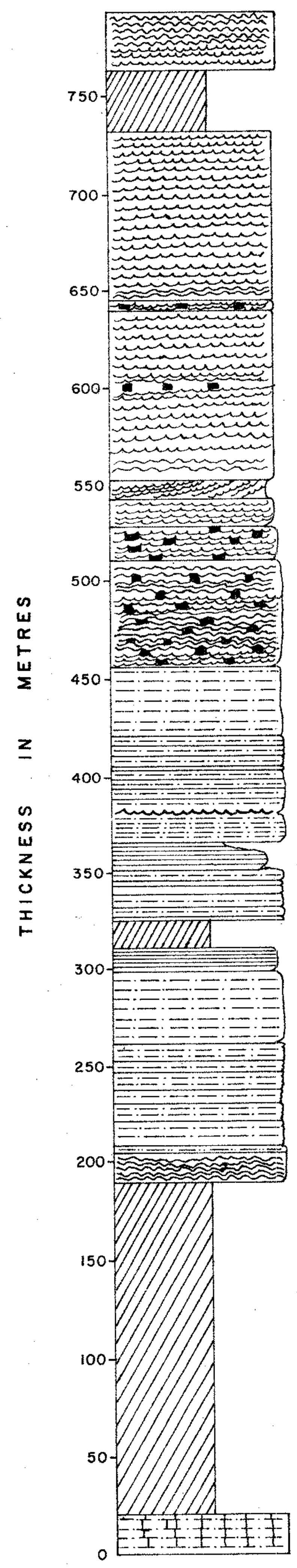
SECTION: GD-106 C-77-13. 9.6 KILOMETRES NORTH OF GILLESPIE LAKE



SECTION: GD-106 C-77-14. 9.6 KILOMETRES NORTH OF GILLESPIE LAKE



SECTION: GD-106C-77-1   WEST OF FAIRCHILD LAKE



Phyllite: greenish-grey weathering

Covered

Phyllite: grey to greenish-grey weathering; compositional banding; often numerous close-spaced fractures

Chloritoid schist

Phyllite: grey-weathering, prominent bedding plane clevage; Medium to coarse grained porphyroblasts of chloritoid are present within some beds in this sequence.

Numerous close-spaced fractures-possible fault zone.

Phyllite

Phyllite: grey to greenish-grey weathering, with medium to coarse-grained porphyroblasts of chloritoid

Phyllite: greenish-grey weathering; close-spaced clevage; medium to coarse grained porphyroblasts of chloritoid are present throughout this unit.

Siltstone: grey weathering; rhythmically laminated; weakly metamorphosed, close-spaced bedding plane clevage.

High angle fault with only minor displacement

Several vertical joint surfaces in this sequence are coated with mg-cg laths of tremolite-actinolite.

Slate: grey to rusty brown weathering slates and thin bedded siltstones which are planar parallel laminated; close-spaced bedding plane clevage

Covered

Slate: rusty brown weathering.

Siltstone: grey to greenish grey weathering; more massive weathering

Siltstone: grey weathering with distinct compositional laminations and close-spaced bedding plane clevage; weathers in a ribbed fashion.

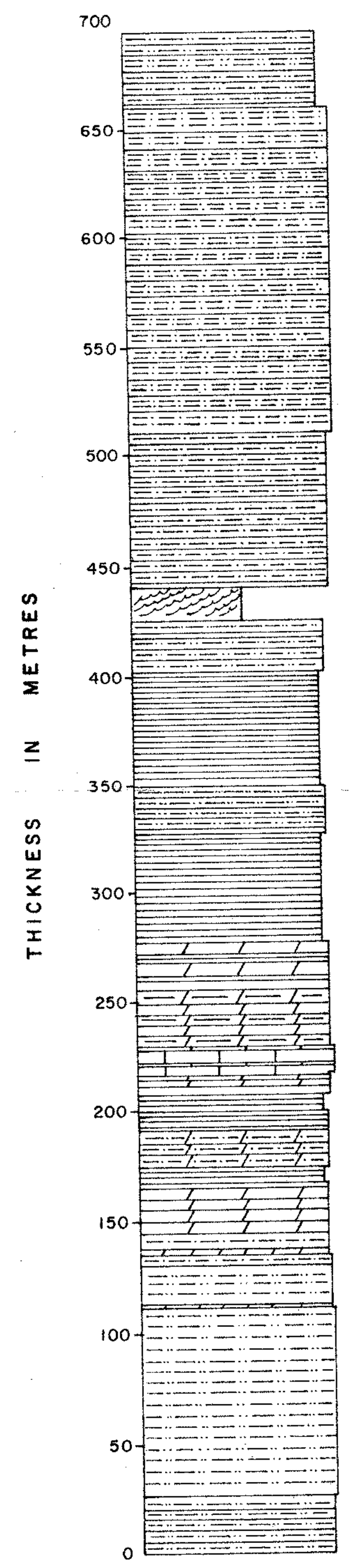
Phyllite: greenish grey weathering with white oovoid quartz eyes elongate in the plane of schistosity

Covered

Metasediments: grey weathering; fine grained; calcareous; alternating dark grey and light grey compositional bands.

RE

SECTION: GD-106C-77-2   WEST OF FAIRCHILD LAKE



Shaly siltstone: dark grey weathering

Siltstone: grey weathering, laminated

Siltstone: dark grey weathering; thin bedding characterised by alternating dark grey and light grey laminations.

Mostly covered-slate dissected by numerous close-spaced fractures

Shaly siltstone: rust stained-dark grey weathering

Slates: rust stained, dark grey weathering.

Shaly siltstones: grey weathering

Slate: rust-stained dark-grey weathering

Slate: dark grey weathering

Slate: dark grey weathering with thin interbeds of dolostone which decrease in number and proportion with stratigraphic height

Dolosiltstone: light grey weathering, thinly bedded with thin interbeds of dark grey shaly dolostone.

Limestone: white weathering, thinly bedded; good marker horizon

Slate: dark grey weathering with 7-15cm brown weathering interbeds of dolostone.

Slate: dark grey weathering, pyrite.

Dolostone: light grey weathering characterised by alternating light grey and dark grey compositional bands.

Slate: dark grey weathering.

Dolostone: light grey weathering; close-spaced bedding plane clevage; compositional banding.

Dolostone: orange-brown weathering.

Shaly siltstone: grey weathering.

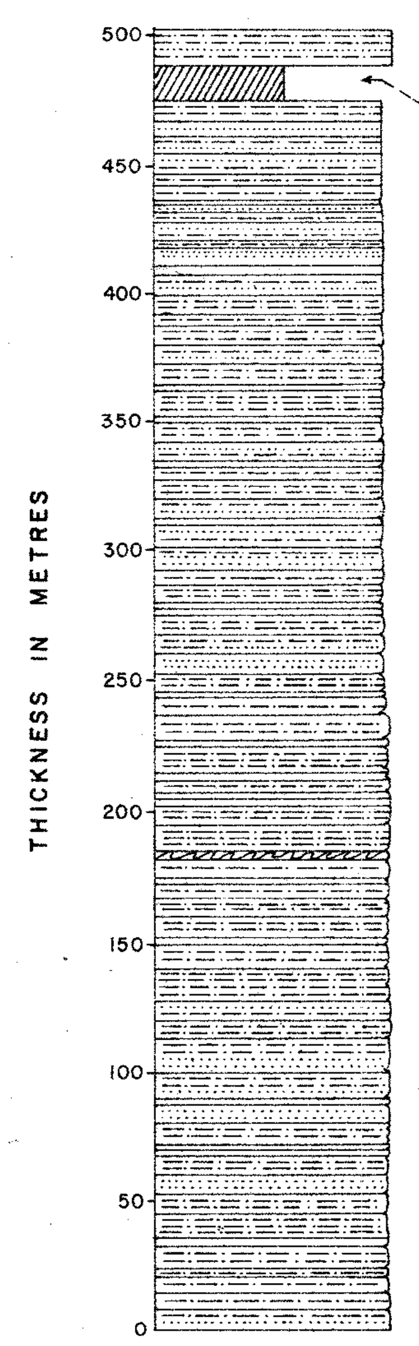
Dolostone: orange-brown weathering.

Shaly siltstone: grey weathering

Shaly siltstone: light grey to grey weathering; close-spaced bedding plane clevage.

RE

SECTION: GD-106C-77-3.   NORTH EAST OF FAIRCHILD LAKE



Siltstone: light grey weathering, thin bedded siltstone and fine-grained sandstone; characterised by parallel to slightly lunate ripple marks on the bedding plane surfaces.

Covered

Siltstone to fine-grained sandstone: grey weathering, in thin to medium thickness beds; ripple marks on many of the bedding plane surfaces.

Siltstone to fine-grained sandstone: grey weathering, in thin to medium thickness beds.

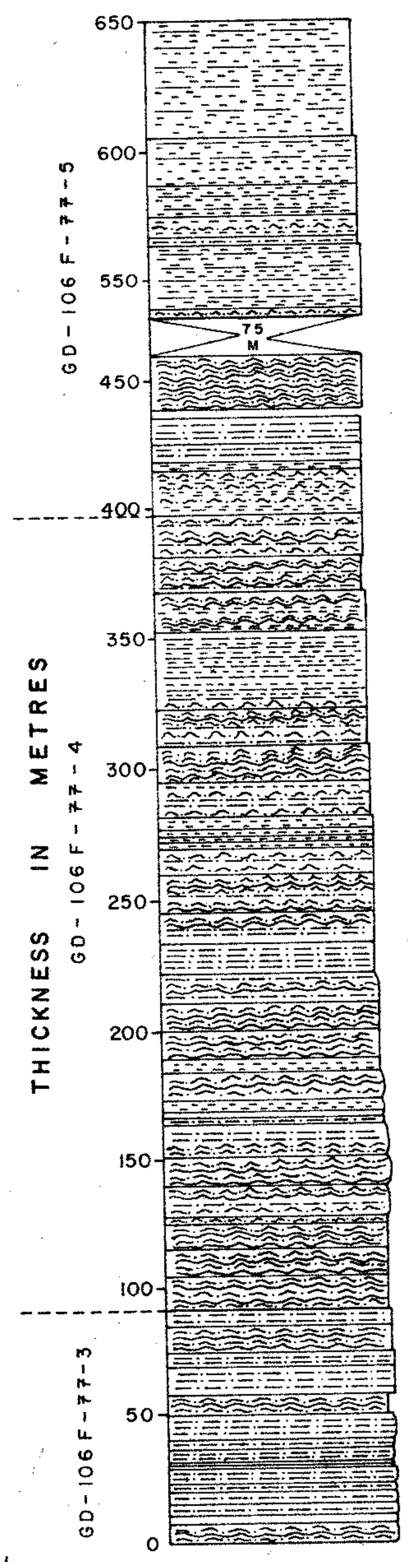
Siltstone and fine-grained sandstone: grey weathering, medium to thick beds. Thicker beds are generally homogenous and massive looking in their interiors, bottom of bed is characterised by a higher shale content; some are cross laminated.

Vertical fault zone, displacement uncertain.

Siltstone to fine-grained sandstone: grey weathering in medium to thick beds; lunate ripple marks are present on some of the bedding plane surfaces.

Siltstone to fine-grained sandstone: grey weathering in medium to thick beds.

SECTIONS: GD-106F-77-3,4,5.   16 KILOMETRES E.N.E. OF FAIRCHILD LAKE



Shaly siltstone: grey weathering (locally rust stained).

Covered + missed section

Siltstone: grey weathering, wavy bedded, silicified.

Siltstone: grey weathering; medium to thick units of wavy bedded siltstone interbedded with medium to thick units of cross-laminated, coarse-grained siltstone.

Shaly siltstone: grey to dark-grey weathering with scattered granule and pebble size fragments of siltstone. beds to 1.0 m. thick.

Siltstone: grey weathering, wavy bedded

Shaly siltstone: dark-grey weathering (often with rust stains) in medium to thick, generally structureless units which contain scattered granule and pebble-size fragments of light-grey siltstone.

Siltstone: grey to dark-grey weathering sequence of cross-laminated, coarse-grained siltstone interbedded within this sequence are medium to thick beds of wavy bedded fragments. many of the coarse-grained siltstone units pinch and swell in thickness along strike often terminating in recumbently folded structures.

Shaly siltstone: dark-grey weathering, contains scattered sand and granule size fragments of white weathering siltstone; unit interbedded with wavy bedded siltstone.

Siltstone: thick units of grey weathering, wavy bedded siltstone alternate with interbedded medium thickness units of light-grey, coarse-grained, cross-laminated siltstone.

Siltstone: grey to dark-grey weathering wavy bedded siltstone; thick lam. to thin beds of shale alternate with thin beds of light-grey weathering cross-laminated siltstone.

Siltstone: grey weathering wavy to lenticular bedded siltstones; egg carton ripple marks; synersis cracks developed in some of the shale interbeds.

Siltstone: grey weathering, wavy bedded.

Siltstone: grey weathering; thin bedded; cross-laminated siltstone; thin interbeds of shale with synersis cracks.

Siltstone: grey weathering flaser bedded siltstone-egg carton ripple marks.

Siltstone: grey weathering, with low angle cross-beds.

Siltstone: grey weathering thin beds of lenticular bedded silty shale interbedded with thin beds of cross-laminated siltstone.

Siltstone: dark-grey to grey weathering, wavy bedded to lenticular bedded siltstone to shaly siltstone.

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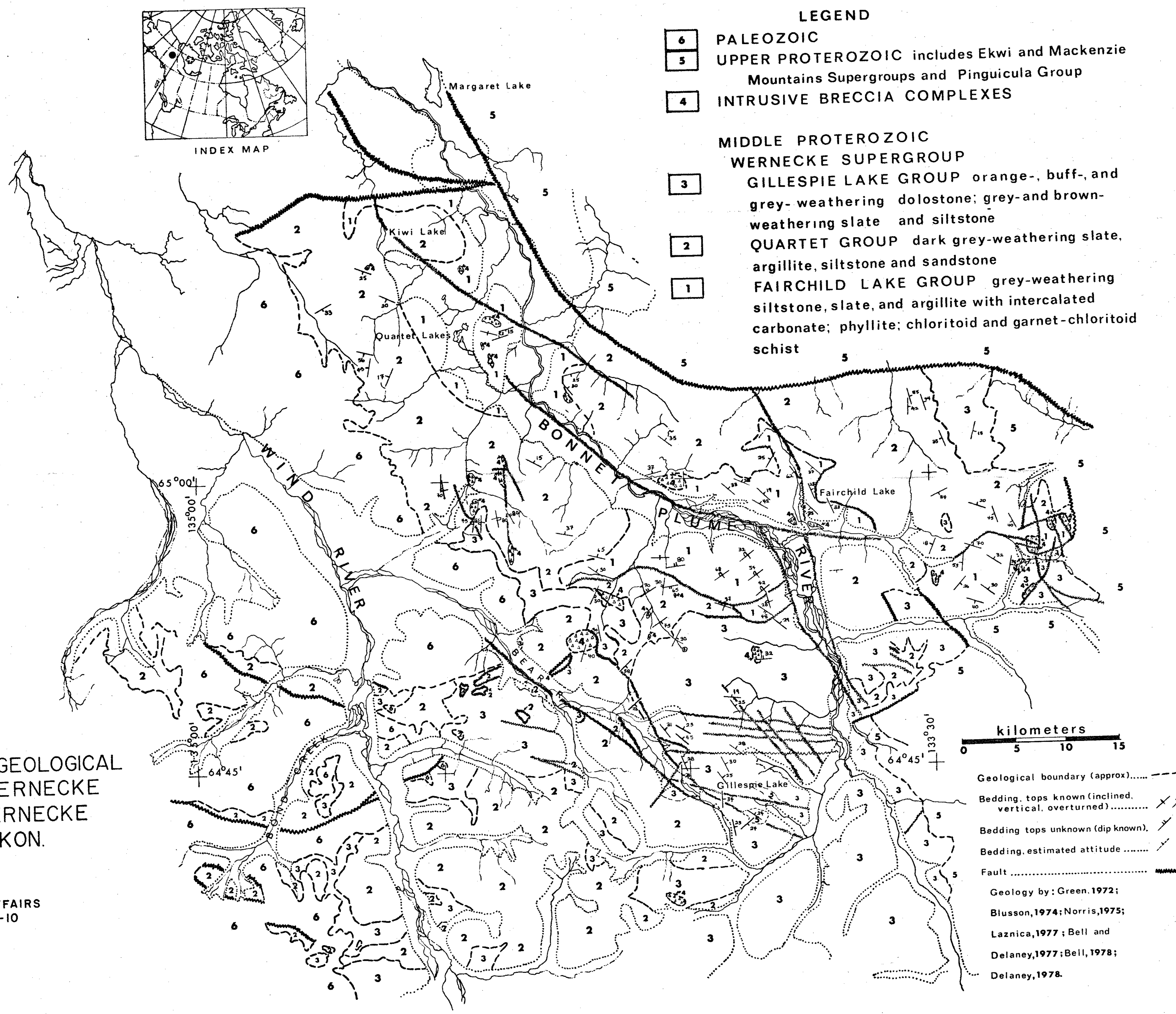


FIGURE 1.

PRELIMINARY GEOLOGICAL MAP OF THE WERNECKE SUPERGRUP, WERNECKE MOUNTAINS, YUKON.

INDIAN AND NORTHERN AFFAIRS
OPEN FILE EGS 1978-10

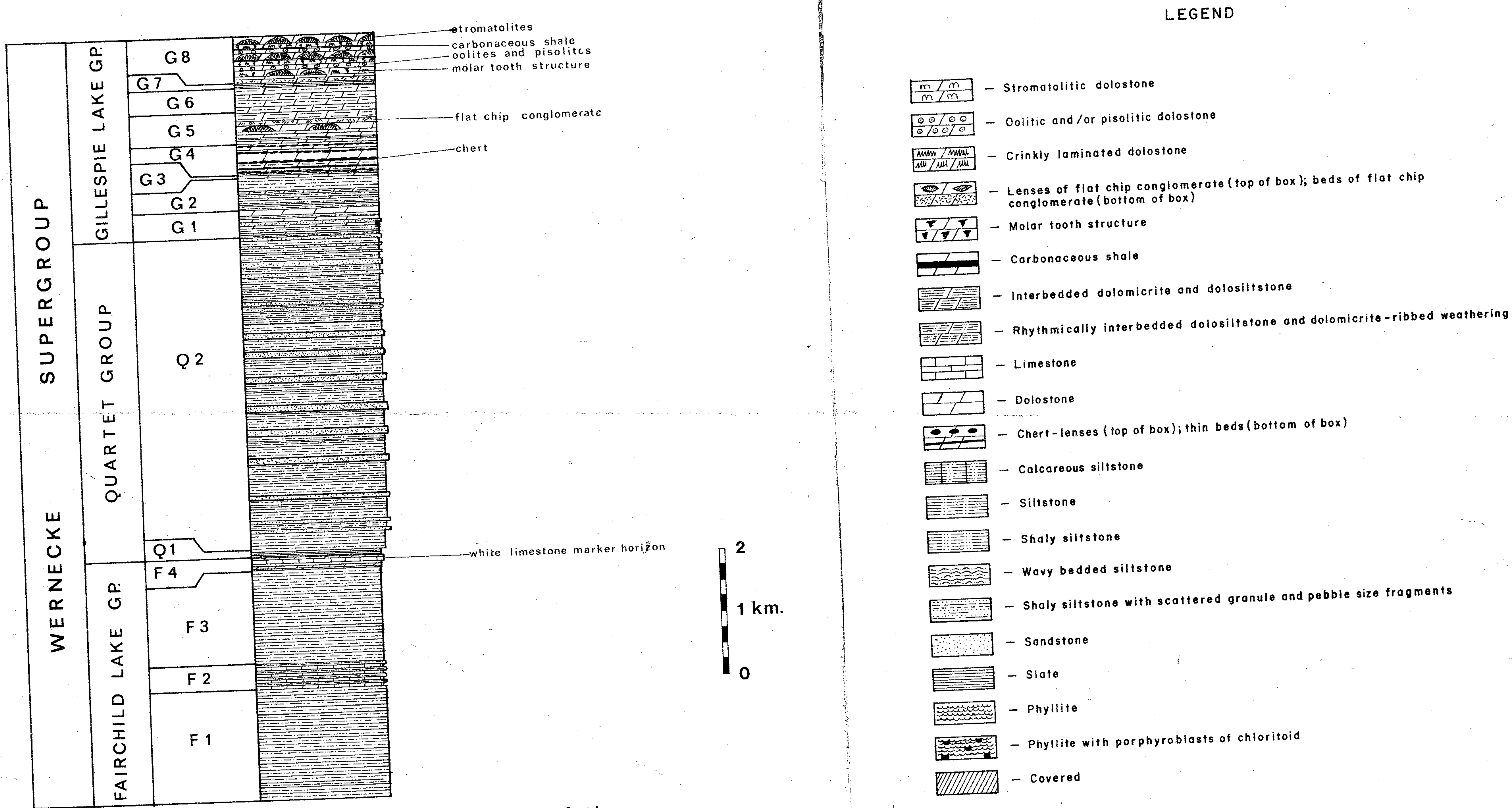
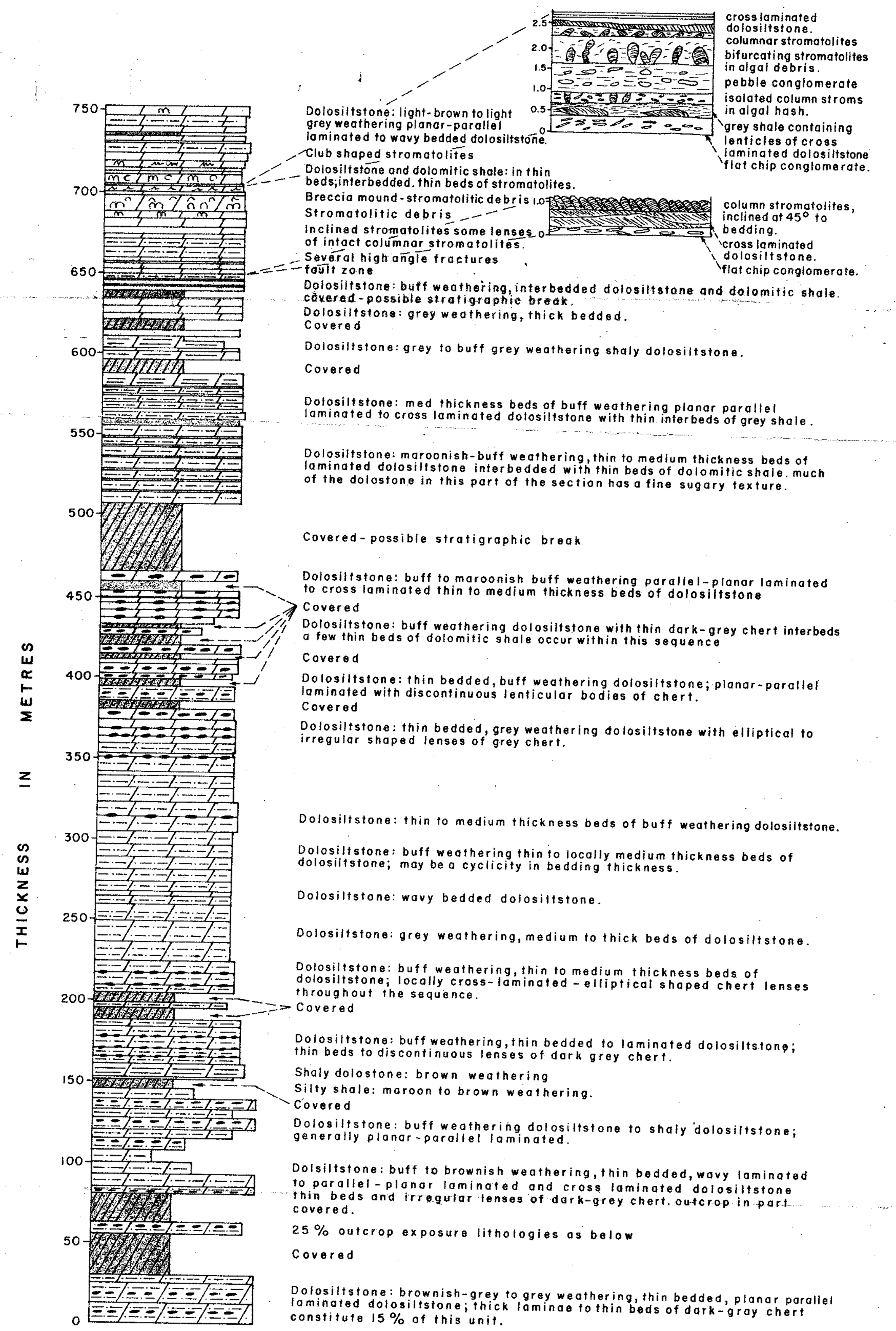
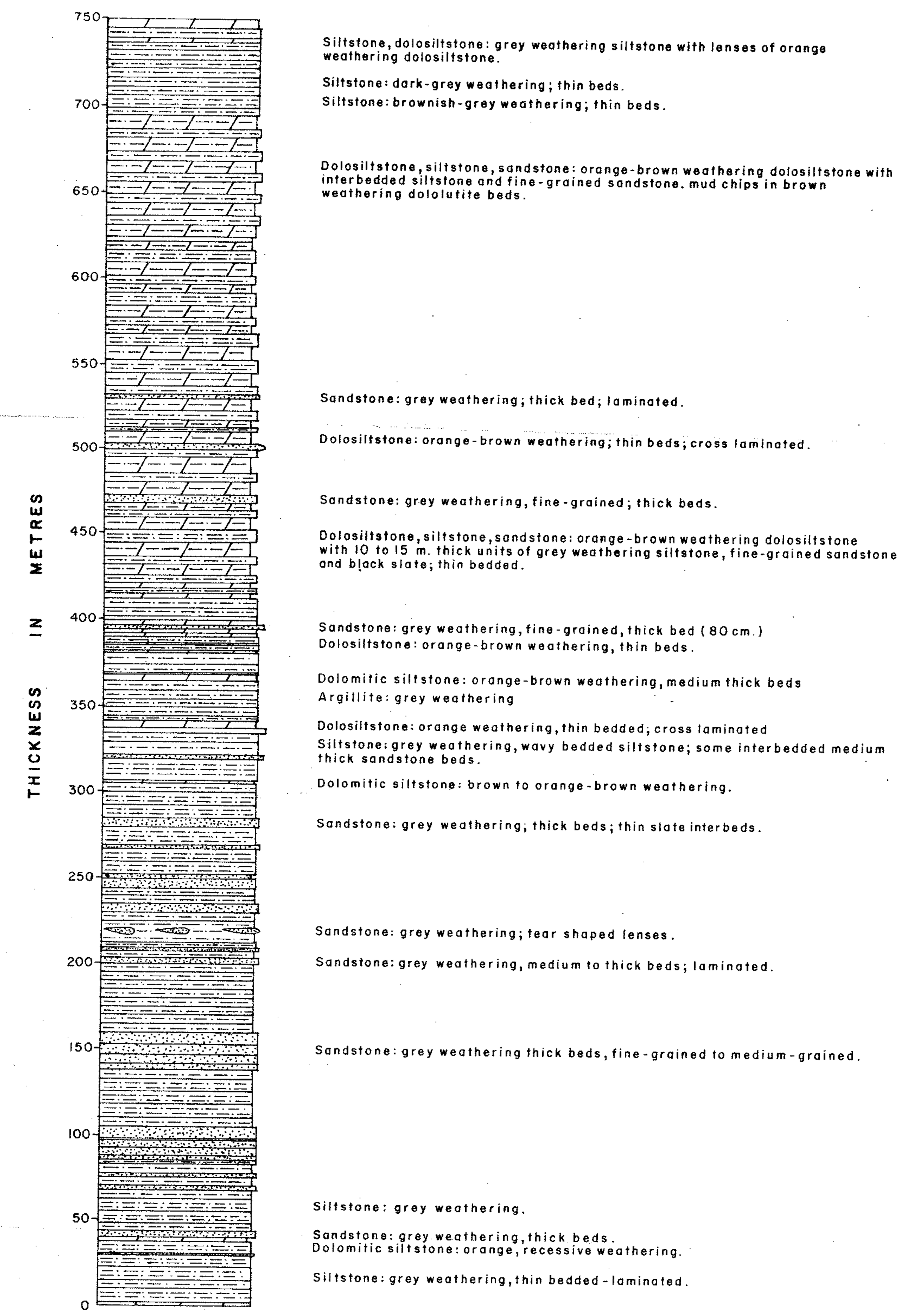


FIGURE 2 Composite Stratigraphic Section of the Wernecke Supergroup

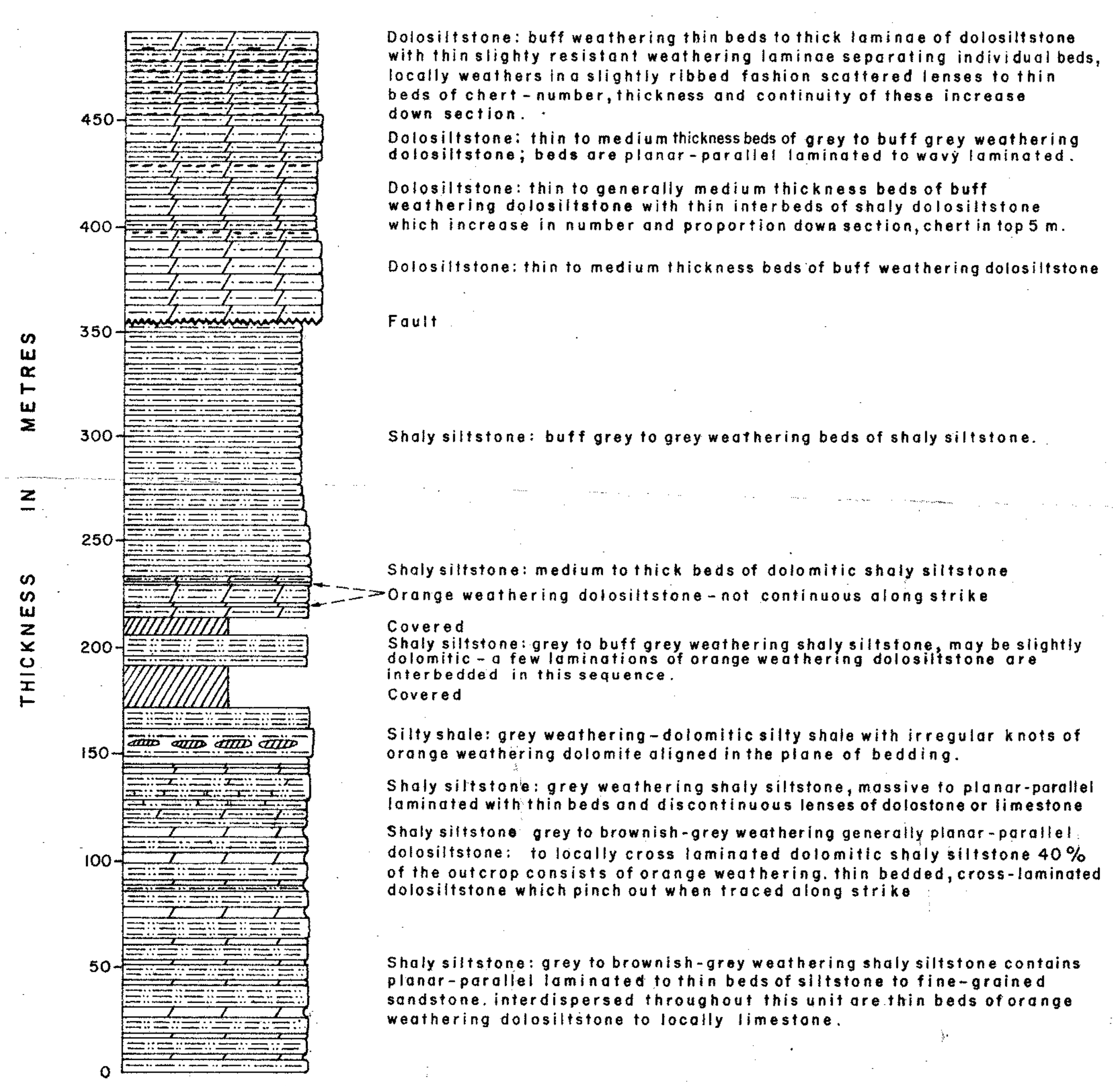
SECTION: GD-106 D-77-4. NORTHWEST OF GILLESPIE LAKE



SECTION: GD-106 D-76-1 8 KILOMETRES NORTHEAST OF GILLESPIE LAKE



SECTION: GD-106 D-77-6. NORTHWEST END OF GILLESPIE LAKE



SECTION: GD-106 D-77-5. NORTHWEST OF GILLESPIE LAKE