BRITISH NEWFOUNDLAND EXPLORATION ~~LIMITED~~

Geological and Geochemical Report
McCusker Claim Groups I, II and III
Liard/Omineca Mining Divisions

57° 124° N.E.

AR 4865

By: K.B. McHale, F.G.A.C., and
B.D. Pearson, P.Eng.

Field Period: July 14 to September 7, 1973

Report Period: Sept. 7, 1973 to Jan. 20, 1974

Report Date: January 20, 1974

94G/04W

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GEOLOGICAL AND GEOCHEMICAL REPORT

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INTRODUCTION

The McCusker Claim Groups I, II and III are located in the northern Rocky Mountains, approximately 130 miles northwest of Fort St. John and 50 miles west of Pink Mountain (mile 143 on the Alaska Highway). The claim groups lie on Mount McCusker and in the valley to the east which forms the headwaters of Gautschi Creek (See Fig. 1).

Elevations range from 5,100 to 8,300 feet, and local relief is rugged. Tree line is approximately 5,100 feet. Figures 2 and 3 illustrate the general terrain.

The property is accessible by helicopter and fixed wing aircraft from Mackenzie or Fort St. John. Both Redfern Lake (17 miles north of the property) and Robb Lake (15 miles south) are suitable for fixed wing aircraft, and the airstrip at Robb Lake will accommodate aircraft of Twin-Otter size.

The claims were optioned by British Newfoundland Exploration Limited (Brinex) from Zenith Mining Corporation in December, 1972.

Geological and geochemical surveys were conducted on the McCusker Claim Groups during 1973. The field crews and supervisor were all employees of Brinex.

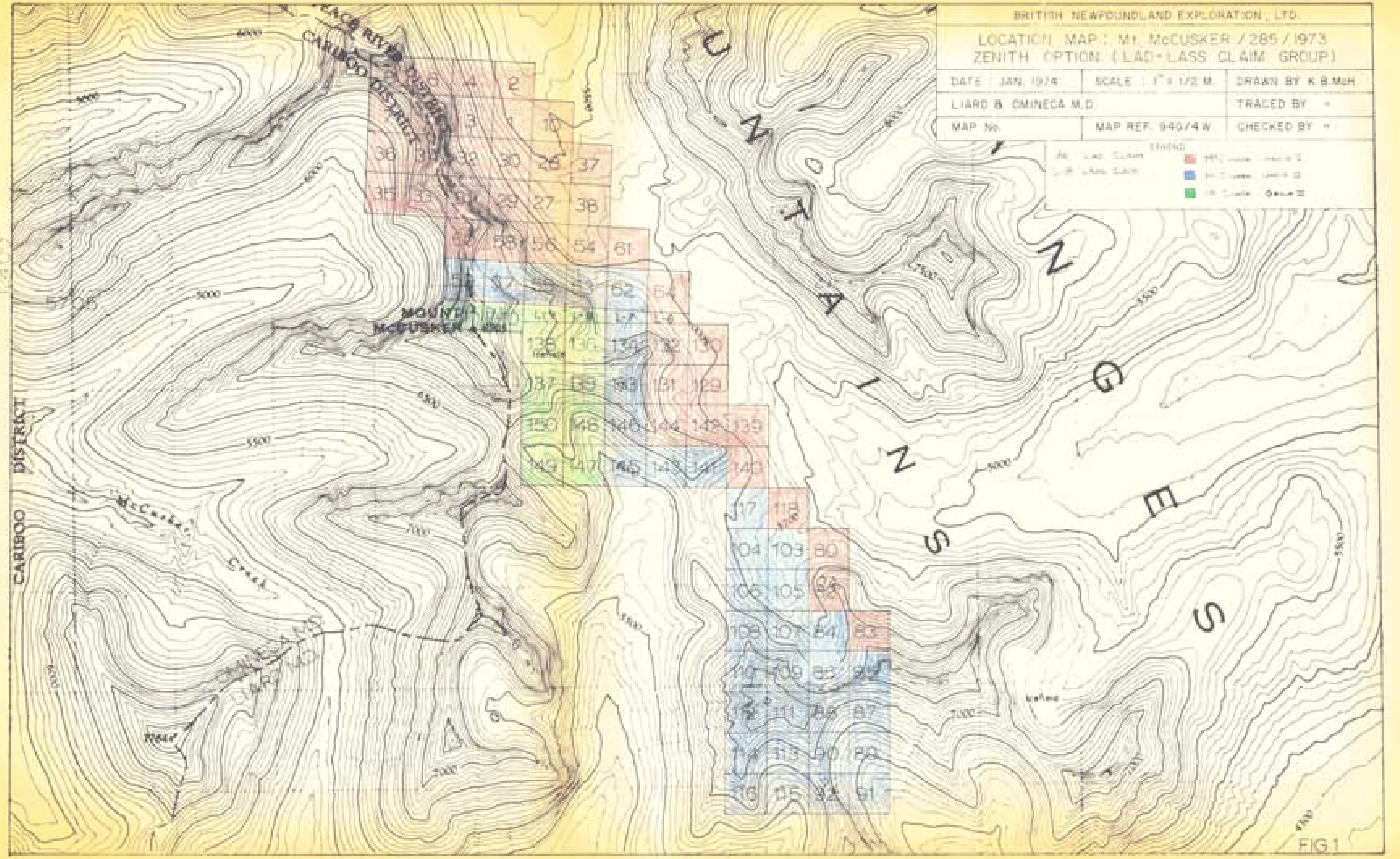
BRITISH NEWFOUNDLAND EXPLORATION, LTD.
LOCATION MAP : Mt. McCUSKER / 285 / 1973
ZENITH OPTION (LAD-LASS CLAIM GROUP)
DATE : JAN. 1974
SCALE : 1" = 1/2 M.
DRAWN BY K.B.McH
LIARD & OMINECA M.D.
TRACED BY "
MAP No.
MAP REF. 94G/4 W
CHECKED BY "
PEACE RIVER DISTRICT
CARIBOO DISTRICT
MOUNT McCUSKER
M O U N T A I N S
R A N G E S
McCusker Creek
CARIBOO DISTRICT
5000
5500
6500
7000
FIG 1

FIG. 2 Tillicum Sequence "North Zone"
(Late July)

FIG. 3 Looking South up Gautschi Creek Valley
to Tillicum Sequence.
(Mid August)

The principals included in the programme are:

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Mr. Tsugio Katayama, Chief Geologist, Non-Ferrous Metals Section,
Marubeni Corporation, Tokyo, Japan.

Contributions made by the individual are acknowledged throughout the text.

SUMMARY

Field work during the 1973 season has outlined two zones (North and South) of mineralized dolomite breccia (hereafter referred to as the Tillicum breccia). The mineralization consists of sphalerite with minor galena and pyrite, and the showings lie at an elevation of 5,900 to 6,200 feet. The average grade of surface samples (both outcrop and talus) is in the order of 2 to 3% combined Zn-Pb. The north zone has a length of 700 feet, and the south zone has consistent mineralization over 900 feet and sporadic mineralization over a further 600 feet. The two zones are separated by 1,000 feet of talus-covered slope. The areas outlined are of sufficient interest to warrant a follow-up drill programme.

Respectfully Submitted

Bradford D. Pearson, P. Eng.

K. Barry McHale

K.B. McHale, F.G.A.C.

Vancouver, B.C.
January 20, 1974

PROPERTY WORK

Field work was conducted on the property during the months of July, August and September, 1973. The index map (Fig. 4) gives the location of work with respect to the claim group and to geographic coordinates.

Regional Geological mapping of the property was done with the aid of airphotos and topographic map enlargements for control. Detailed geological mapping and sampling was done over the main areas of interest, and for this purpose a grid with a line and station spacing of 50 feet was established by tape and compass survey and a topographic map (1" : 50') was drawn for the areas of detailed work.

Stream silt geochemistry was conducted in drainages on the property and those streams draining areas of the property that were considered of importance, and rock geochemistry was performed where appropriate.

All surveys used airphotos and topographic maps for control.

GEOLOGY

A. Regional

To date the area has not been mapped in detail by the Geological Survey of Canada or the B.C. Department of Mines. The existing G.S.C. map (12-1963) indicates that the area is underlain by gently folded Paleozoic shales, limestones, dolomites and cherts. Regional mapping of the area in 1973 by Dickie and Fraser of Brinex has shown a folded and thrusted sequence of

Paleozoic dolomite, shale, limestone and sandstone. The reports by G. Dickie and M. Fraser are included in Appendices I and II of this report.

B. Detailed

1. North Zone

The North Zone is exposed for 1,000 feet at the northern extremity of a carbonate unit which tongues out in shale. The North Zone (Figs. 5, 6, 7) mineralization lies within a 500 feet thick sequence of dolomite, dolomite breccia, sandstone and orthoquartzite, striking northwesterly and dipping gently at 15 to 20° to the southwest.

The age of the sediments is not known by direct evidence as there is no macrofossil control and samples submitted for conodont studies have proved to be barren. However, the shales and shaly dolomites to the north of the zone contain the brachiopods (Strophomena sp. and Fardenia cf. ellipsoides Stearn*) and are therefore Middle to Late Silurian in age. These sediments are thought to be correlatable with the upper part of the North Zone sequence and therefore it is probable that the North Zone is of Middle to Late Silurian age.

The North Zone seems to occur at a facies front. The dolomites change rapidly to shales and shaly dolomite both along trend in a northwesterly direction and also upwards in the section. The facies front is thought to trend at an oblique angle to the strike of the unit in a south-southwesterly - north-northeasterly direction.

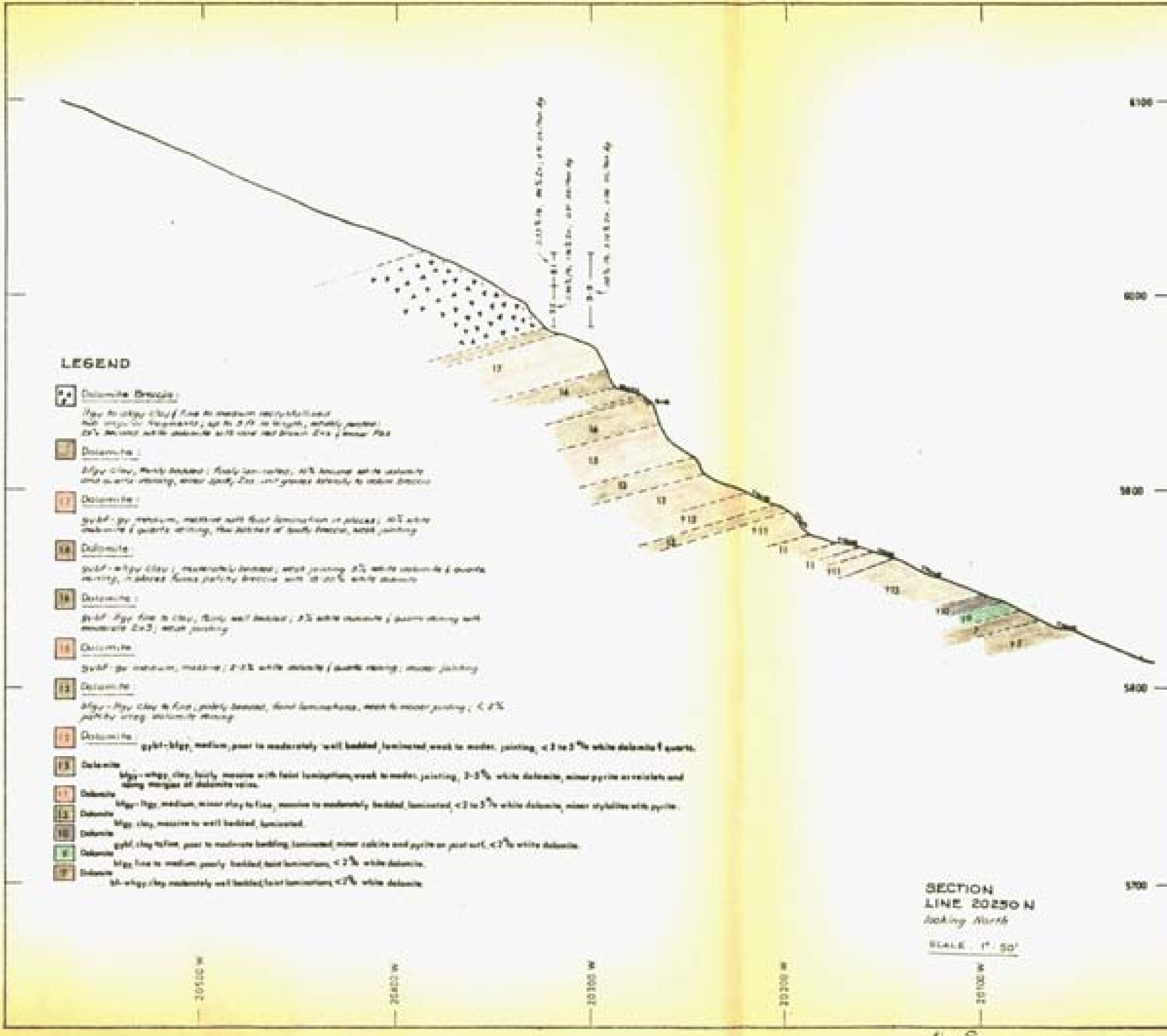
*Stelck, C.R., 1974, Personal Communication

The lowermost unit of the North Zone sequence (Fig. 5) consists of approximately 25 feet of orthoquartzite and dolomitic sandstone. The orthoquartzite is well crossbedded and may represent a channel deposit.

The overlying sequence (units 3-17) consists of 250 to 300 feet of massive to poorly bedded clay to medium-crystalline dolomite. In general there is 2 to 5% secondary white dolomite ("porosity") with minor quartz "veining" throughout it and there appears to be an increase in "porosity" from the base to the top of the sequence. In unit 6 there is a moderate amount of frosted detrital quartz, and in places the unit grades to a dolomitic sandstone.

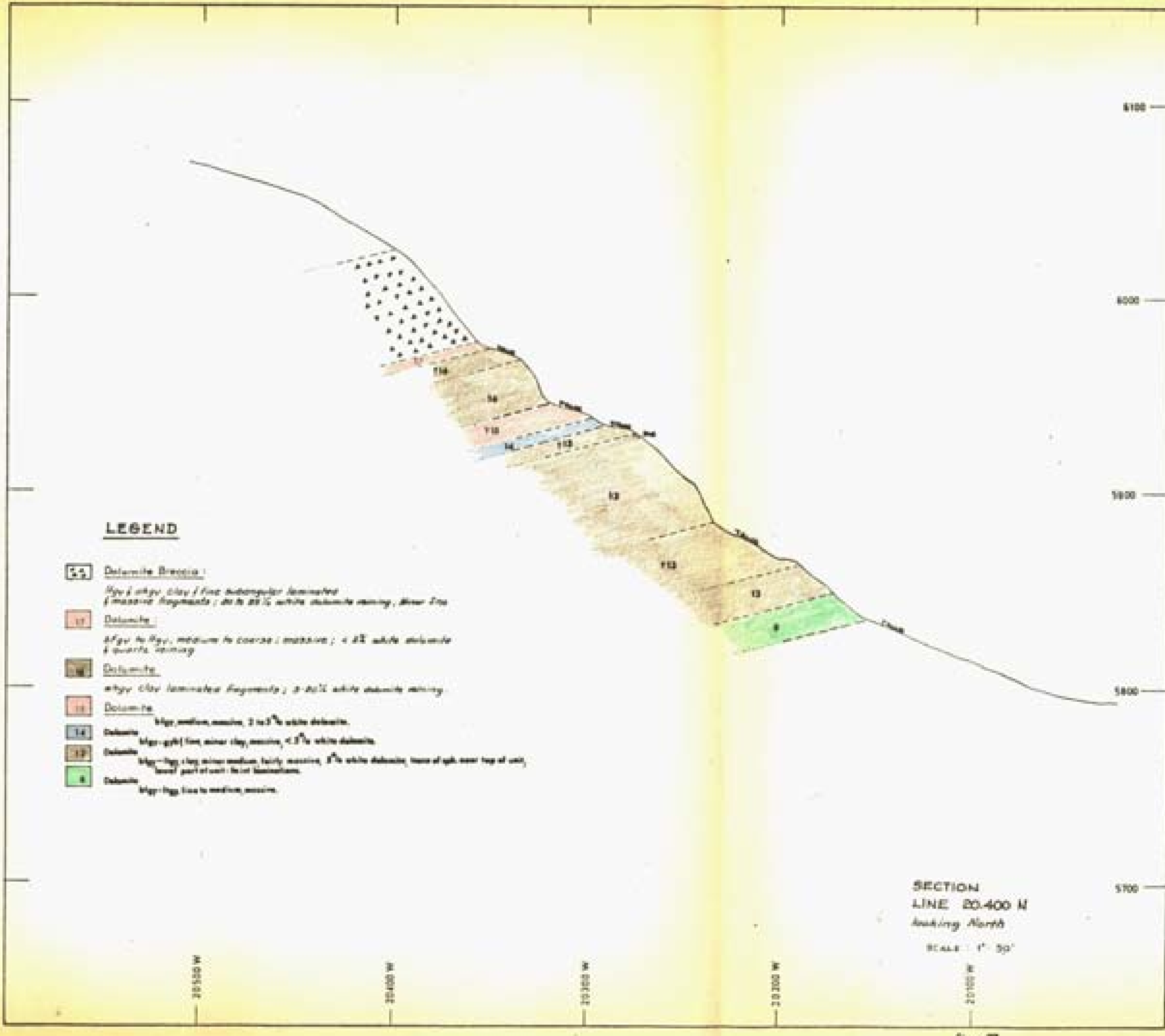
This sequence is overlain by a dolomite breccia (Tillicum) up to 100 feet thick which in general is a mottled buff grey to grey buff in color. The fragments, which may be up to three feet across, (Fig. 8), vary from light grey subangular laminated clay size to massive dark grey fine to medium-crystalline dolomite. The breccia has an average of 15 to 20% secondary white dolomite and quartz. Toward the base however, the breccia may have a dark grey fine-to-medium-crystalline dolomite as the major cement component, and in these areas the amount of white dolomite is only 5 to 10% with some of this being derived by recrystallization of primary cement. Some of the breccia fragments (Fig. 9) contain interbedded layers of frosted detrital quartz grains.

Although no fossils have been definitely identified in the Tillicum breccia unit to date, some parts of the breccia contain material which may be dolomitized Amphiporid remains.



LEGEND
Dolomite Breccia
Dolomite
6100
6000
5700
SECTION
LINE 20250 N
looking North
SCALE 1" 50'

fig 6



6100
6000
5900
5800
5700
LEGEND
Dolomite Breccia
Dolomite
Dolomite
Dolomite
SECTION
LINE 20.400 N
looking North
SCALE 1" 50'
20500 W
20400 W
20300 W
20200 W
20100 W

fig.7

FIG. 8 "Syndepositional" Breccia, North Zone
Showing wide range in size of fragments, hammer is on massive clay-size fragment.

FIG. 9 "Syndepositional" Breccia, North Zone
Showing gently warped laminations and bands of detrital quartz grains in large fragment; white fragment in lower left is massive clay-size dolomite.

The Tillicum breccia is overlain by a sequence of buff grey clay-to-fine-crystalline well-bedded dolomite with some minor interbedded shales containing small amounts of pyrite. In general, the sequence has less than 2% secondary white dolomite veining, mostly along joint surfaces. The lowermost dolomite in this sequence contains minor amounts of frosted detrital quartz grains.

Mineralization

Minor sphalerite and galena occurs in units 13, 15 and 16 (see Figs. 5, 6, 7) at a depth of 40 to 70 feet below the base of the Tillicum breccia. Minor pyrite occurs in some of the units in this sequence and is associated with stylolytic surfaces or very narrow calcite veinlets.

The Tillicum breccia is mineralized (Fig. 10) with sphalerite, galena and pyrite. Based on testing with a "zinc oxide" (Fig. 11) solution, there appears to have been considerable leaching of the sphalerite.

The sulphides are usually confined to the secondary white dolomite. The only exception to this is at the northern end of the zone where disseminated fine grained pyrite occurs within the fragments of massive grey dolomite, and also as veinlets cutting the fragments.

In the secondary white dolomite, the sulphides occur as discrete crystalline blebs, patches and discontinuous veinlets. Galena also occurs as dendrites. There is evidence for several stages of mineralization, but this could be interpreted as overlapping crystallization periods. In places the

FIG. 10 "Synedepositional" Breccia, North Zone
Secondary white dolomite with ZnS, PbS and FeS_2.

FIG. 11 "Crackle" Breccia, South Zone
Sprayed with "ZnO" solution.

sphalerite rims small fragments in the secondary white dolomite and lies along the walls of "veins" with galena deposited in the central parts and there are also occurrences where the sequence is reversed. In addition to this, there are probably at least two stages of pyrite mineralization.

It is clear that polished section work is needed to define further the paragenesis of the sulphide mineralization.

2. South Zone

The South Zone is separated from the North Zone by 1,000 feet of talus covered slope and is itself poorly exposed through the talus.

Based on the similiarity of the finely laminated dolomites, presence of detrital quartz and dolomitized Amphiporid remains, it is thought that the two zones (North and South) are correlatable. However, with detrital quartz and Amphiporid remains being more abundant in the South Zone it is thought that this zone was closer to the shoreline.

Due to the lack of continuous outcrop, it is difficult to trace individual beds within the zone. Therefore the area can only be discussed in general, but sections from the northern (Fig. 13) and southern (Fig. 14) ends of the zone are included to show the variation of the stratigraphic section within the zone.

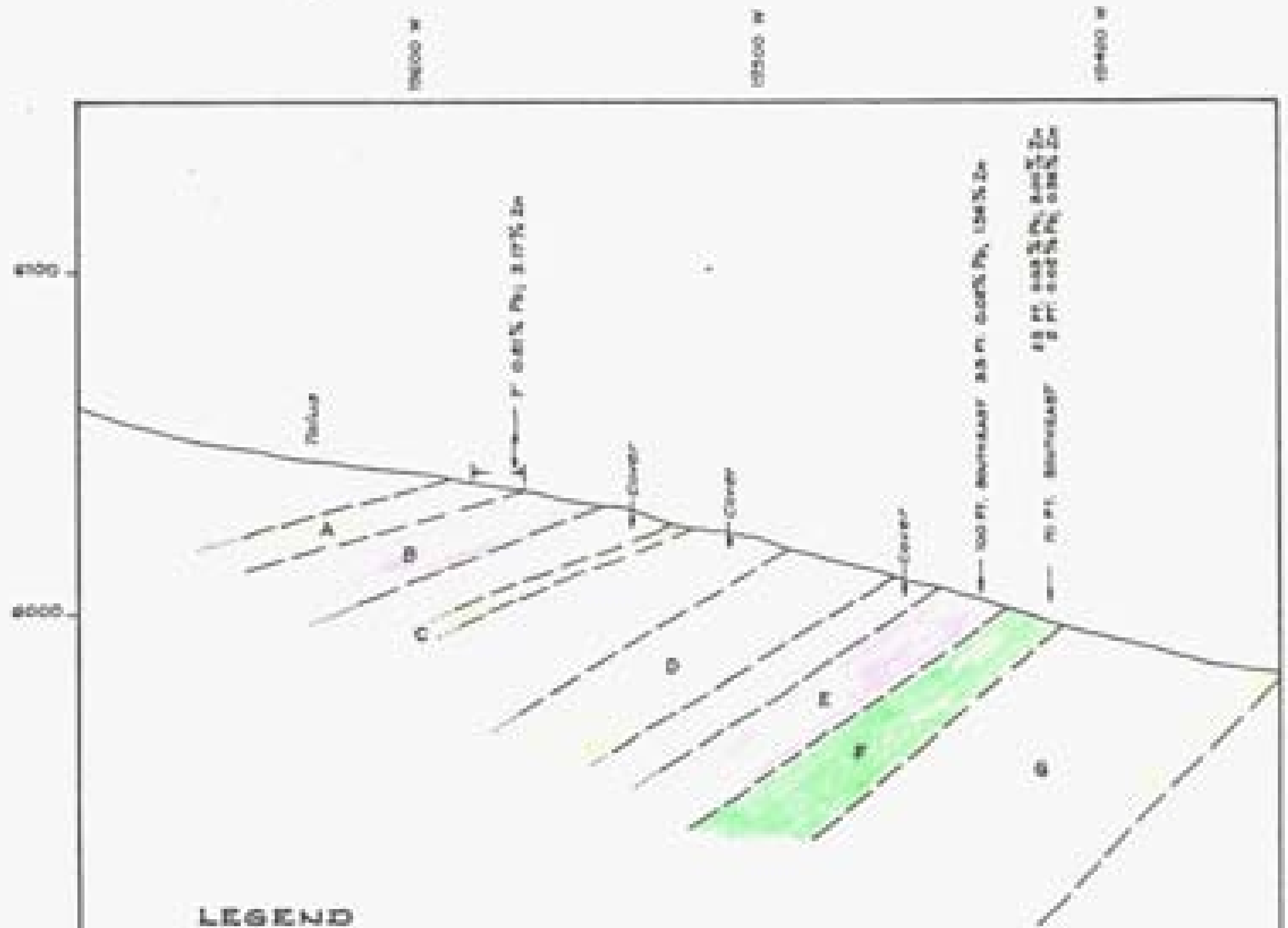
The South Zone (Figs. 12, 13, 14) consists of a sequence of mainly clay-to-fine, with minor medium-crystalline dolomite. The individual units vary from massive to finely laminated, well bedded dolomite striking northwesterly and dipping gently to the southwest. Variable amounts of secondary white dolomite and quartz are present. In places, intense "veining" in the clay-size dolomites has produced a breccia texture. It appears that these rocks have been fractured and the secondary white dolomite has infilled and "stoped" the rock to create what have been termed "vein" breccia. On Line 18250 N, in unit E, the secondary white dolomite and quartz occurs primarily along joint surfaces as veins up to 3 inches wide. This type of occurrence was also noted in the uppermost units in the North Zone.

Frosted detrital quartz grains and dolomitized Amphiporid remains are present, and are more abundant in the South Zone than in the North Zone.

A breccia (similar to the North Zone breccia) outcrops on Line 18250 N at stations 18700 W and 19050 W. This breccia has laminated and massive fragments with both fine-crystalline grey dolomite and secondary white dolomite (10-20%) as cement. Variable amounts of frosted detrital quartz grains occur in the unit, both within the fragments and around them.

Mineralization

The nature and occurrence of the mineralization in the South zone is similar to that of the North Zone. Sphalerite, with minor galena and pyrite, occurs in secondary white dolomite, and in this zone some of the sphalerite occurs as coarse crystalline masses up to two inches across. In general, the South Zone has predominantly sphalerite mineralization, galena being much rarer than in the North Zone.



LEGEND

A. Dolomite

GYBF CLAY; 5-10% Secondary white dolomite & quartz veining that forms patches of Micro Breccia; Moderate ZnS & Minor PbS

B. Dolomite

GYBF CLAY-Fine, well bedded & laminated, 2% secondary white dolomite with minor ZnS

C. Dolomite

GY CLAY; poorly bedded; 10% white dolomite & coarse quartz veining forms patchy min breccia

D. Dolomite

GYBF CLAY; 10-20% white dolomite & coarse quartz veining; minor ZnS patches of breccia in unit.

E. Dolomite

GYBF CLAY-Fine; poorly bedded 2-5% white dolomite & coarse quartz veining; ? amphibole present; minor ZnS,

F. Dolomite

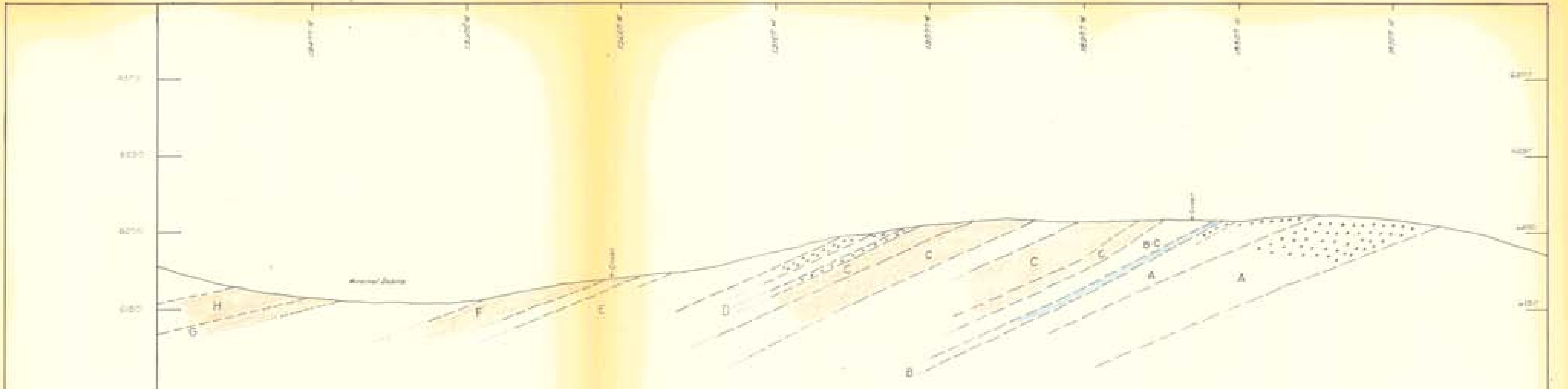
GY Fine-Medium; 5-10% white dolomite with patches up to 20%; minor to moderate ZnS

G. Dolomite

WHGY CLAY: Moderately well bedded becoming poorer down section; finely laminated; 2 to 5% white dolomite veining

SECTION
LINE 18900 N
looking North
SCALE: 1" = 50'

fig 13



LEGEND

A **DOLOMITE BRECCIA :** VARIES FROM FAINT LAMINATED AND MASSIVE FRAGMENTS WITH LTGY FINE DOLOMITE CEMENT TO BRECCIA WITH 20 TO 25 % SECONDARY WHITE DOLOMITE AND QUARTZ, MINOR RED BROWN ZnS

B **DOLOMITE :** BRGY FINE WITH PATCHES OF DETRITAL QUARTZ GRAINS ; VERY MINOR HAIRLINE WHITE DOLOMITE VEINLETS.

C **DOLOMITE :** BRGY CLAY POOR TO WELL BEDDED ; 10% 1/4" TO 1/2" WHITE DOLOMITE VEINLETS AT BASE OF UNIT, DECREASING TO < 2% AT TOP OF UNIT ; MINOR FINE GRAINED PYRITE AND ALSO MINOR ZnS AND TRACE PbS SOUTH OF SECTION IN LOWER PART OF UNIT

D **DOLOMITE BRECCIA :** 5-10 % WHITE DOLOMITE VEINLETS ; MODERATE AMOUNT OXIDIZED PYRITE IN LOWER HALF ; MINOR ZnS AND PbS IN UPPER HALF OF UNIT.

E **DOLOMITE :** BRGY - LTGY CLAY ; IN LOWER PART 15-20 % WHITE DOLOMITE AND COARSE QUARTZ VEINING [illegible] ; UP TO 3" WIDE WITH LEACHED RED BROWN AND GREEN ZnS MODERATE TO STRONG JOINTING

F **DOLOMITE :** LTGY CLAY ; MODERATE BEDDING , WEAK JOINTING ; < 5 % WHITE DOLOMITE AND QUARTZ VEINING WITH TRACE ZnS

G **DOLOMITE :** BRGY CLAY ; MODERATE TO STRONG JOINTING ; 10-15 % WHITE DOLOMITE AND QUARTZ VEINING

H **DOLOMITE :** BRGY CLAY ; MODERATE TO WELL BEDDED ; MODERATE TO STRONG JOINTING ; 5% PATCHES COARSE WHITE DOLOMITE AND QUARTZ VEINING.

SECTION
LINE 18250 N
looking North
SCALE: 1" : 50'

fig. 14

DOLOMITE BRECCIA ORIGIN

No definite origin can be demonstrated for the Tillicum breccia, but the available data enable a model of formation to be proposed.

The breccia unit occurs in a clay-to-medium-crystalline dolomite sequence apparently at a facies front. The dolomites change rapidly to the northwest and also upwards in the sequence to thin bedded pyritiferous shale and shaly dolomite. This deposition of the dolomite can be inferred to have taken place on a shelf margin, and it is probable that the area was a positive element throughout the depositional sequence.

The presence of frosted detrital quartz grains both in and around the fragments indicates that deposition of the primary dolomite and formation of at least part of the breccia was proximal to the shoreline. Aeolian derived (Fig. 9) detrital quartz is a common characteristic of sediments deposited in the "peritidal" facies zone (R.W. Macqueen, 1973, pg. 13).

The fine grained laminated dolomites are thought to be primary in origin (H. Gabrielse, 1963, pg. 50; Blatt et al, 1972, pgs. 486-491) and to have been deposited in shallow lagoonal areas. The presence of dolomitized Amphiporid remains would also indicate shallow water lagoonal conditions for primary deposition.

Field evidence shows that there may be two types of breccia, whose origin may be fundamentally different:

A. "Syndepositional" Breccia

The North Zone of the Tillicum breccia has been classified as a primary "syndepositional" breccia which may have been formed by "slumping", with the dominant agent being wave action, breaking off recently lithified dolomite and resulting in the fragments tumbling and flowing down the slope. The primary "syndepositional" breccia can perhaps be further divided into two units, lower and upper. The lower part of the Tillicum breccia unit (Fig. 15) displays both fragments and cement of fine-to-medium-crystalline grey dolomite. Breccia of this nature was also noted further down in the section (Fraser, 1973). The upper part of the Tillicum breccia has 20 to 25% secondary white dolomite. In this part there are both laminated and massive dolomite fragments, and individual fragments (Fig. 8) may be up to three feet across. In addition, small fragments of siltstone are present in the breccia at the north end of the zone.

Some of the dolomite fragments (Fig. 9) show curved laminations, which could indicate deformation of semi-lithified material. The mixing (Fig. 16) and rotation of the fragments indicates that some movement was involved in the formation of the breccia, and indeed some of the fragments in the breccia are fragments of a previous breccia, suggesting that as the breccia formed some of it was broken and redeposited.

The presence of interstitial quartz grains does not support a "collapse" origin for the breccia. Other workers (Dickie, 1973) have suggested that solution of anhydrite is related to "collapse" brecciation, but no evidence of this is seen.

FIG. 15 "Syndepositional" Breccia, North Zone with major cement component fine-crystalline grey dolomite.

FIG. 16 "Syndepositional" Breccia, North Zone Shows both laminated and massive fragments.

At some time after deposition of the breccia, mineralizing fluids apparently flowed through the open spaces of the breccia and resulted in deposition of secondary white dolomite and minor quartz with sphalerite, galena and pyrite. At this time also some of the primary dolomite was recrystallized into medium-coarse white dolomite, most noticeably in the lower portion of the breccia unit.

B. <u>"Crackle" Breccia</u>

The major part of the South Zone that was called a "vein" breccia in the field should probably be called a "crackle" (Fig. 17) breccia. The cause of initial brecciation in the dolomites is not know, but it could be related to a "collapse" breccia located laterally along the facies front. If such a "collapse" breccia is present, it must exist at depth under the shale-dolomite sequence to the southwest.

It is possible that the "syndepositional" breccias of the "North" and "South" Zones represent a depositional environment on a shallow water carbonate platform on a "shelf" margin. If this hypothesis is correct then one might expect a zone of mineralized "syndepositional" breccia along the facies front which is covered by talus and lies under the cover to the southwest and trends in a south-southwesterly direction.

If the mineralized "crackle" breccia of the "South" Zone is related to a "collapse" breccia, then one might also expect a mineralized "collapse" breccia to exist at depth under the shale-dolomite sequence to the southwest of the "South" Zone.

FIG. 17 "Crackle" Breccia, South Zone, with weathered ZnS and PbS in secondary white dolomite.

In general, the North and South Zones show similarities to features known in the Pine Point area. Both areas of deposition were on a shallow carbonate platform on the edge of a marine basin, and dolomitization accompanied sulfide mineralization. The major geological differences between the two areas is that dolomitization was more extensive at Pine Point and the ground preparation for the Pine Point mineralization was of the Mississippi Valley "solution and collapse" type. However, as discussed above, this type of environment may exist to the southwest of the South Zone under the talus.

Concerning the Arvik deposit on Little Cornwallis Island, N.W.T., Sangster (1974, pg. 141) states ". . . the deposit is of the so-called "Mississippi Valley" type probably controlled by karst solution caverns and breccias . . . Low-grade mineralization is largely in the form of sulphides accompanying white dolomite veining and irregular "soaking" of the Thumb Mountain dolomite. High grade mineralization consists of massive sulphides in a wide variety of textures of which botryoidal to massive sphalerite and crystalline galena is the most common".

It is tempting to suggest that the "crackle" breccia of the "South" Zone at Tillicum may be spatially related to a more highly mineralized "collapse" breccia in a similar fashion to Arvik.

SAMPLING AND ASSAY RESULTS OF THE TILLICUM DOLOMITE BRECCIA

Forty-two samples of mineralized dolomite breccia were collected in 1973. The majority of these were obtained from talus, and locations of mineralized talus and outcrop were flagged. It is apparent that mineralized talus material forms linear patterns subparallel to the trend of the sediments (Fig. 5). Samples were taken along this trend and, where possible, parallel samples were taken to check on the validity of assay results. Normally, several chips were taken from each piece of breccia along the sample line in a zone 5 to 10 feet wide.

Outcrops were chip-sampled on a six inch spacing along a fixed sample line. The only exception to this was on Line 20250 N where samples S-1 and S-2 were taken by the normal method but sample S-3 was taken from a zone approximately 4 feet wide so that each chip would contain some sulfide mineralization.

A. North Zone (See Fig. 18)

The results of outcrop sampling in the North Zone are given in TABLE I, from which it can be seen that average values are in the order of 1 to 2% combined Zn-Pb.

Samples S-1 and S-2 combined give an average of 1.69% combined Zn-Pb over a thickness of 53 feet. Sample S-3 was taken (as previously described) to examine possible variations in grade over a wider sample section, and it is clear that this method of sampling gives assay results that are at least twice that of conventional chip sampling. Although the results of two sampling methods cannot be combined, it is reasonable to suggest that the average grade of the section might lie between 1.69% and 3.77% combined Zn-Pb.

The grade of the talus samples (TABLE II) is on the average much greater than the grade of the outcrop samples. The causes of this difference is uncertain, but at least two possibilities can be suggested. Outcrop assays may be lower

TABLE I

NORTH ZONE OUTCROP SAMPLES

Sample	Thickness	% Zn	% Pb	Oz/Ton Ag
S- 1	24'	0.86	0.33	0.10
S- 2	29'	1.76	0.38	0.21
S- 3	53'	3.72	0.05	0.06
S- 9	8'	1.41	0.05	0.04
S-42	8'	0.82	0.12	0.06

TABLE II

NORTH ZONE TALUS SAMPLES

Sample	Length	% Zn	% Pb	Oz/Ton Ag
S- 4	20'	3.72	0.63	0.06
S- 5	15'	2.89	0.18	0.07
S- 6	5'	3.17	0.91	0.09
S- 7	15'	2.16	0.07	0.04
S- 8	22'	1.46	0.07	0.04
S-10	55'	3.13	0.07	0.04
S-11	38'	2.60	0.21	0.04
S-12	38'	3.92	0.68	0.09
S-13	36'	4.85	0.86	0.09
S-11A	Composite	1.73	0.49	0.04
S-11B	Composite	1.85	0.46	0.06
S-14	15'	0.34	0.09	0.03
S-15	10'	2.08	0.04	0.06
S-16	14'	1.90	0.04	0.07
S-17	17'	1.20	0.17	0.03

due to partial leaching of surface mineralization. This is supported by the positive results from testing with the "ZnO Oxide" solution (see Fig. 11). Alternatively the talus samples might be derived from higher grade more brecciated sections which might have eroded preferentially. Blocks in talus would probably not be as greatly affected by leaching processes as outcrop material. As a result of this discrepancy in assay results, the two results cannot be combined to give a meaningful average.

The assay averages for the dolomite breccia talus samples between Lines 20320 N and 20610 N are 0.21% Pb and 2.45% Zn over a combined length of 180 feet, and this probably represents a mineralized thickness of 60 feet.

B. South Zone (See Fig. 19)

Outcrop sampling in this zone gave results (TABLE III) of up to 3.40% Zn over a thickness of 8 feet, but in general sample thicknesses averaged 2 to 4 feet giving values of 1 to 3% Zn and minor Pb. Eleven scattered outcrop samples taken over a length of 600 feet gave an average thickness of 4.7 feet grading 2.19% Zn and 0.17% Pb. Due to the erratic nature of the mineralization no inference of potential strike length can be drawn at this time.

Talus sampling in this zone (TABLE IV) also gave higher results than outcrop samples. The talus samples between 18950 N and 19150 N gave average values of 3.89% Zn and 0.05% Pb over a length of 250 feet.

TABLE III

SOUTH ZONE OUTCROP SAMPLES

Sample	Thickness	% Zn	% Pb	Oz/Ton Ag
S-25	7.0'	3.17	0.81	0.07
S-29	2.5'	3.00	0.03	0.06
S-31	12.0'	0.95	0.22	0.07
S-33	3.5'	1.36	0.02	0.04
S-34	2.0'	0.56	0.02	0.03
S-35	8.0'	3.26	0.02	0.06
S-36	2.0'	2.08	0.02	0.07
S-37	8.0'	3.40	0.05	0.09
S-40	2.0'	0.82	0.02	0.04
S-41	3.0'	1.16	0.01	

TABLE IV

SOUTH ZONE TALUS SAMPLES

Sample	Length	% Zn	% Pb	Oz/Ton Ag
S-18		8.20	0.06	0.11
S-19	28'	1.25	0.04	0.03
S-20	29'	3.78	0.03	0.06
S-22	100'	4.92	0.04	0.07
S-23	60'	3.33	0.14	0.04
S-24	55'	3.92	0.05	0.04
S-26	27'	4.07	0.17	0.06
S-27		2.52	0.04	0.04
S-28		0.93	0.02	0.03
S-30	18'	1.92	0.07	0.04
S-32	28'	2.05	0.06	0.06
S-38	28'	5.00	0.03	0.10

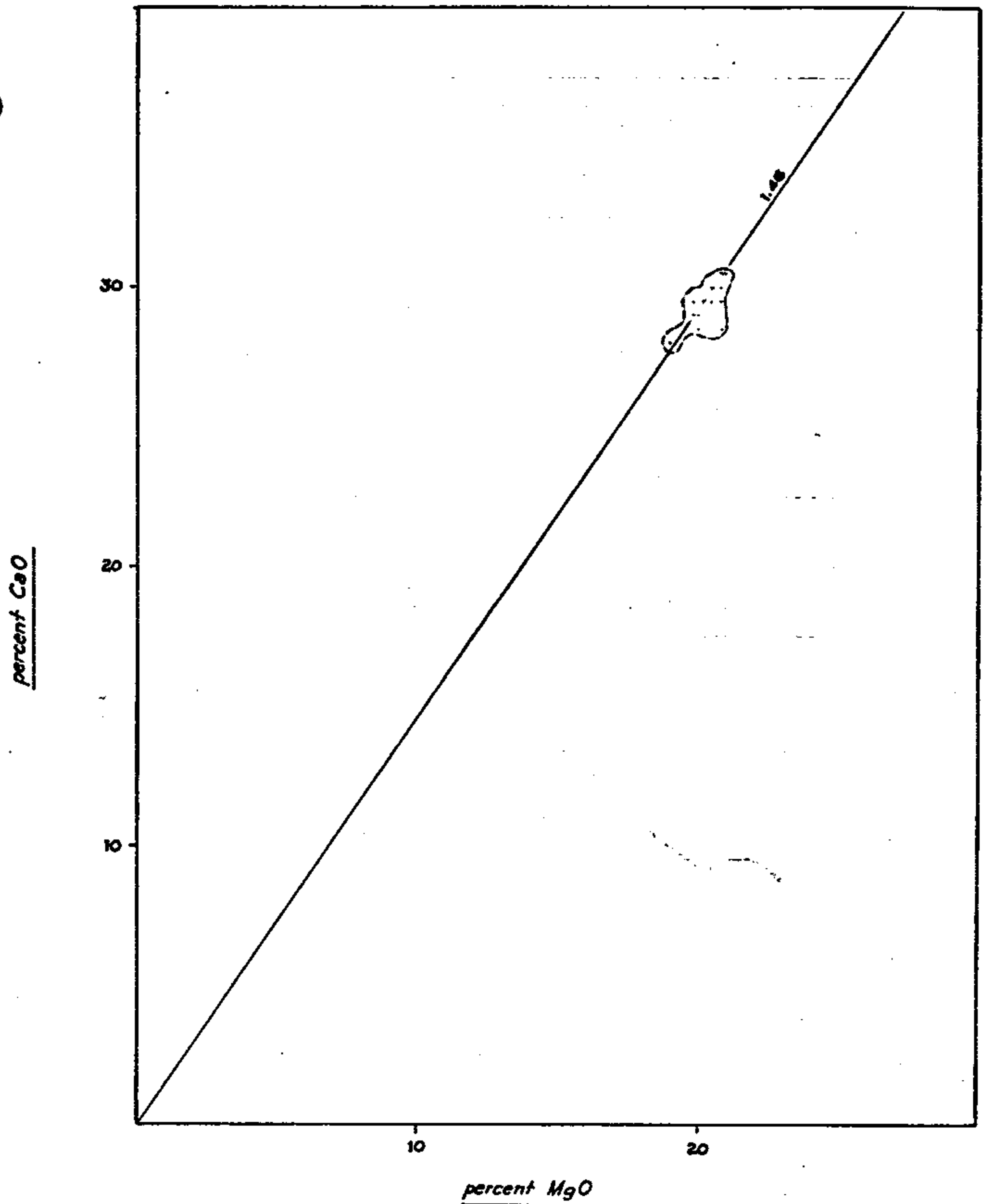
ROCK GEOCHEMISTRY (See Fig. 20)

A. Dolomite Breccia

The dolomite breccia units (Tillicum - Lower Valley and East Valley) were sampled on approximately ¼ mile spacing except for those samples collected in the known mineralized parts (North and South Zones) of the Tillicum breccia, where sample spacing was dependent on the distribution of mineralization. In the non-mineralized breccias, individual chip samples were collected over an area approximately 100 feet in diameter. A total of 101 samples was analyzed for CaO, MgO, Cu, Pb, Zn, Ag and Cd. The samples from the mineralized zones were submitted for assay (see previous section), and the others for rock geochemical analysis, to Chemex Labs. Ltd. in North Vancouver. Sample preparation and analytical procedures are given in Appendix III

The CaO and MgO analyses were done to determine whether there was any relationship between the CaO/MgO ratios and the occurrence of sulfide mineralization in the dolomite breccias. The analytical results show that all breccias have a fairly consistent CaO-MgO content. Graphical plotting (Figs. 21-25) of the data shows that there is no regular variance in the CaO/MgO ratios and that there is therefore no obvious relationship between bulk sample CaO/MgO ratio and the presence of sulphide mineralization. Staining of the secondary white dolomite has shown that it is actually a mixture of ferrous dolomite and high-Mg-calcite. Further study is required to determine what effect this compositional variation has on the CaO/MgO ratios.

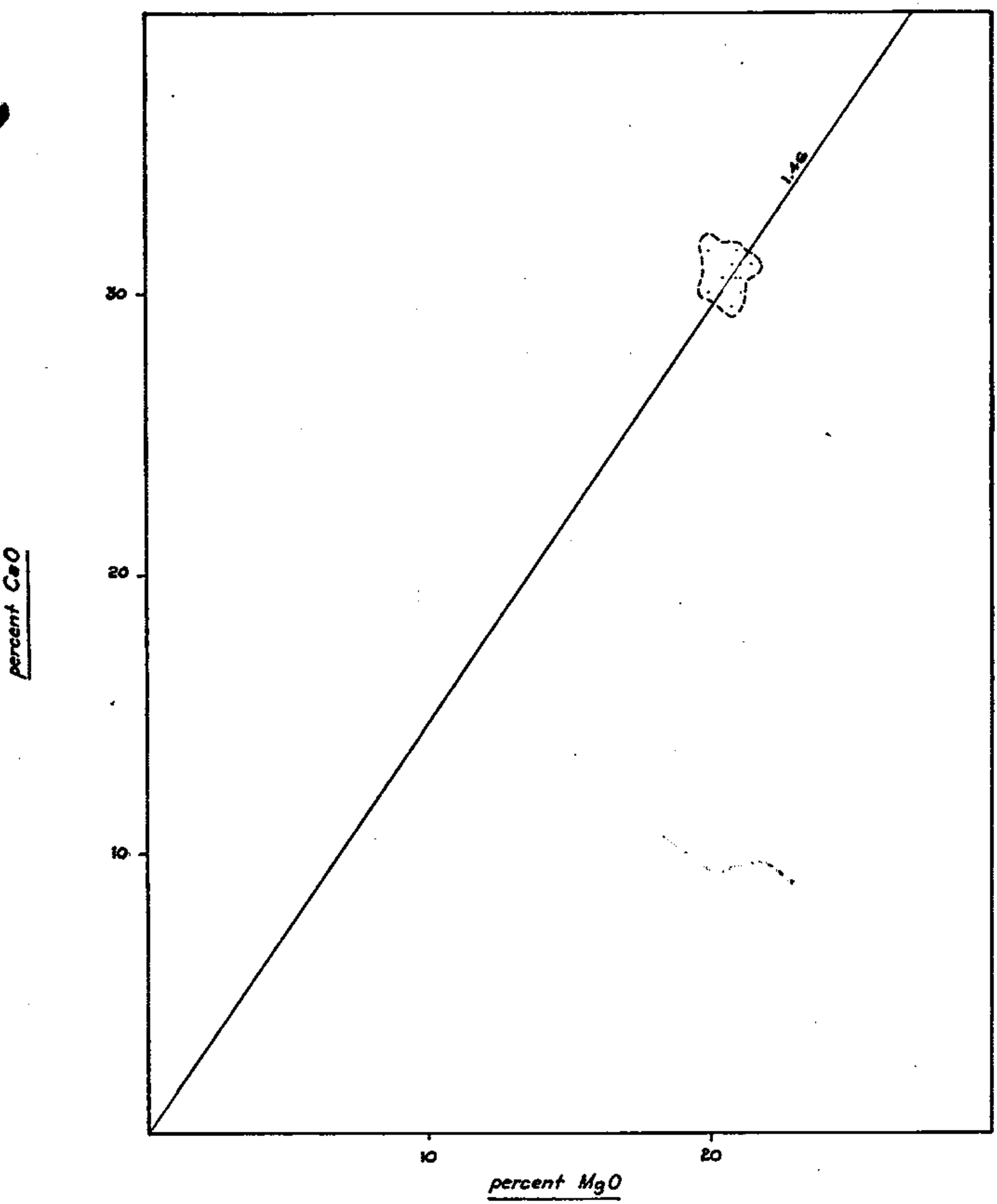
The lead, zinc and copper analyses are shown on the accompanying map (Fig. 20) and the statistical data are shown on Fig. 26. In general the values fall



TILLICUM BRECCIA

CaO/MgO

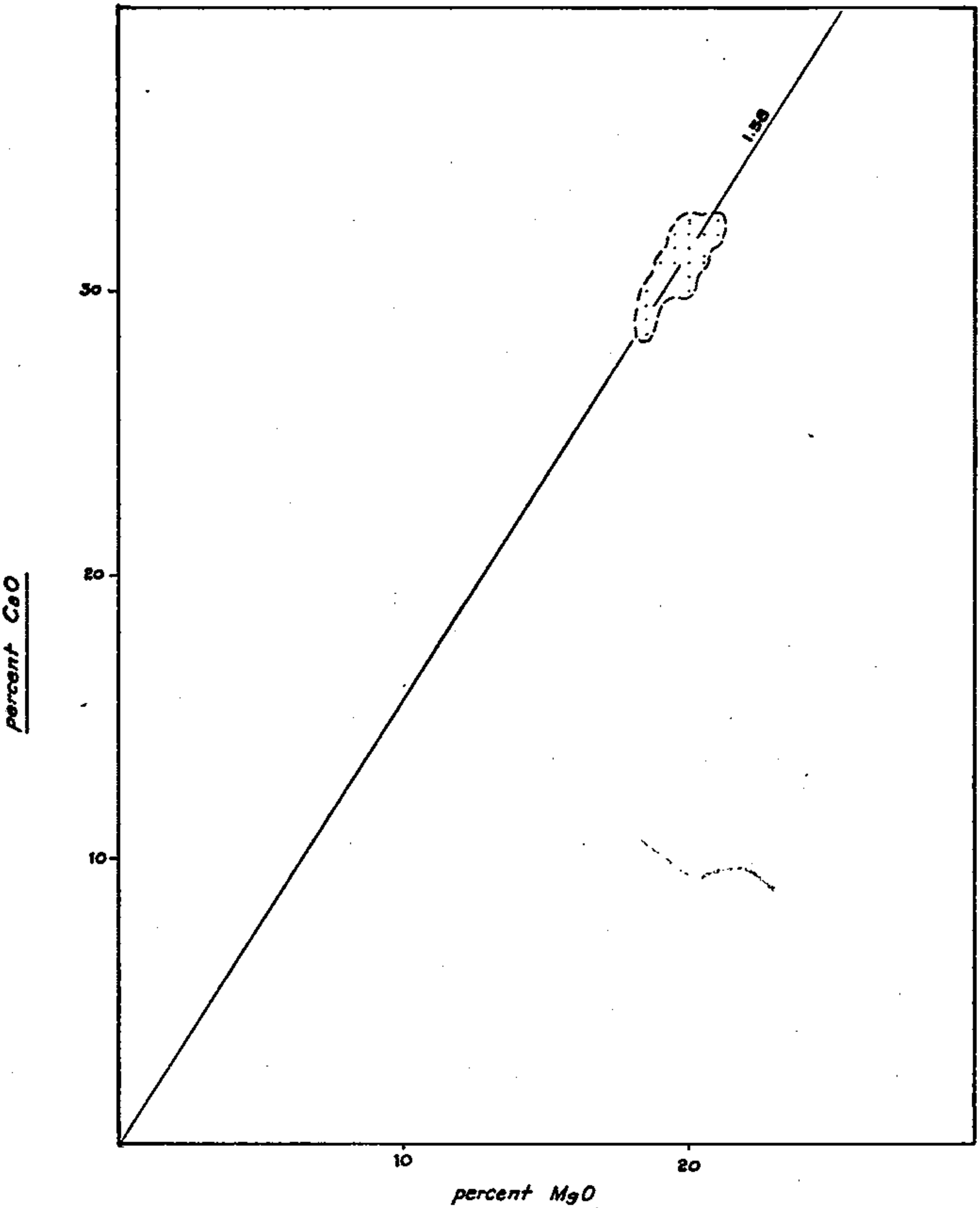
fig. 21



EAST VALLEY BRECCIA

CaO/MgO

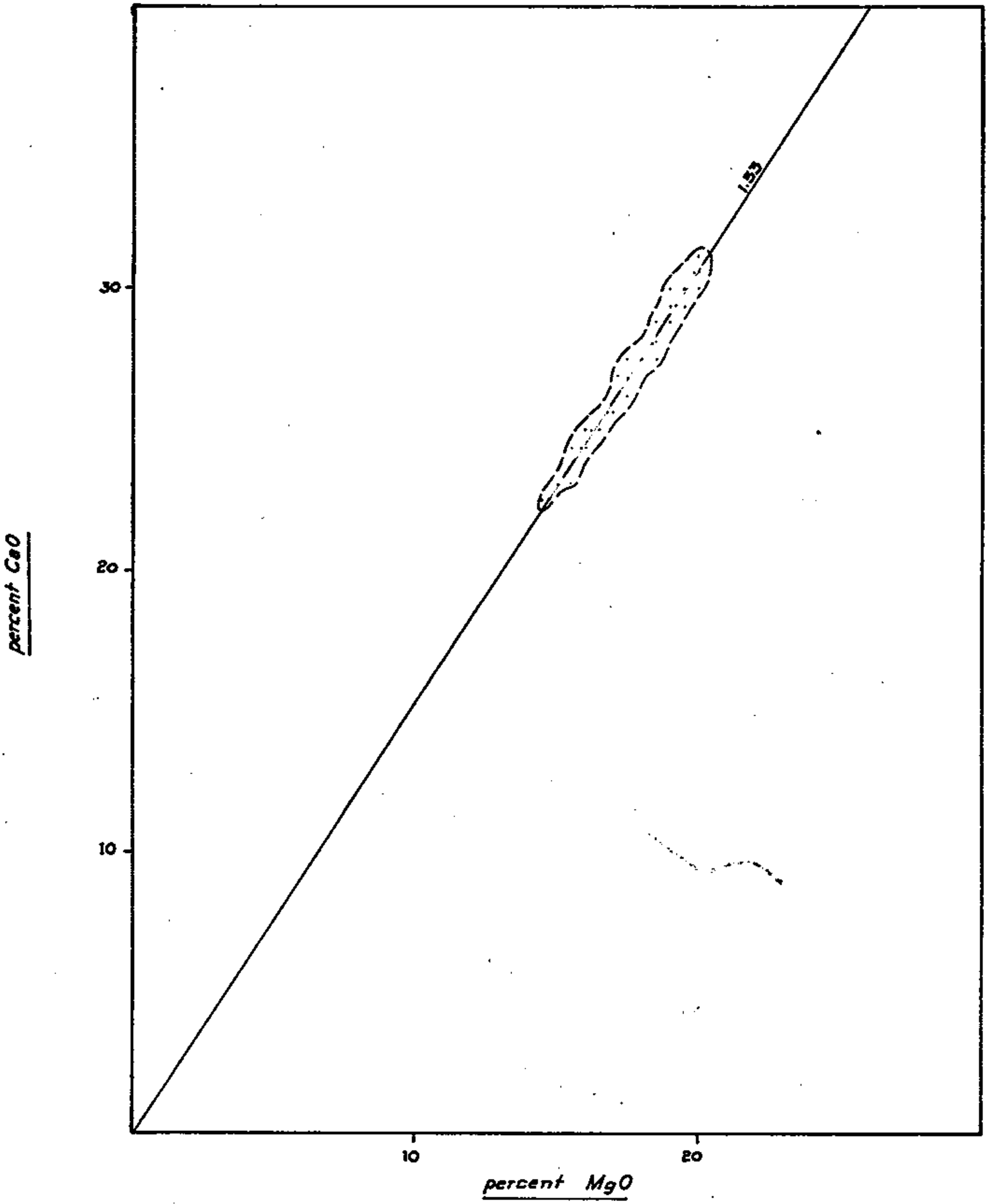
fig. 22



LOWER VALLEY BRECCIA

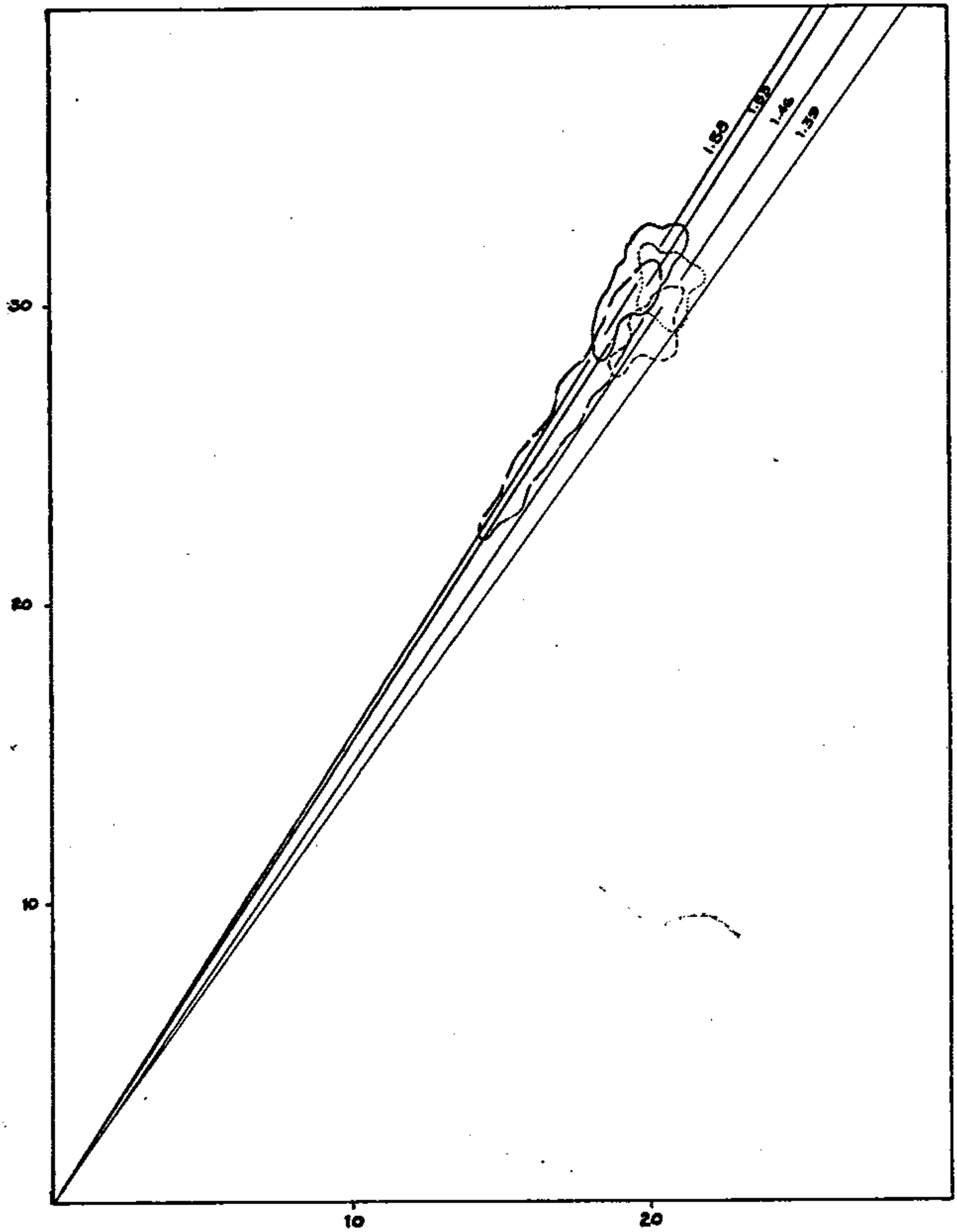
CaO/MgO

fig. 23



TILLICUM BRECCIA
MINERALIZED
CaO/MgO

fig. 24



DOLOMITE BRECCIA

CaO / MgO

fig. 25

within the accepted trace element ranges (TABLE V) for carbonates, except for the lead content which tends to be high.

1. Lead

The lead content of the dolomite breccias is high compared to the published averages for carbonates. A plot of the data (Fig. 26) shows that the East Valley breccia and the Tillicum** breccia contain anomalous ($>$ 50 ppm) amounts of lead. While no lead mineralization was noted in the breccias, some of the anomalous values in the Tillicum** breccia correlate with anomalous stream silt samples.

2. Zinc

In general the results fall within the accepted range for carbonates. The Tillicum** breccia has a higher zinc background than the other breccias and is the only one which shows anomalous zinc content. Indeed minor sphalerite was noted near several of the anomalous sample sites.

3. Copper

From the graph (Fig. 26) it would appear that $>$ 5 ppm is anomalous and few anomalous results were obtained. All these values fall well within the accepted average metal content for carbonates.

**Refers to the Southeastern extension of the unit past the zone of known sulfide mineralization.

TABLE V

ROCK TYPE.	ELEMENTS in p.p.m					REFERENCE
	Cu.	Pb	Zn	Ag.	Ba.	
Limestone		75	35		120	Principles of Geochemical Prospecting Gizsburg.
Limestone	5-20	5-10	4-20	0 2	20-200	Geochemistry in Mineral Exploration. H. Hawkes and Webb
Limestone	4	9	20		10	"Distribution of elements in some major units of the earths Crust." K.K. Turekian and K.H Wedepohl
Limestone		9	5-41 (mean 23)			Econ. Geol. Marc.-Apr. 1971.
Shale	45	20	95		580	"Distribution of elements in some major units of the Earth's Crust" K.K. Turekian and K.H. Wedepohl.
Shale	57	20	80	0·1	580	From "Geo Khimiya" A.P. Vinogradov, Geokhimiya.
Shale		20	220	0·5	460	Principles of Geochemical Prospecting (1)
Shale	30-150	20	50-300		300-600	Geochemistry in Mineral Exploration. H. Hawkes and Webb
Shale		6-36	59-153 (mean 106)			Econ. Geol. Marc - Apr. 1971.
Black shale.	20-300	20-400	100-1000	5-50	450-700	Geochemistry in Mineral Exploration. H. Hawkes and Webb
Clays and Shale.	20-200		20-100			R. L. Mitchell.

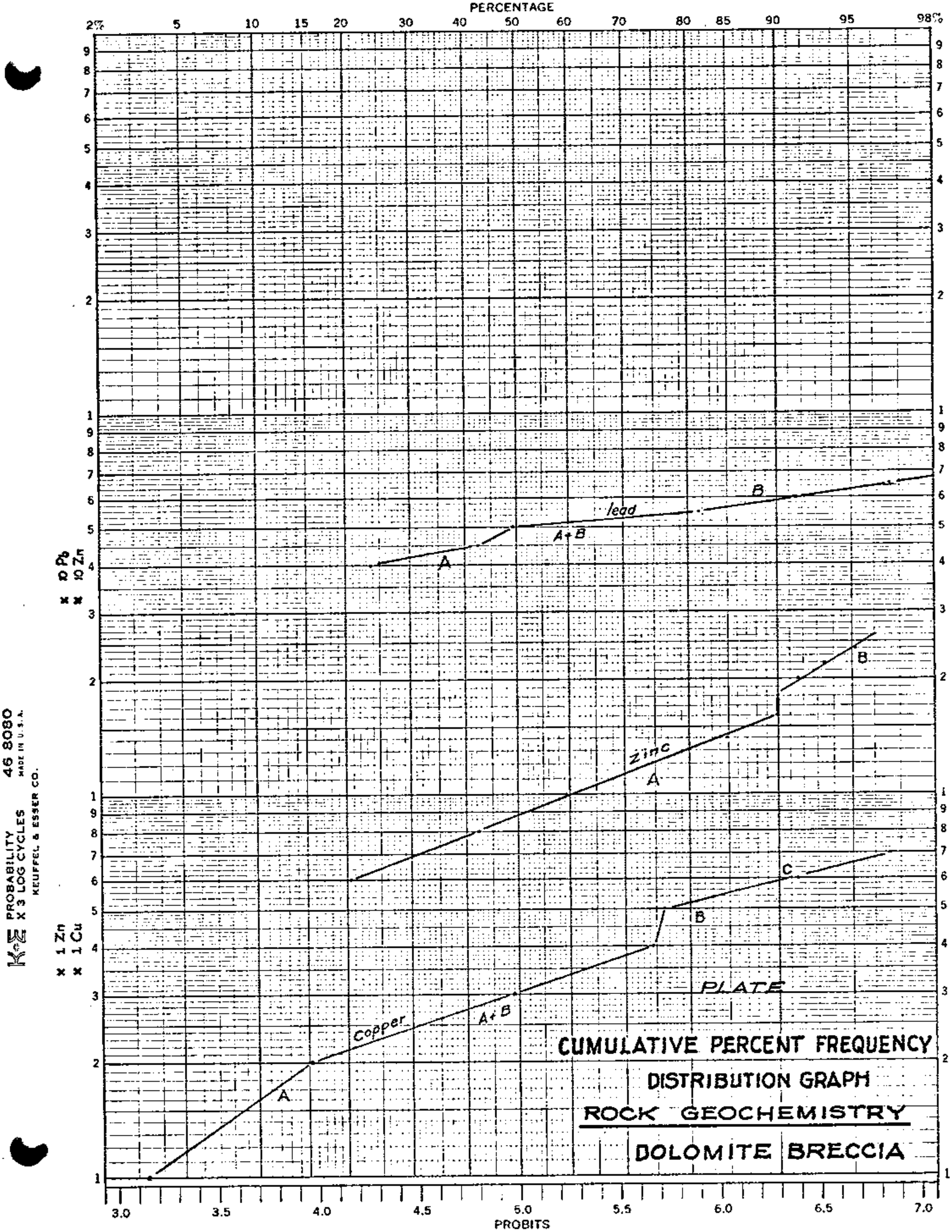

PERCENTAGE
PROBITS
x 10 Pb
x 10 Zn
x 1 Zn
x 1 Cu
K+E PROBABILITY X 3 LOG CYCLES 46 8080 KEUFFEL & ESSER CO. MADE IN U.S.A.
lead
A
A+B
B
zinc
A
B
copper
A
A+B
B
C
PLATE
CUMULATIVE PERCENT FREQUENCY
DISTRIBUTION GRAPH
ROCK GEOCHEMISTRY
DOLOMITE BRECCIA

fig.26

B. Shales

The shales along the eastern side of the Mt. McCusker range were sampled and analyzed for Pb, Zn, Cu and Ag. The results are shown on the accompanying map (Fig. 20) and in TABLE VI. The copper and zinc values are low compared to the average trace metal content of shales (TABLE V). The lead values are approximately twice the average value for shales.

STREAM SILT GEOCHEMISTRY

Approximately 120 silt samples were collected from close to or within the McCusker Groups. Analytical results were plotted (Fig. 27) together with those from samples collected in 1972. There is a fair correlation between the two sets of data.

The results were plotted in several fashions in an attempt to assess the validity of the results (Figs. 28-32). For most of the sampled areas, the anomalous values are lead $>$ 50 ppm and zinc $>$ 50 ppm.

It is remarkable that the plot (Fig. 29) of the data indicates that the mineralized zone of the Tillicum breccia is reflected only by a weak Zn, Pb anomaly (See Fig. 27, Area I).

TABLE VI

ROCK GEOCHEMISTRY SHALES

Sample	Cu (ppm)	Pb (ppm)	Zn (ppm)	Ag (ppm)
6602	12	42	9	0.5
6603	7	50	16	1.5
6604	13	44	57	0.5
6605	10	44	9	0.5
6606	7	48	13	0.5
6607	6	50	11	1.0
6608	6	50	18	1.0
6609	7	48	22	1.0
6610	4	46	14	1.0
6611	6	42	16	1.0
6612	7	42	16	0.5
6613	7	54	25	1.0

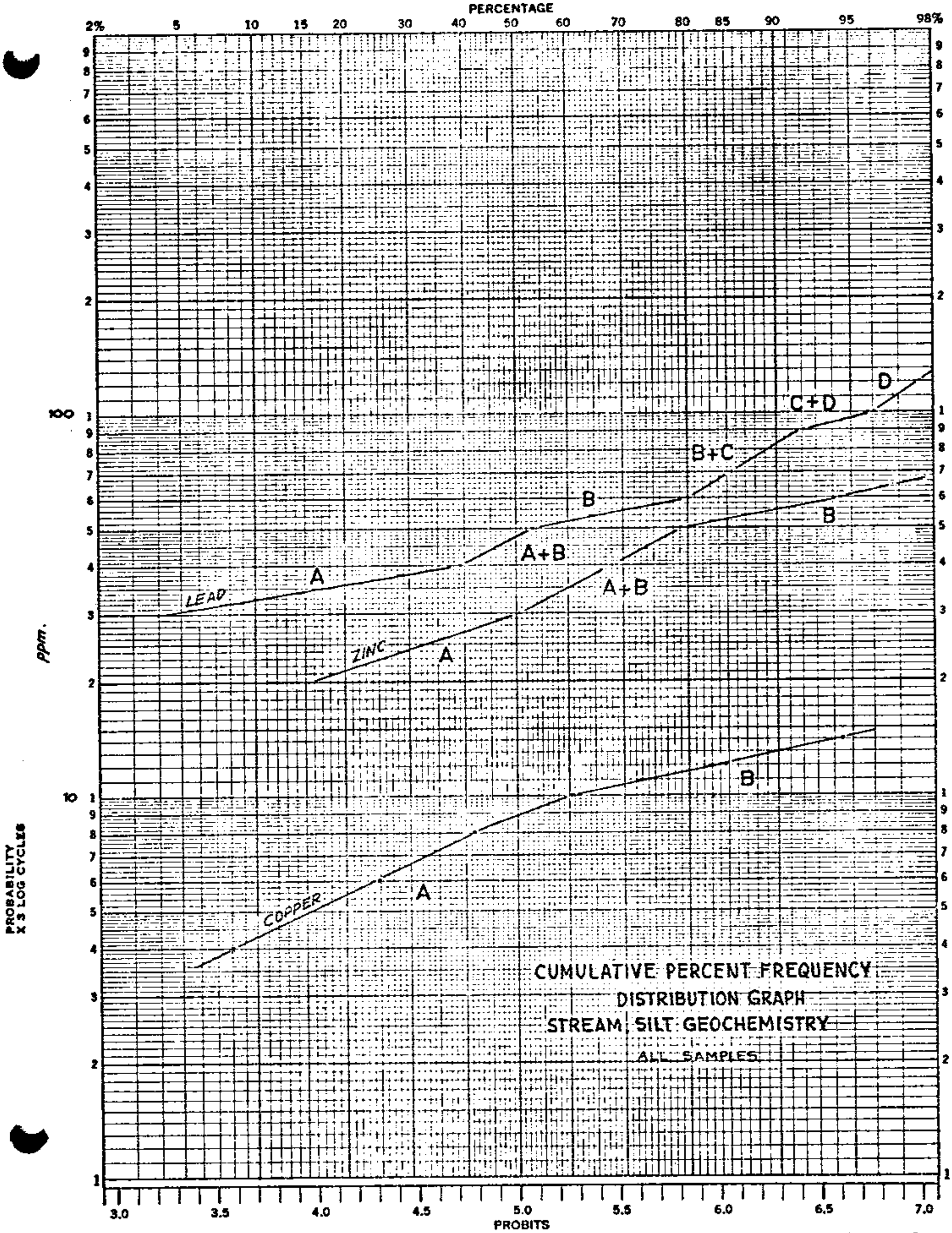
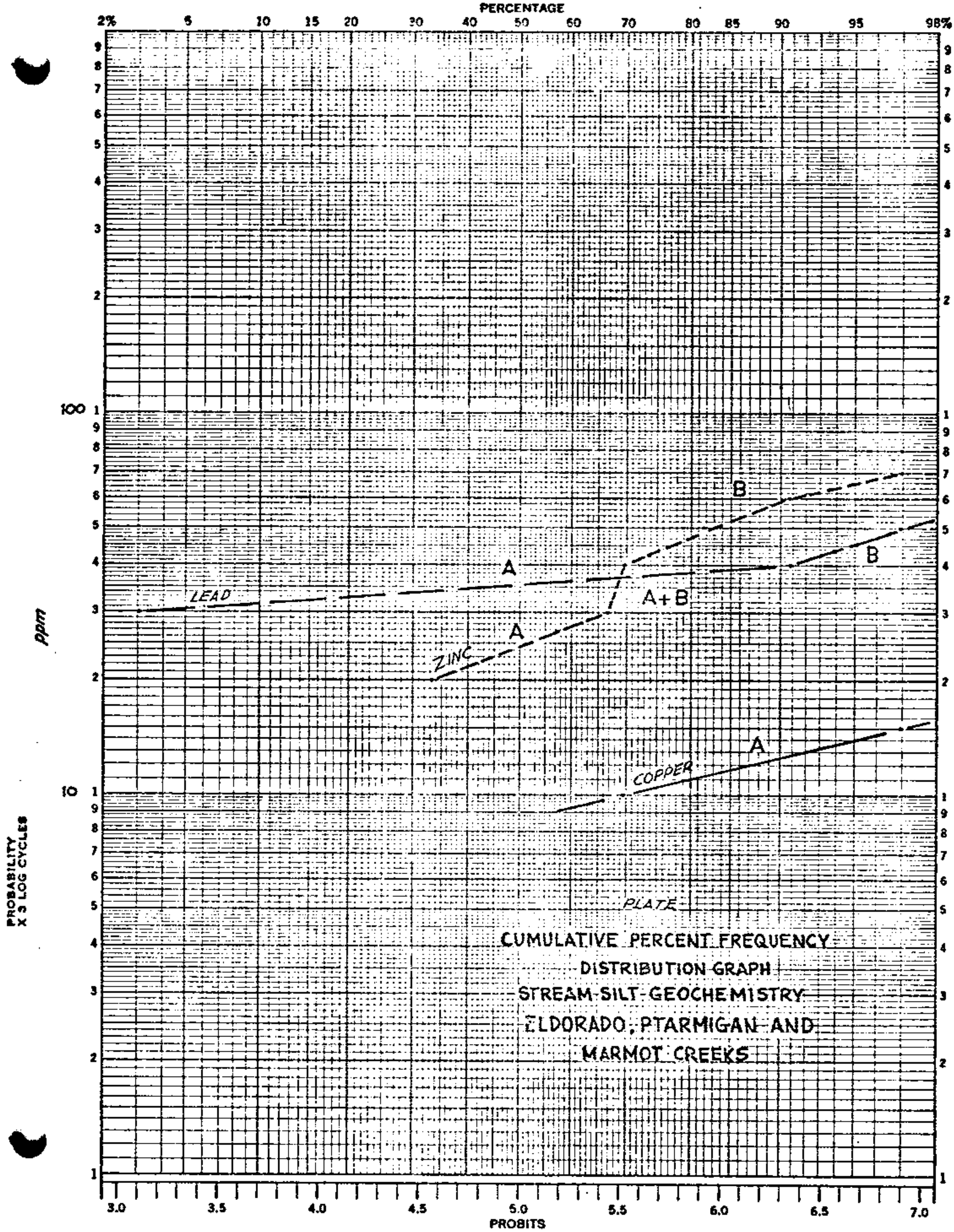

PERCENTAGE
2% 5 10 15 20 30 40 50 60 70 80 85 90 95 98%
ppm.
100
10
1
PROBABILITY X 3 LOG CYCLES
LEAD
A
A+B
B
B+C
C+D
D
ZINC
A
A+B
B
COPPER
A
B
CUMULATIVE PERCENT FREQUENCY
DISTRIBUTION GRAPH
STREAM SILT GEOCHEMISTRY
ALL SAMPLES
3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0
PROBITS

fig. 28



CUMULATIVE PERCENT FREQUENCY DISTRIBUTION GRAPH
STREAM SILT GEOCHEMISTRY
ELDORADO, PTARMIGAN AND MARMOT CREEKS

fig. 29

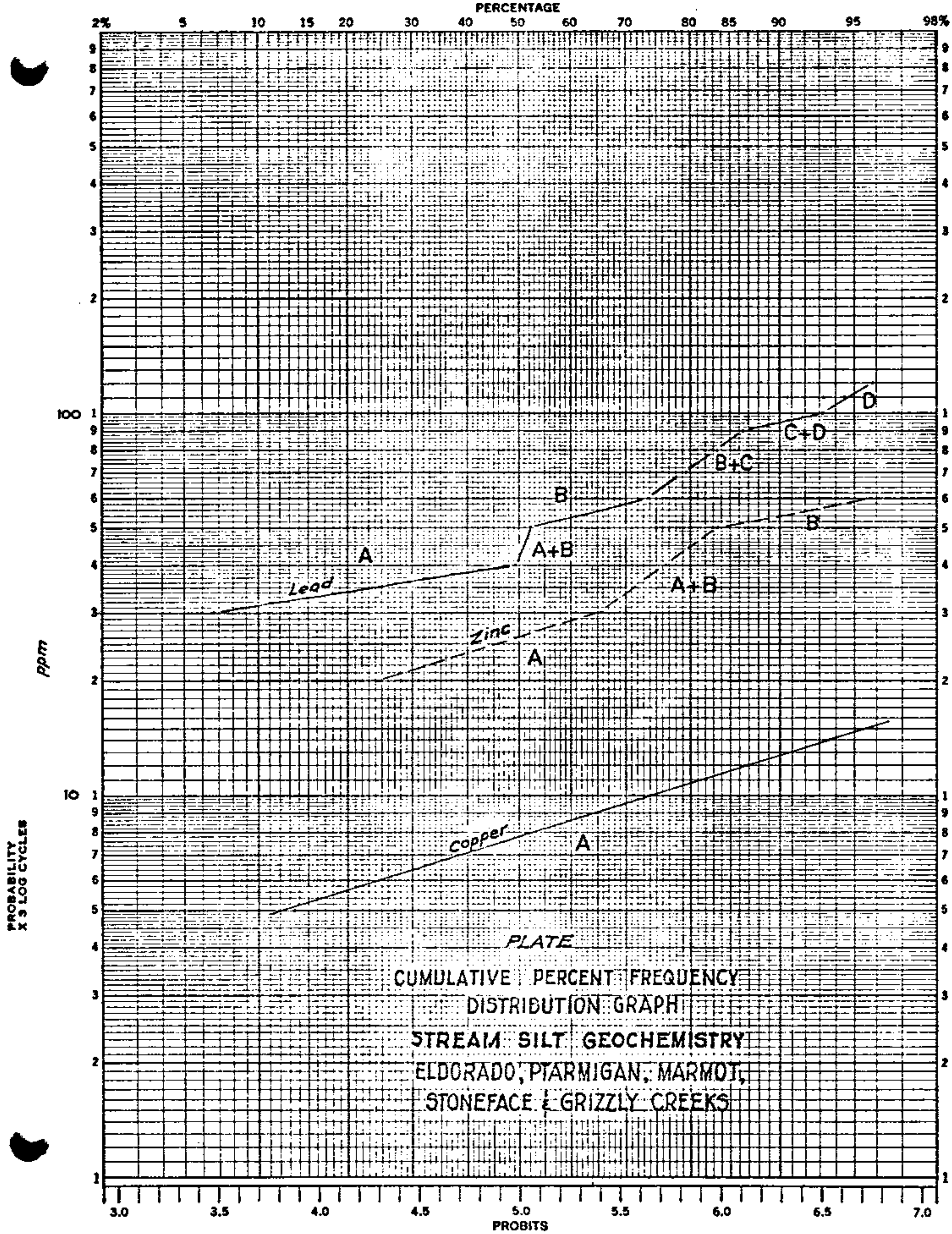

PERCENTAGE
2%
5
10
15
20
30
40
50
60
70
80
85
90
95
98%
100
10
1
ppm
PROBABILITY
X 3 LOG CYCLES
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
PROBITS
Lead
A
A+B
B
B+C
C+D
D
Zinc
A
A+B
B
Copper
A
PLATE
CUMULATIVE PERCENT FREQUENCY
DISTRIBUTION GRAPH
STREAM SILT GEOCHEMISTRY
ELDORADO, PTARMIGAN, MARMOT,
STONEFACE & GRIZZLY CREEKS

fig. 30

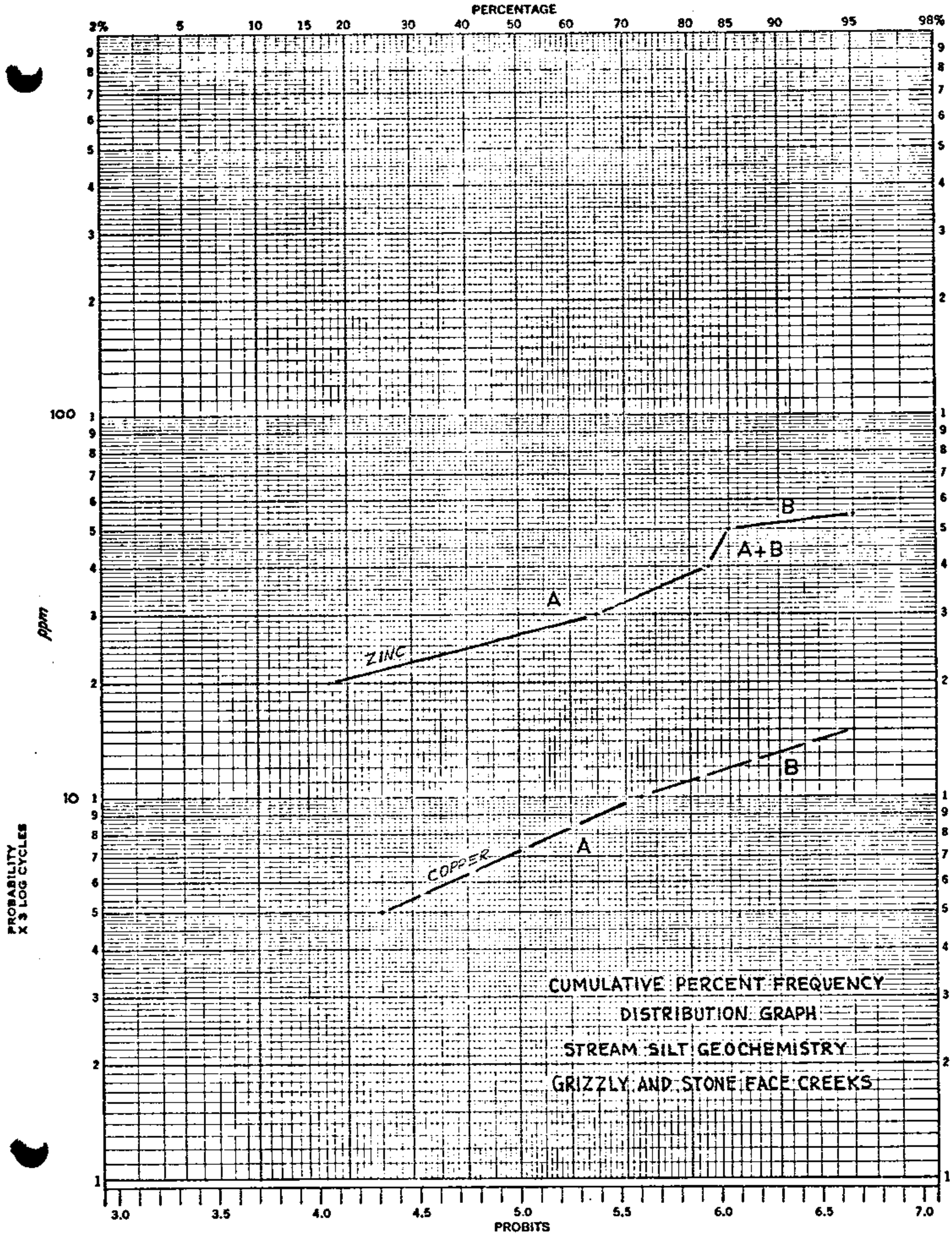

PERCENTAGE
2% 5 10 15 20 30 40 50 60 70 80 85 90 95 98%
ppm
PROBABILITY X 3 LOG CYCLES
100
10
1
ZINC
A
A+B
B
COPPER
A
B
CUMULATIVE PERCENT FREQUENCY
DISTRIBUTION GRAPH
STREAM SILT GEOCHEMISTRY
GRIZZLY AND STONE FACE CREEKS
3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0
PROBITS

fig.31

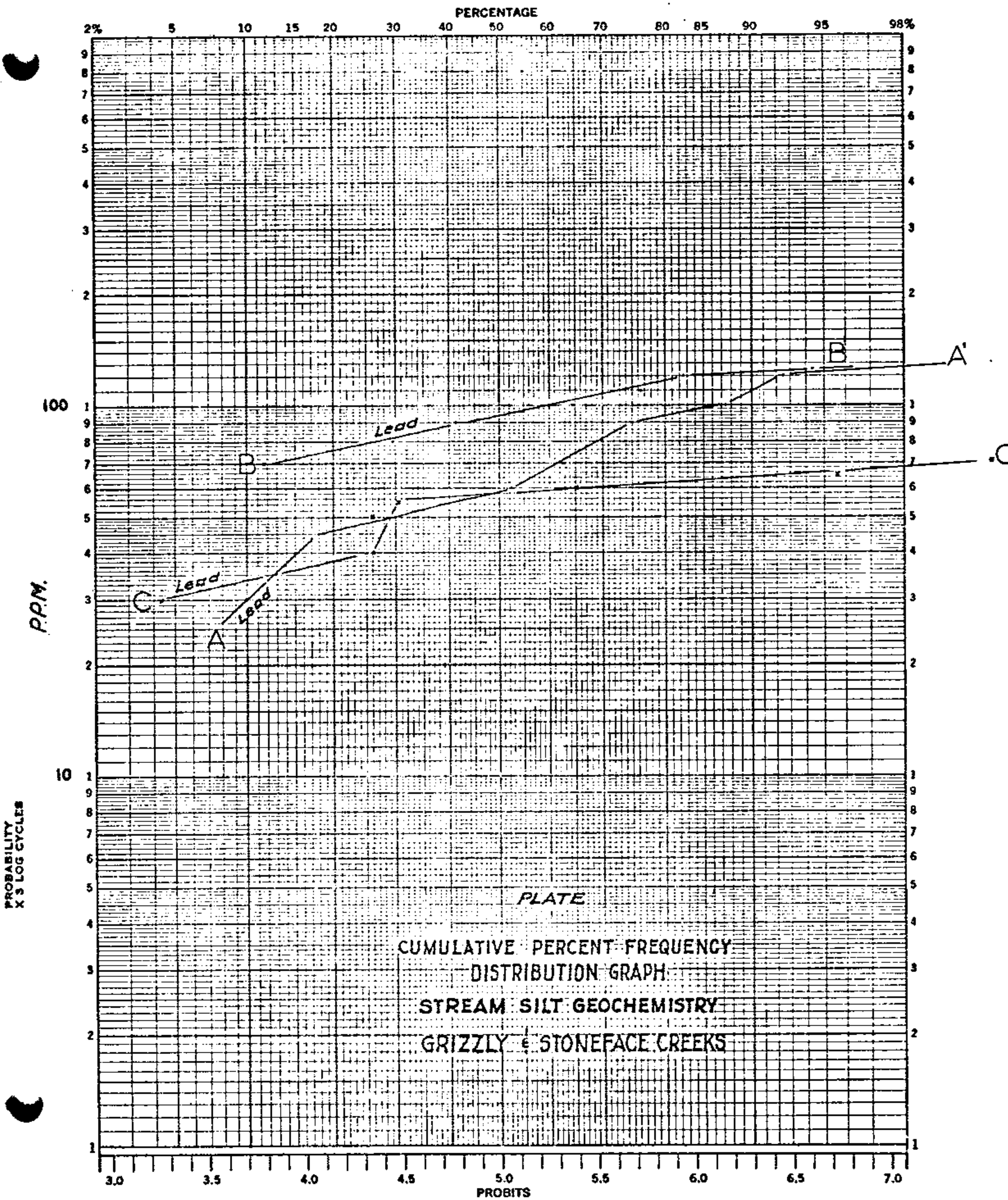

PERCENTAGE
2%
5
10
15
20
30
40
50
60
70
80
85
90
95
98%
Lead
Lead
Lead
A
A'
B
B
C
C
100
10
P.P.M.
PROBABILITY
X 3 LOG CYCLES
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
PROBITS
PLATE
CUMULATIVE PERCENT FREQUENCY
DISTRIBUTION GRAPH
STREAM SILT GEOCHEMISTRY
GRIZZLY & STONEFACE CREEKS

fig. 32

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*Sedimentary Geology and Mineral Deposits of the Canadian Cordillera

APPENDICES

APPENDIX I

ASPECTS OF STRATIGRAPHY

ROBB LAKE AREA N.E.B.C.

JUNE - AUGUST, 1973

BY: DR. G. J. DICKIE

During the 1973 field season, field work was concentrated on the stratigraphy of the east face of Mt. McCusker. The sphalerite occurrence in a dolomite breccia unit appears to be of Lower Devonian age in a position equivalent to the Muncho-McConnell Formation. The breccia unit is at the northwestern margin of the carbonate bank and immediately changes facies laterally to a black shale and shaly dolomite. The close association of dolomite breccia and dark shale seems to characterize many of the sphalerite occurrences in the Robb Lake area and so the facies change at Mt. McCusker should be traced to the south and west.

MT. McCUSKER AREA

Stratigraphic Sequence

The section of rocks of most interest is that containing the mineralized dolomite breccia at the foot of Mt. McCusker. This section is cut off below and above by thrust faults and shows remarkable lithofacies variation in the Mt. McCusker area. The rocks on the valley divide and in the south valley, are a continuous sequence of thick bedded dolomites and sandstones of Silurian and possibly Lower Devonian age. To the north and west, this sequence grades abruptly into thin bedded shales and shaly carbonates, the facies change extending further north and west for progressively older rocks in the sequence.

Carbonate Sequence

The oldest exposed rocks in this sequence are relatively thin bedded shaly, fossiliferous dolomites containing crinoid fragments and coral heads which

which indicate a Silurian age. Overlying these rocks are approximately 300 feet of thick-bedded resistant dolomites with fossiliferous bands and one zone of chert nodules. The most distinctive marker horizons in this sequence are:

1. A coral bank layer 20 feet thick which contains abundant large <u>Halysites</u> and <u>Favosites</u>. The unit is very dark grey, recessive, and shaly, and can be traced across the valley north of the divide,
2. A thin bed rich in Pentamerid brachiopods overlain by a xone of chert nodules which may be replacing fossil forms. Either the brachiopods or the chert can be traced through the valley both north and south of the divide,
3. A 50 foot unit of strongly recrystallized dolomite (resembling a breccia in places).

The resistant dolomites grade upward into quartz sandy dolomite, through dolomitic sandstone, to a quartzite (quartz sandstone with silica cement), which occurs at the base of the cliff below Mt. McCusker.

Above the quartzite are medium-to-micro-crystalline, thick-bedded poorly fossiliferous dolomites which have a grey-buff weathering colour. The thickest section of these dolomites (approximately 400 feet) occurs south of the valley divide. Two fossiliferous bands were found, both above the mineralized breccia horizon. The lower band contains about one foot of Amphipora-like debris and the upper is rich in gastropods, crinoids and Favositid corals with one occurrence of an uncoiled cephalopod. None of these fossils has unique age significance but together suggest a Lower Devonian age, probably the Muncho-

McConnell equivalent. The mineralized breccia unit can be traced some distance to the south but mineralization decreases rapidly in that direction.

At the top of the section south of the divide, the crystalline dolomites grade to sandy dolomite and to sandstone, interbedded with fractured finely crystalline dolomite. This sandy sequence could be the Wokkpash Formation equivalents.

The sequence immediately overlying the dolomite and sandstone is recessive and hidden by talus but is probably a grey, fissile shale. The next prominent outcrop occurs about 100 feet stratigraphically higher and is banded, black and brown weathering shale, strongly sheared. This shale unit appears to have been thrust over the dolomites from the west. The sequence in the overthrust block grades up into shaly, fossiliferous limestone and then beds of thick bedded dolomite occur containing abundant Halysites and Favosites indicating a Silurian age.

The thrust fault which truncates the thick dolomite sequence outcrops midway up the face of Mt. McCusker and can be traced to the northern end of the mountain where it merges with an overlying thrust fault.

Lateral Variations

The section described from the valley floor to the first thrust has a fairly constant thickness from south to north on Mt. McCusker, but there are drastic lithology changes. The Silurian rocks in the lower part of the sequence grade into thin bedded dolomites and shales which form the dipslopes on the northeastern side of the valley. The thick dolomites of the Upper Silurian beds disappear under talus on Mt. McCusker and their shale equivalents can be found to the north. The most critical lateral change affects the unit containing the mineralized breccia, bounded below by the quartzite and above by the thrust fault. Within a lateral distance of two miles in a northwest direction, the 400 feet of crystalline dolomite is replaced by thin beds of shaly dolomite in a thick shale sequence. The abruptness of the facies change is remarkable.

Mineralized Breccia Unit

The occurrence of the breccia unit within a narrow stratigraphic range in the sequence implies that the formation of the breccia is connected with the depositional process. There are two possibilities:

(a) Slump Breccia - where the blocks of recently lithified dolomite moved down a slope and formed a talus pile. This type of breccia is described from the Upper Devonian sequence in Alberta (Srivastava et al, 1972; Cook et al, 1972). In this instance, the breccia could be initiated by slumping of recently formed adjacent dolomite, and the "flowage" of debris out on to the basin floor. The irregular thickness of the breccia bed and the occurrence of a mixed size of dolomite fragments in all orientations supports this origin.

(b) Collapse Breccia - caused by removal of anhydrite below the recently formed dolomite layers and the subsequent collapse of the "roof rock". Later solutions deposited the coarse crystalline dolomite cement. No anhydrite occurs in outcrop but any traces of anhydrite would be rapidly dissolved on exposure to rain and melt water. The depositional environment would be a supratidal flat where pools of seawater are evaporated to produce anhydrite and salt. The pools may be irregularly distributed in time and space. Subsequent groundwater movement dissolves the salts and the collapse is not necessarily uniform over the whole unit.

The collapse origin of the breccia is favoured because of the tight packing of dolomite fragments, the lack of interstitial granular material, and the very high porosity in places.

APPENDIX II

STRATIGRAPHY OF

THE

MOUNT McCUSKER AREA

BY: M. FRASER

1973

INTRODUCTION

Mount McCusker is located in the Northern Rocky Mountains of British Columbia, south of the Sikanni Chief River in the headwaters of Gautschi Creek. Field mapping during the Summer of 1973 was restricted to those areas of outcrop which lie in the valley to the east of Mount McCusker and those on the accessible lower parts of the eastern slope of the mountain. The description of rocks outcropping along the upper ridges and on the western slope is based on aerial reconnaissance, airphoto interpretation and examination of talus.

Those rocks which outcrop in the eastern portion of the Mount McCusker area make up a sedimentary sequence about 3,000 feet in thickness. Shallow water dolomites are most common in the section with lesser amounts of sandstone, orthoquartzite and shaley carbonate. Within this sequence is a dolomite breccia unit which contains discontinuous zones of Pb, Zn mineralization. Thrust over these rocks are flat lying calcareous shales conformably overlain by limestone. A second thrust sheet, above the first, caps the section with an unknown thickness of shales and siltstones.

The rocks have been deformed by folding along axes which trend approximately 160° and by thrust faults which parallel this trend. It is possible, however, that other structural elements, not recognized during this study, are present in the McCusker area.

The age of the rocks in the region is uncertain. The thick lower sequence is thought to represent sedimentation from Upper Ordvocian through Lower Devonian. The units outcropping above the lower thrust may be Upper Ordovician to Silurian and the shales above the upper thrust may be Cambro-Ordovician.

LITHOLOGY

The dolomites and shales of the Mount McCusker area are interpreted as representing a facies change along the Lower Paleozoic shelf-edge. The Silurian rocks show a parallel northwestward facies change.

Fig. 1 lists the various rock units and shows those which are considered to be laterally equivalent facies. It is possible that the mapped change in rock types is a result of faulting and not of facies variation. However, no evidence of a fault has been found in the field. Assuming lateral differences are the result of facies changes, the facies front would be striking in a generally northeastward direction in the McCusker region.

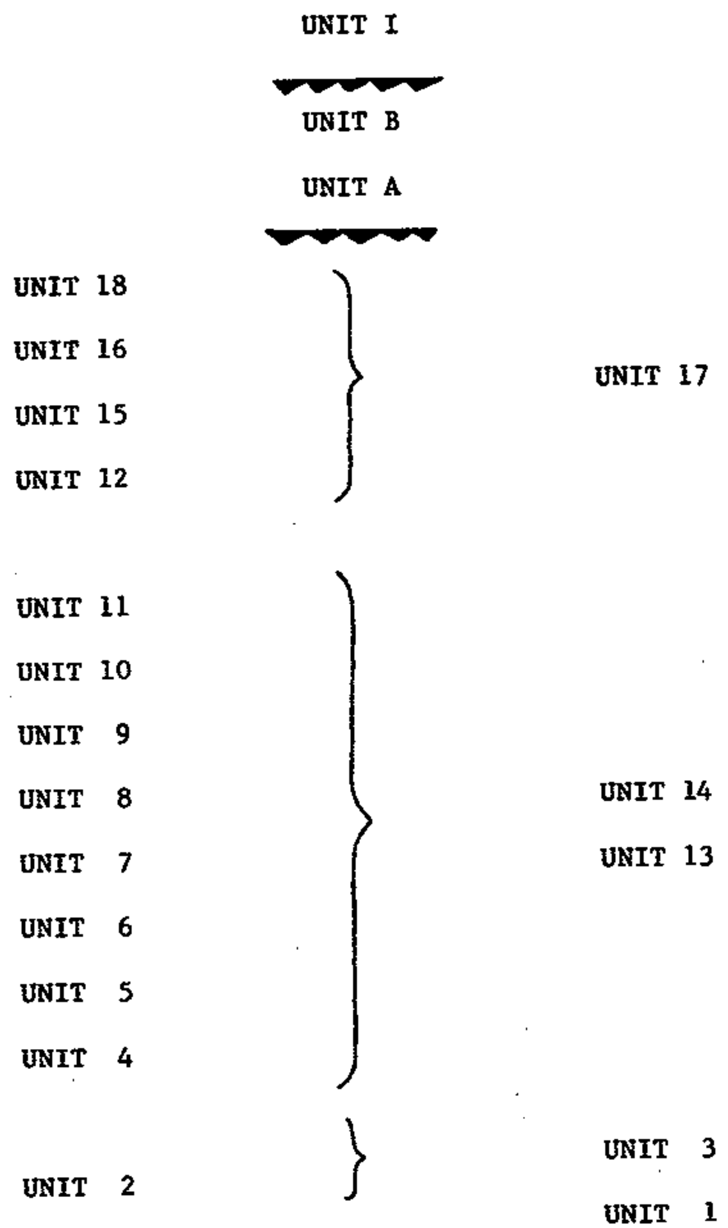
CENTRAL AND SOUTHERN VALLEY AREA

Unit 2

Lowermost in the shelf sequence is a 300 foot thickness of recessive, thin bedded, finely crystalline dolomite. The rocks of this unit are generally grey, with the exception of a distinctive black subunit, 2a.

Unit 2a

Gastropods, brachiopods, crinoids and horn corals are the most common fossils and may comprise up to 40% of some beds. Associated with these fossils may be minor Syringopora, Halysites and Favosites. The fossil assemblage and the thin bedded nature of the dolomites suggests that these rocks were deposited on a relatively deep (75 feet) open marine shelf.



UNIT I
UNIT B
UNIT A
UNIT 18
UNIT 16
UNIT 15
UNIT 12
UNIT 17
UNIT 11
UNIT 10
UNIT 9
UNIT 8
UNIT 7
UNIT 6
UNIT 5
UNIT 4
UNIT 14
UNIT 13
UNIT 2
UNIT 3
UNIT 1

Fig. 1

Unit 4

This unit is made up of 100 feet of grey to light grey weathering, fine to medium crystalline dolomites. Thick bedding makes this unit relatively resistant and thus, stratigraphically, the lowest cliff-forming dolomite in the valley. Some beds are rich in crinoidal debris but the fossil content of the rocks is generally below 5%. Some of the crinoids have a star shaped columnal canal, a feature which is believed to indicate proximity to a shale-carbonate interface. In addition to crinoids, minor number of oncolites and corals occur in these rocks.

Unit 5

The dark grey to black colour and the highly fossiliferous nature of this 40 foot unit make it one of the more distinctive ones within the map area. Thin bedding (2" to 3") and a strongly developed vertical jointing combine to make it rubbly in character, and consequently recessive. The upper 20 feet of Unit 5 is, in part, biostromal. The patchy biostromes are dominantly coraliferous, containing abundant Halysites and Favosites in growth positions as well as Syringopora, colonial rugose corals and horn corals (Pl. III, Figs. 1, 2). Cephalopods and tabular stromatoporoids are also common.

Several recrystallization minerals are found in Unit 5. Very coarsely secondary crystalline calcite, uncommon in the map area, forms patches up to 9 inches in size. Martite, quartz and dolomite are found in biomoldic vugs. Chert nodules and concretions are also common in this unit.

UNIT 6

Overlying the biostromal unit is a 175 foot thickness of light grey, fine to medium crystalline dolomite (Pl. IV, Fig. 1). This unit is generally thick bedded, although silty laminations are common in the lower part. Fossils are common but not abundant throughout the unit. The assemblage consists of horn corals, Halysites, Favosites, tabular stromatoporoids, crinoids and to a lesser extent bryozoa and gastropods. Resistant tabular forms which show no skeletal framework are common. They are the products of the silicification of corals, algae or stromatoporoids.

UNIT 7

The cherty pentamerid unit is a distinctive marker, 30 feet in thickness, which outcrops along the valley on both the north and south sides of the divide. It is a thin bedded, light grey rock of clay-sized dolomite. The highly fossiliferous lower part of the unit is almost a brachiopod coquina (Pl. V, Fig. 1). Less abundant than Pentamerus, but also present are horn corals, Halysites, Heliolites, Favosites, crinoids and tabular stromatoporoids. The upper beds of the unit are characterized by closely spaced bands of chert nodules (Pl. V, Fig. 2). The chert makes up approximately 30% of the rock and although all internal structure of the nodules has been lost, they are probably recrystallized and replaces fossil skeletons.

UNIT 8

This unit, 150 feet in thickness, is made up of thinly-bedded, light grey, fine to medium crystalline dolomite (45%), sandy dolomite (30%) and sandstone (25%). Quartz is present as well-rounded, frosted grains, and is concentrated in the lower part of the unit as thin but laterally continuous beds of quartzite, sandstone and sandy dolomite. Fossils are not abundant, but minor numbers of corals, oncolites and brachiopods occur within the dolomitic beds.

Unit 9

Unit 9 is a dolomitic rock with weakly developed brecciation which is laterally discontinuous (disappearing in the south). It is best developed in the north where it reaches a maximum thickness of 40 feet. The breccia is a light grey, medium crystalline dolomite which is moderately to strongly "veined" with coarse secondary dolomite. Sulfides do not appear to be present.

Unit 10

This rock unit is made up of 140 feet of light grey, medium to finely crystalline dolomite with minor intercalations of sandstone and quartzite near the top. Unit 10 which contains minor *Halysites*, *Favosites*, horn corals, brachiopods, crinoids and planispiral gastropods, marks the top of the fossiliferous Silurian section exposed in the McCusker valley. Within the unit is a medium crystalline dolomite which weathers with a distinctive vuggy surface, making possible the correlation of beds exposed along the creek bed at the southeastern corner of the map area with those exposed north of the divide.

Unit 11

Unit 11, as easily recognizable quartz arenite and orthoquartzite, ranges in thickness from 200 feet in the south to 25 feet in the north. The beds of medium to coarse sand are conspicuously cross-bedded, indicating the probability that deposition occurred in a nearshore environment (Pl. VI, Figs. 1, 2).

The rock is composed of very pure quartz sand. Grains are well rounded and frosted. The cement consists of dolomite or quartz, the two types grading laterally and vertically. Since the variation in cement appears to be the only difference between the quartz arenite and the orthoquartzite, these have been mapped as one unit. Within the unit are small pods, generally less than 100 feet long, of sandy dolomite. R. Thompson of the B.C.D.M. believes that this unit marks the Devonian-Silurian time boundary. As yet, no fossil evidence has been found to confirm this idea.

Unit 12

This unit is 225 feet thick at the northern limit of its outcrop, thickening southward to over 300 feet. The vertical sequence of beds is laterally continuous, there being a 10 to 20 foot basal sandy dolomite immediately overlying the quartzite (Unit 11), about 100 feet of clay sized dolomite, a 45 foot sequence of interbedded sandy dolomites and dolomites, 60 feet of medium crystalline dolomite topped by more grey-buff weathering clay sized dolomite. It is this upper subunit which thickens southward, increasing in thickness from 10 to 100 feet. Within the uppermost dolomite to the south, there are pods of syndepositional breccia up to 100 feet in length and 25 feet in thickness. Questionable birdseye structures are also found in this unit suggesting that the breccias were formed in a supratidal environment.

Unit 15

The dolomite breccia unit is about 100 feet in thickness and continuous along strike throughout the map area and beyond its southern boundary. Intermittent occurrences of sphalerite, galena and pyrite mineralization have been found from moraine in the McCusker cirque to the northern limit of outcrop, a distance of 4,000 feet. South of the moraine, sphalerite occurrences are sporadic. The breccia is grey-buff weathering and made up of fragments of clay-sized dolomite, some of which are laminated (Pl. VII, Figs. 1, 2). The matrix of the breccia varies from fine to medium crystalline dark grey dolomite to coarsely crystalline white dolomite. Some outcroppings contain dolomite fragments showing evidence of soft sediment deformation and rotation. This fact, combined with the presence of detrital quartz sand in the matrix suggests a syndepositional origin for at least some of the breccia.

North of the divide, a relatively thin sequence of dolomites overlies the dolomite breccia, to the south, up to 1,000 feet of dolomite is present. It is thought that this extreme variation in thickness is the result of both faulting and a lateral facies change from dolomite to basinal shales. The southern sequence of dolomites is thick bedded and grey-buff weathering, and varies from clay size to finely crystalline at the base, to medium crystalline above. Fossils are present only in the upper 50 to 100 feet of the section where minor numbers of gastropods, crinoids and corals occur. To the north, the dolomites become dark grey and silty; evidence of the actions of burrowing organisms was noted in some laminated units. These dolomites are probably basinward equivalents of the lighter coloured dolomites to the south.

UNIT 18

Conformably overlying the dolomite sequence is a thickness of approximately

50 feet of coarse-grained, cross-bedded, buff weathering arenite. Unlike the pure quartz arenite of Unit 11, this rock contains 10 to 15% rock fragments and quartz grains are more angular. The sandstone may be conformably overlain by finely crystalline dolomite but, more commonly, it is cut by the lower thrust fault and overlain by shales.

NORTHERN VALLEY AREA

The rocks outcropping in the northern part of the McCusker valley are quite difference from those exposed to the south. Basic similarities in lithologies suggest that they are facies equivalents to the sequence just described.

Unit 1

Unit 1, greater than 300 feet thick, is a pyritiferous, brown-weathering, shaly limestone which outcrops on both limbs of the syncline exposed in the northern part of the map area. Since no limestone is present in the valley to the south, it is thought that this unit underlies the southern sequence. The bedding in these rocks has been obscured by a moderately strong crenulation cleavage which cuts the bedding at about 40° and gives the weathered surface a distinctive crinkled surface (Pl. 1, Fig. 1). Exposed along the creek which forms the northern limit of mapping is a 200 foot thickness of brecciated dolomite. Breccia fragments vary in size from an inch to greater than 5 feet and are in a poorly cemented limonite-stained matrix (Pl. II, Figs. 1, 2). It is thought that this is a fault breccia.

Unit 3

In the core of the syncline is a 600 to 800 foot section of grey to dark grey, finely crystalline dolomite. In some beds intense veining by dolomite and quartz has formed a small quantity of dolomite breccia. Although the unit is not highly fossiliferous, planispiral gastropods and oncolites are common in some beds (Pl. I, Fig. 2).

Unit 13

About 600 feet of grey to light grey, finely crystalline dolomite makes up the regularly bedded sequence which outcrops along the north end of Mount McCusker. Helicopter reconnaissance suggests that it is this same unit which is exposed in the window on the western side of the mountain. The dolomites within this unit are frequently silty, laminated and stylolitic. Occasional beds with mud cracks and birdseye structures suggest a shallow depositional environment with occasional subaerial erosion. Throughout the sequence, fossils are uncommon with but minor occurrences of oncolites, planispiral gastropods, crinoids, corals and tabular stromatoporoids. These dolomites may be equivalent to the more fossiliferous grey dolomites to the south.

Unit 14

Overlying the thick section of light grey dolomites is a buff weathering, silty dolomite. The unit is thinly bedded with irregular bituminous laminations which show evidence of bioturbation. It is possible that this dolomite and the silty dolomite overlying the Tillicum breccia were deposited contemporaneously on the flanks of a small basin in which the shales of Unit 17 were deposited.

Unit 17

In the central part of the map area is a very thick unit of interbedded dolomites, shaly dolomites and shales which are thought to be the deeper water facies equivalent of the nonfossiliferous, shallow water dolomites to the north and south. The dolomite beds are found at the base of the sequence, the rocks becoming more shaly up section. While the shales are unfossiliferous, the shaly dolomites are rich in crinoids, brachiopods and shell debris.

MIDDLE THRUST SLICE

Unit A

The lower thrust sheet brings brown and black banded calcareous shales over the dolomite section (Pl. VIII, Fig. 1). The fresh surface is a uniform grey colour and the banding of the weathered surface is apparently due to minor compositional changes from one bed to another. No megafossils were found in the shales, although minor occurrences of chert nodules were noted. The rocks are strongly sheared and have a prominent cleavage at a high angle to the bedding plane. Although no fossil evidence was found to date this unit, it is tentatively referred to the Ordovician, following the Photogeologic Map of Northeastern B.C. (1972).

Unit B

Overlying the shales is about 10 feet of strongly veined, red-buff weathering clay dolomite. This is in turn overlain by a thick sequence of fossiliferous, argillaceous limestone (Pl. VIII, Fig. 2). Fossils in float indicate a Silurian age for the upper parts of the limestone unit while fossils collected from the lowermost beds give an Upper Ordovician age. This unit lies between the two thrust faults and is faulted out to the north by the upper thrust. It is best exposed to the south in the vicinity of the hanging glacier, where the thrusts diverge.

UPPER THRUST PLATE

Unit I

Since Unit I outcrops only along the crest of Mount McCusker and to the west, it was not possible to examine the rocks in outcrop. However, an examination of talus indicated that the unit is made up of interbedded dark brown calcareous shales and siltstones. Like the lower shales, these rocks may also be Cambro-Ordovician in age.

STRUCTURE

Within the Mount McCusker area the rocks are deformed by both folding and faulting. A small syncline with an associated anticline are present at the northern end of Mount McCusker (Pl. IX, Fig. 1). The eastern limb of the syncline is oriented at approximately 150/20° S.W. and the western limb at approximately 175/25° N.E. The axis of the fold strikes at 160° and plunges 10° to the south. The more westerly anticline is less well exposed since it has been truncated by the thrust fault which at that point dips about 45° to the west. The only evidence of the fold is a flattening of the beds, thought to be near the crest of the anticline. The orientation of the beds exposed in the window suggests that they lie on the western limb of the syncline, indicating that the axis of the anticline does not parallel that of the syncline but rather swings to the southwest.

After being folded, the rocks were cut by a major thrust which strikes at approximately 150°. At the northern end of Mount McCusker, the trace of the thrust divides and the two fault traces splay outwards to the south. Pl. IX, Fig. 2 shows the trace of the upper thrust which brings Unit I over Unit A. The paler brown colour of Unit I may have resulted from baking of the shales during thrusting. The thrust plane is also well defined in Pl. VIII, Fig. 2 where it abruptly cuts the light grey limestone of Unit B. The lower thrust is thought to follow the base of the shale cliff (Pl. X, Fig. 1). To the south, it cuts the top of Unit 18 and then swings down section northward thus reducing the amount of Unit 16 exposed from 1,000 feet to about 500 feet over the Tillicum breccia.

It is possible that other faults exist within the section. As previously stated, the major facies change from dolomite in the south to shale in the north may be a fault boundary. Detailed fossil age dating across the boundary will be needed before a facies front explanation for variation in rock-type can be proved. The outcrop in the window also suggests further faulting but on-site mapping will be necessary to clarify details.

SIGNIFICANT FOSSILS IN THE MOUNT McCUSKER MAP AREA

Primitive corals collected from Unit B have been identified as Palaeofavosites and Streptelasma, Upper Ordovician or Lower Silurian in age. Assuming an Upper Ordovician age, this would place the limestone below the Nonda Formation as described by Norford et al (1966). The Upper Ordovician age of Unit B also supports the theory that the underlying dark calcareous shales of Unit A are Cambro-Ordovician in age.

The planispiral gastropods of Unit 3 have tentatively been identified as Maclurites and Palliseria cf. robusta Wilson. These fossils belong to a Late Ordovician suite.

Halysites, Favosites and Pentamerus, typical Silurian fauna, are found from Unit 2 through Unit 10. From Unit 10 upwards, the section is virtually barren. Those few specimens collected from Unit 16 and Unit 17 (Strophomena sp. and Fardenia cf. ellipsoides Stearn) have been positively identified as a Middle to Late Silurian fauna.

COMPARISON OF MOUNT McCUSKER SECTION WITH THOSE OF NEARBY AREAS

Norford et al (1966) defined the Silurian Nonda Formation as consisting of a basal quartzite and sandstone unit overlain by resistant grey and dark grey weathering dolomites with rare limestone. The upper grey dolomites are described as being thick bedded, fossiliferous, sometimes biostromal, units. Above the darker grey dolomites are well-bedded sandy dolomites and occasionally light-grey to buff weathering laminated dolomites which contain laterally correlative beds showing shrinkage cracks and dessication breccia. Norford mentions two measured sections, one the Sikanni Chief River, and the other at Guilbault Creek, about 45 miles south of Mount McCusker. Most of the work on the Nonda has been done to the north of Mount McCusker. However, the area is referred to briefly:

> "Disconformity and complex and abrupt facies changes are present in the Ordovician and Silurian rocks between the Sikanni Chief and Peace Rivers, but as yet details are poorly known." (Norford et al, 1966, p. 510)

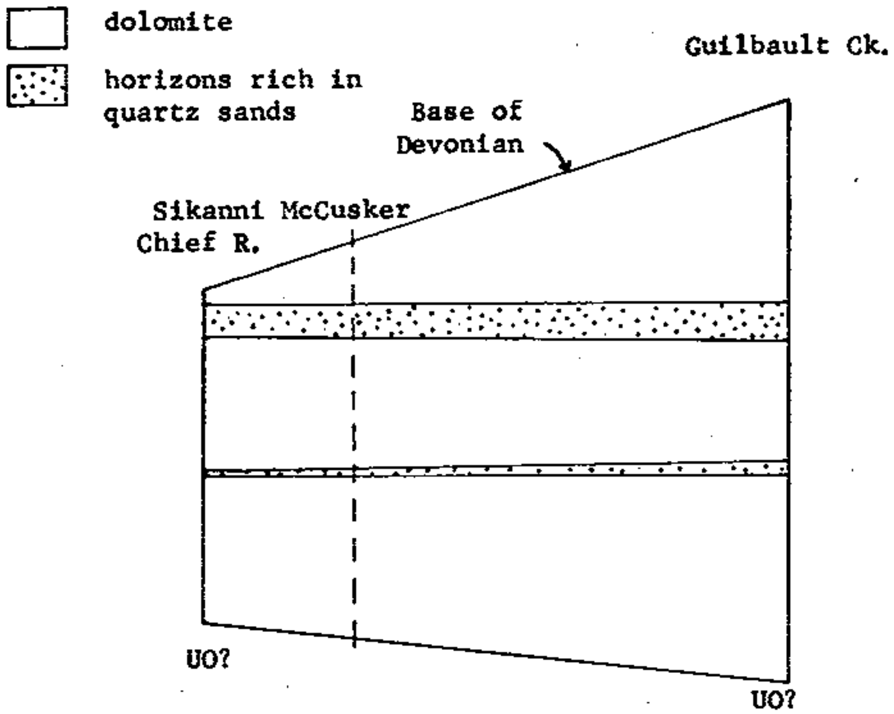


Fig. 2 Diagram showing sections of Nonda Formation

Interpolating between the two sections of Norford et al, one obtains a generalized section similar to that actually measured at Mount McCusker (Fig. 2). South of 57° 30' N, the basal unit of the Nonda Formation is a sequence of thinly bedded, platy limestones and dolomites. This may correlate with Unit 2 of the McCusker area. Units 3 to 7 probably belong to the lower Nonda, described as a sequence of recessive, dark, fossiliferous dolomites. The typical fossil assemblage of the Middle Silurian consists of Favosites, Halysites, Heliolites, Pentamerus, Thamnopora, Syringopora and Coenites, an assemblage common in the lower dolomites of the McCusker section. Biostromal beds occasionally found within the Nonda Formation are also present at McCusker. The section of the Nonda measured at the Sikanni Chief has 100 feet of dolomite rich in detrital quartz. This is represented in the McCusker area by Unit 8, which consists of 150 feet of interbedded sandstone, sandy dolomite and dolomite. The interpolated section shows approximately 200 feet of dolomite overlying the quartz rich unit. This would place the base of the Devonian below the quartzite, Unit 11. Since the last occurrence of Halysites, here used as an index fossil for the Silurian, is in the dolomites of Unit 10 there is some support for putting the Silurian-Devonian contact at the top of Unit 10.

Taylor and Mackenzie (1970) have recently revised the Devonian nomenclature for the northeastern Rocky Mountains by placing the Muncho-McConnell and the overlying Wokkpash in the Lower Devonian. The section of the Muncho-McConnell at the Sikanni Chief River consists of 850 feet of dark grey, finely crystalline dolomite with minor chert and some intercalations of shale, overlain by about 40 feet of sandy dolomite and sandstone. High spiraled gastropods, _Favosites_, _Coenites_ and ostracodes are the only fossils present, and only in minor numbers. At the Sikanni Chief, the Wokkpash is made up of light yellow-brown-weathering quartzose sandstone and impure, argillaceous dolomite succeeded by more massive cross-bedded sandstone. Further south, according to Taylor, the formation has been eroded from extensive areas during a Pre-Middle Devonian hiatus.

As described by Taylor and Mackenzie, the Muncho-McConnell Formation is only grossly similar to the dolomites and sandstones represented at Mount McCusker by units 11 to 18. The major discrepancy is the presence of a basal quartzite in the mapped area. Since Unit 11 appears to pinch out to the north it is possible that it was not present in the area studied by Taylor and Mackenzie. The absence of shale partings and chert in Unit 16 is also a departure from the normal Muncho-McConnell dolomites. The section at McCusker is similar to the lower part of the Muncho-McConnell, however, in that the dolomite is finely crystalline and only sparsely fossiliferous. The presence of an upper sandstone, Unit 18, is also typical of the lower Muncho-McConnell. Alternatively, Unit 18, being cross-bedded, may correspond to the Wokkpash Formation.

Taylor refers to the Wokkpash Formations forming a weathered step in the section profile and Pl. X, Fig. 1 shows that Unit 18 does form a distinctive notch on the mountainside.

It would seem from the comparison of the Mount McCusker section with the type sections of the Nonda, Muncho-McConnell and Wokkpash Formations, that the sedimentary sequence in the map area may belong to the Silurian and Lower Devonian, the mineralized breccia being in the Muncho-McConnell Formation. Brachipods* (Strophomena sp. and Fardenia cf. ellipsoides Stearn) collected from Unit 17 (facies equivalent of Units 12, 15, 16, 18) have been identified as a Middle to Late Silurian fauna. This would make the Lower Muncho-McConnell Middle to Late Silurian in this area.

*C.R. Stelck, Personal Communication, 1974

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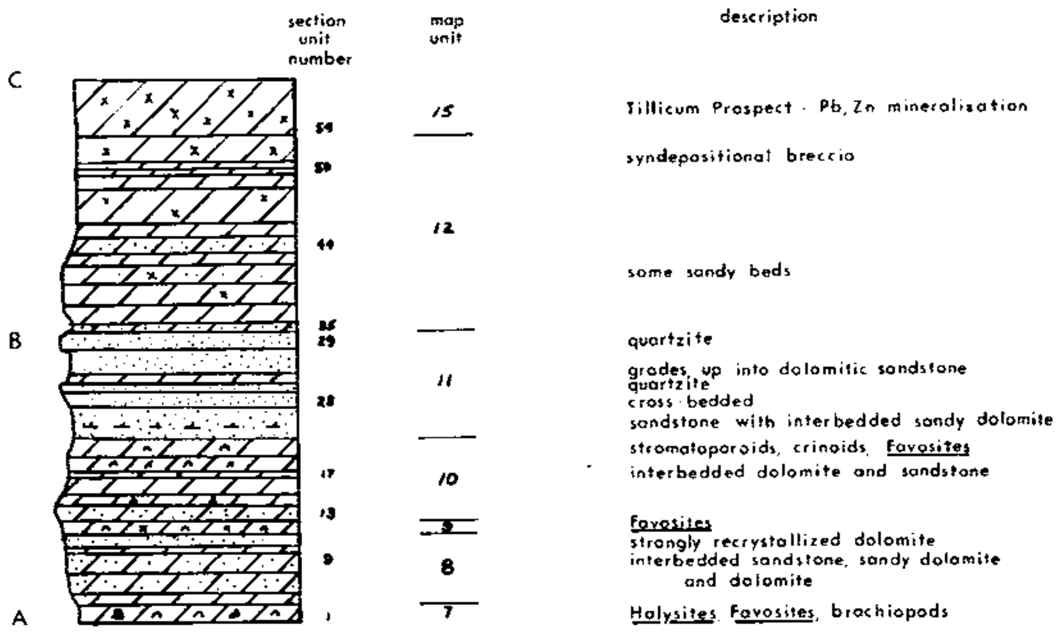
Griffin, D.L.: The Devonian Slave Point, Beaverhill Lake, and Muskwa Formations of Northeastern British Columbia and Adjacent Areas. BCDM Bull. No. 50, 1965.

Irish, E.J.W.: Halfway River Map-Area, British Columbia. G.S.C. Paper 69-11, 1970.

Norford, B.S.; Gabrielse, H.; Taylor, G.C.: Stratigraphy of Silurian Carbonate Rocks of the Rocky Mountains, Northern British Columbia. Bull. Can. Pet. Geol., Vol. 14, No. 4, 1966, P. 504-519.

Taylor, G.C. and Mackenzie, W.S.: Devonian Stratigraphy of Northeastern British Columbia. G.S.C. Bull. 186, 1970.

STRATIGRAPHIC SECTION ABC



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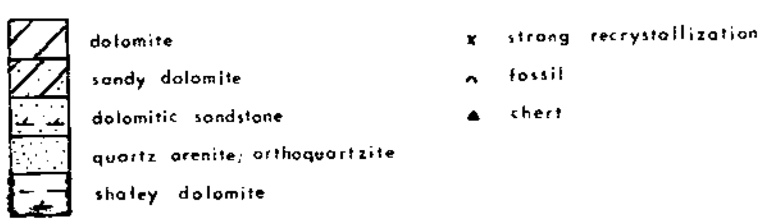
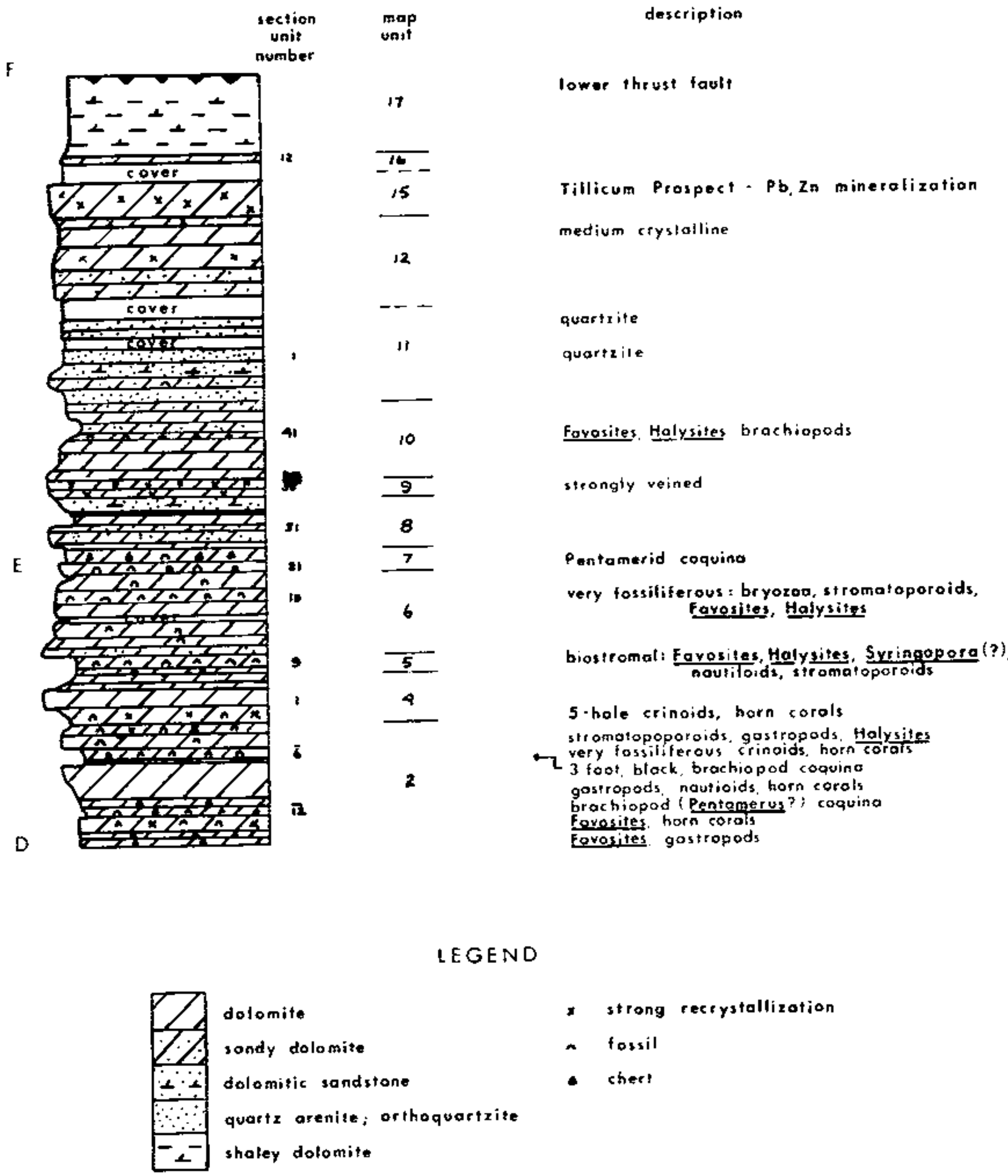
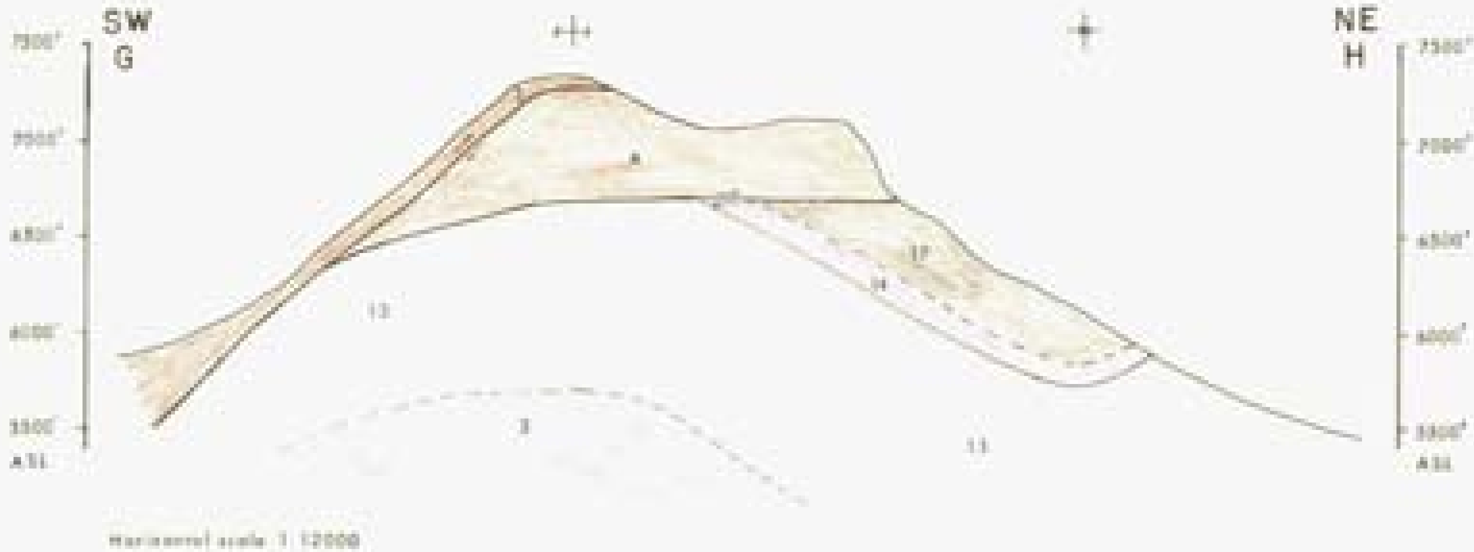


Vertical scale 1:4800

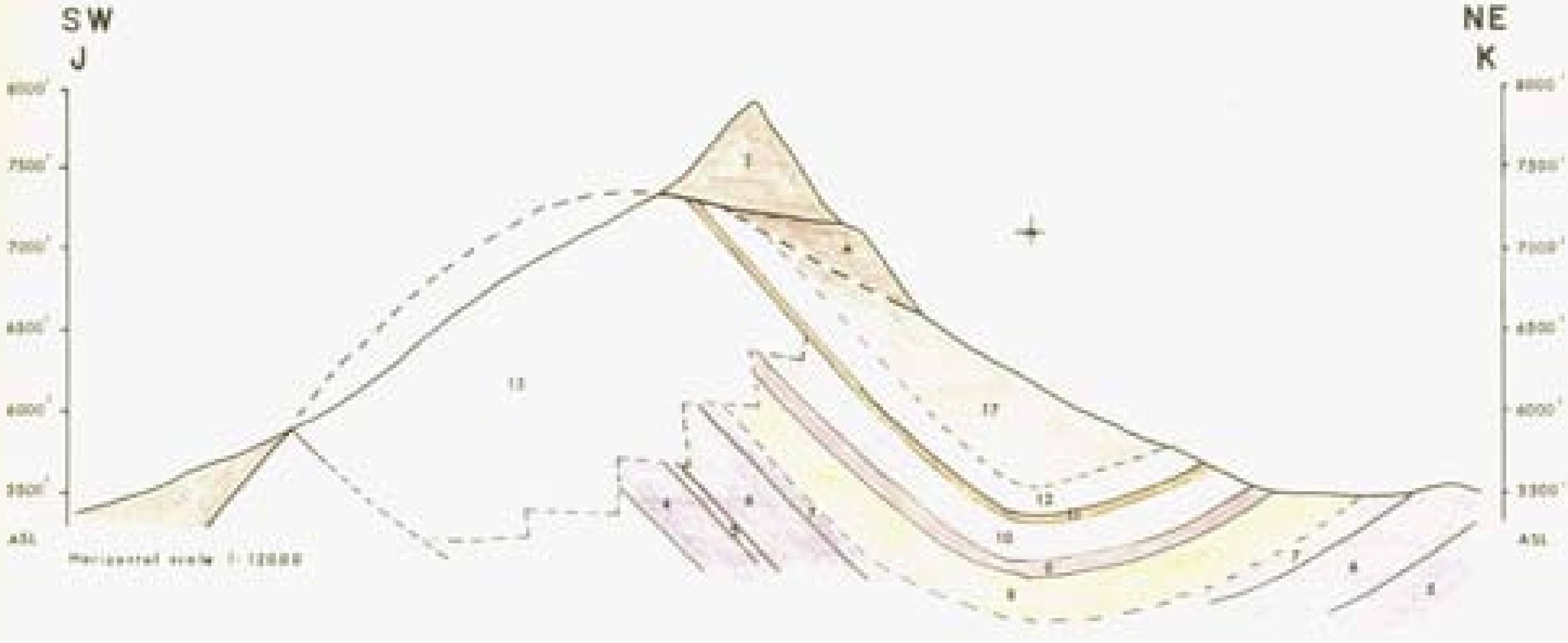
STRATIGRAPHIC SECTION DEF



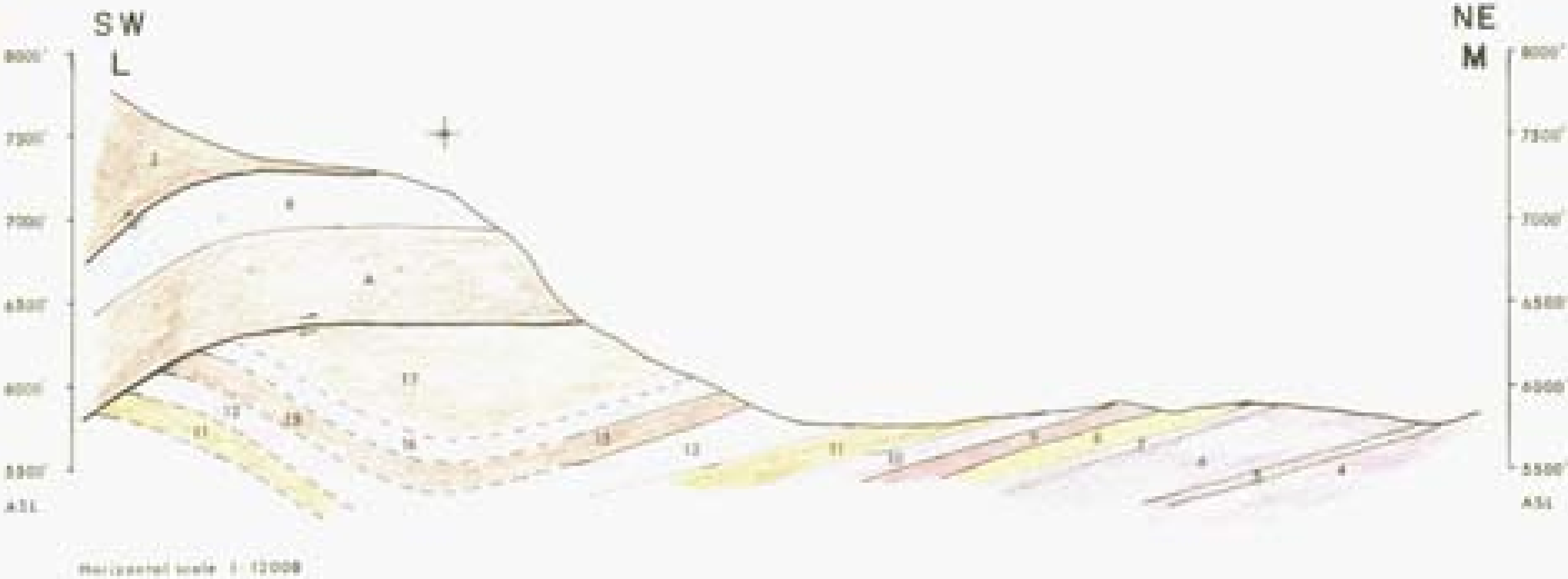
Vertical scale 1: 4800



STRATIGRAPHIC CROSS-SECTION GH



STRATIGRAPHIC CROSS-SECTION JK



STRATIGRAPHIC CROSS-SECTION LM

FIG. 1 Unit 1 showing distinctive banding resulting from crenulation cleavage.

FIG. 2 Oncolitic dolomite of Unit 3. Average size of oncolites is ½ inch.

PLATE I

FIG. 1 Fault breccia of Unit 1. Block on lower left (S) is about 2 foot wide.

FIG. 2 Fault breccia in Unit 1.

PLATE II

FIG. 1 Biostromal section of Unit 5. Note _Halysites_ (H), tabular stromatoporoid (S), colonial rugose coral (C) and chert nodule (N).

FIG. 2 Dip slope of Unit 5 showing _Syringopora_ (S) and colonial rugose coral (C).

PLATE III

FIG. 1 Light grey weathering dolomite of Unit 6. Note the thick bedding and cliff-forming nature of the unit. The staff is 5 feet long.

PLATE IV

FIG. 1 Dip slope of lower part of Unit 7 showing *Pentamerus* shells.

FIG. 2 Upper part of Unit 7 showing abundant chert nodules. Staff is graduated in feet.

PLATE V

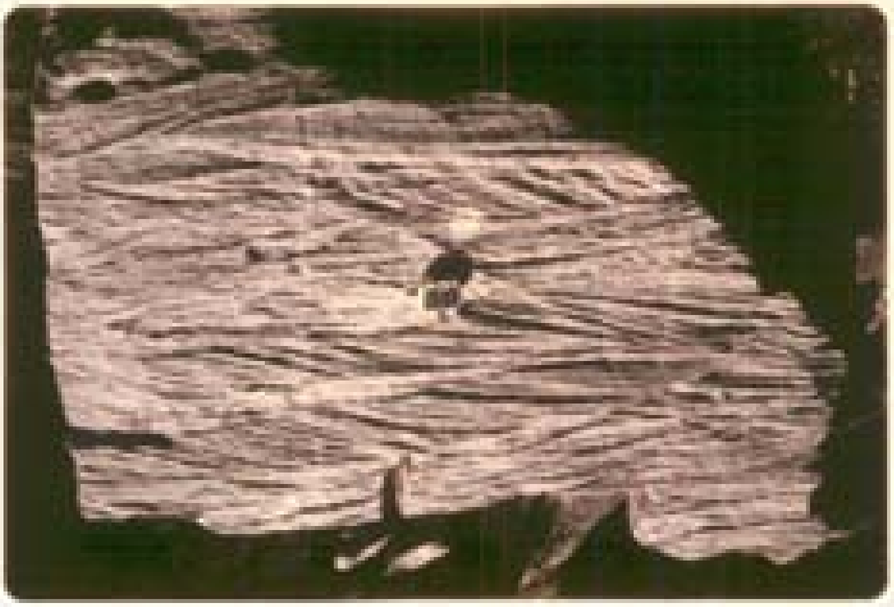


FIG. 1 Well developed cross-bedding in quartz arenite of Unit 11.

FIG. 2 Cross-bedding in Unit 11.

PLATE VI

FIG. 1 Dolomite breccia unit showing laminated fragments.

FIG. 2 Unit 15, dolomite breccia.

PLATE VII

FIG. 1 Colour banding on weathered surface of Unit A. Note that shearing has distorted bedding.

FIG. 2 Unit B, a distinctive light grey unit, truncated above by upper fault. Fault traces shown as dashed lines.

PLATE VIII

FIG. 1 Outcrop at northern end of Mount McCusker. Syncline (S) and Anticline (A) axes shown as solid lines, fault traces as dashed lines.

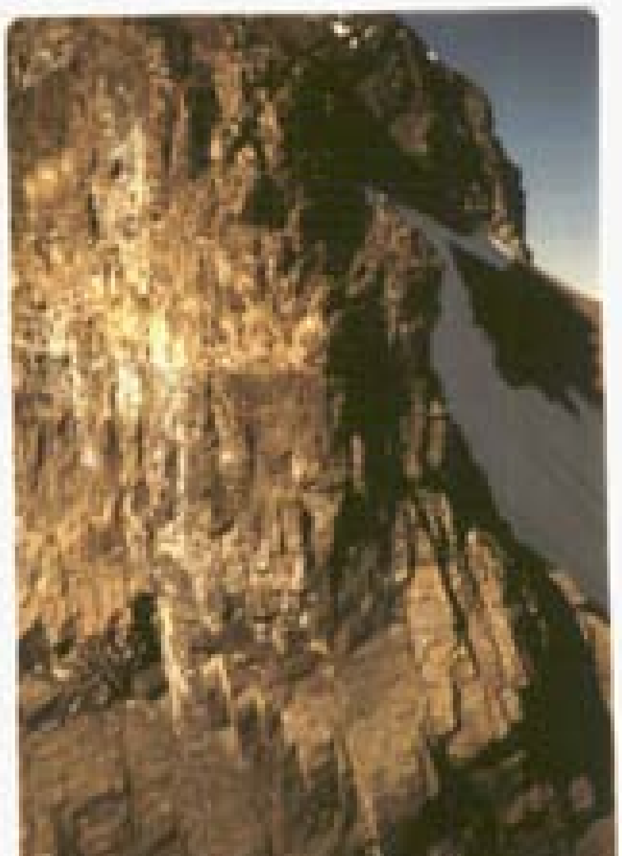


Fig. 2 Closer view of upper fault contact in Fig. 1.

PLATE IX

FIG. 1   Mount McCusker showing weathered step at Unit 18. Dashed line is lower thrust fault.

PLATE X

APPENDIX III

GEOCHEMICAL SURVEY

SAMPLING AND ASSAY PROCEDURES

The stream silt samples were collected on a spacing of approximately 500 feet along the drainages. Samples were collected in waterproof Kraft paper sample bags. The samples were air dried before being shipped to Chemex Labs Ltd. for analysis.

Rock geochemistry samples were collected in canvas or plastic bags depending on the size of the sample. The samples (in unmineralized material) were collected on a spacing of ¼ mile interval. At each sample site, chips were collected from an area 100 feet in diameter.

For the base metals and silver, sample preparation and analysis was performed by Chemex Labs. Ltd., North Vancouver, using standard geochemical procedures. The -80 mesh size fractions were digested by hot nitric/perchloric acid and read by Atomic Absorption Spectroscopy for Cu, Pb, Zn, Cd and Ag.

Laboratory procedures for the processing and analyses for calcium and magnesium was as follows:

A. PREPARATION

The samples are arranged in numerical order, then listed on assay laboratory sheets. If the rock material is dry it is first crushed in a jaw crusher, then in a cone crusher and split to an appropriate size in a Jones Riffler. The entire split portion is dried, then pulverized in a Bico-Braun revolving plate pulverizer and made to pass a 100 mesh stainless steel sieve. The screened sample is then rolled 100 times on a rolling mat and placed in a labelled assay bag.

B. ANALYSES

1. Calcium

A 0.5 gram sample is weighed on an analytical balance and digested in 6N. hydrochloric acid. It is then taken to dryness on a hot plate and baked at 120°C for one hour. After the separation of silica and iron, the calcium is precipitated as the oxalate, filtered, then titrated against standardized potassium permanganate solution.

From the titration data the concentration of calcium is calculated and reported as percent calcium oxide (%CaO).

2. Magnesium

In the magnesium determination a 0.5 gram sample is weighed into a teflon dish and treated with nitric acid, hydrofluoric acid, hydrochloric acid and perchloric acid.

The sample is then transferred into a 250 ml volumetric flask with the addition of potassium chloride as an ionization suppressant. It is finally run on the A.A.5 Atomic Absorption Spectrophotometer against prepared standards and reported as percent magnesium oxide (MgO).

APPENDIX IV

ITEMIZED MANDAYS OF WORK

ZENITH OPTION

PERSONNEL	SALARY ($/Day)	CLAIM GROUPS McCUSKER GROUP I (40 Claims)	McCUSKER GROUP II (36 Claims)	McCUSKER GROUP III (12 Claims)
PEARSON	62	6	5	1
GRIMLEY	75	.5	.5	-
WESTOLL	75	.5	.5	-
KATAYAMA	75	.5	.5	-
DICKIE	75	2	2	1
McHALE	41	23	18	5
FRASER	25	20	20	4
TORREY	20	25	21	2
SMITH	36.75	.5	.5	-
LEE	22	1	1	-
MASTERTON	23.80	6	6	4
HUBL	19.25	18	14	4
WONG	21	12	11	4
PERKINS	21	1	-	-
TOTAL PER CLAIM BLOCK		116	100	25

241 TOTAL MAN DAYS

APPENDIX V

CONSOLIDATED DECLARATION OF COSTS

McCUSKER NO. I, II AND III CLAIM GROUPS

	CLAIM GROUPS		
EXPENSES	McCUSKER GROUP I (40 Claims)	McCUSKER GROUP II (36 Claims)	McCUSKER GROUP III (12 Claims)
WAGES & BOARD	$ 5,092.44	$ 4,336.59	$ 1,108.86
HELICOPTER COSTS	5,654.15	5.044.76	1,212.76
GEOCHEMICAL ANALYSIS	1,288.61	1,200.00	500.00
REPORT PREPARATION	1,300.00	1,100.00	300.00
TOTALS	$13,335.20	$11,681.63	$ 3,121.62

Declared before me at the City
Vancouver , in the
Province of British Columbia, this 7th
of February, 1972 , A.D.

Sub-mining Recorder
A Commissioner for taking Affidavits within British Columbia
A Notary Public in and for the Province of British Columbia

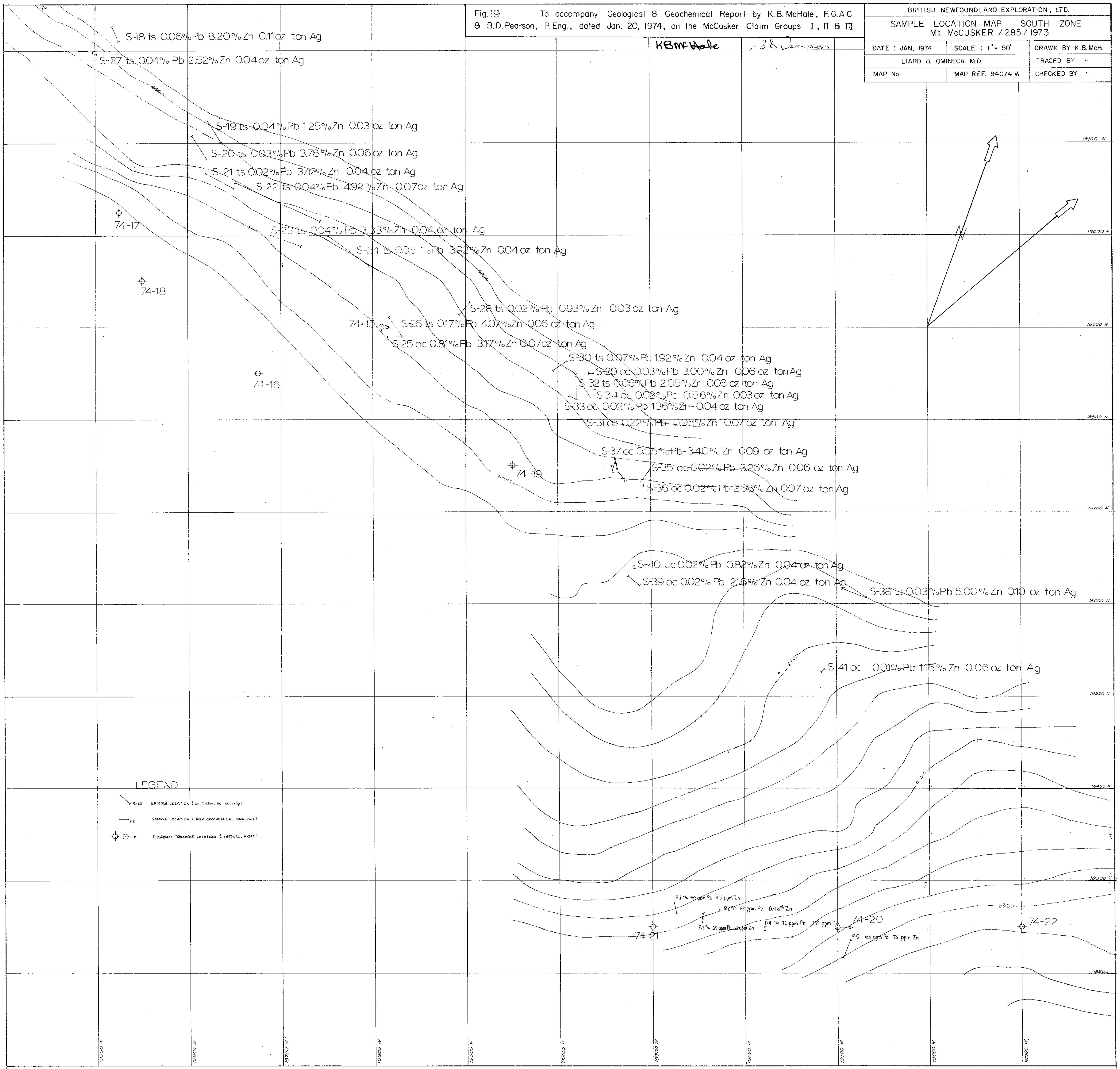


Fig.19 To accompany Geological & Geochemical Report by K.B. McHale, F.G.A.C. & B.D. Pearson, P. Eng., dated Jan. 20, 1974, on the McCusker Claim Groups I, II & III.
KBMcHale
B.D. Pearson
BRITISH NEWFOUNDLAND EXPLORATION, LTD.
SAMPLE LOCATION MAP SOUTH ZONE
Mt. McCUSKER / 285 / 1973
DATE : JAN. 1974
SCALE : 1" = 50'
DRAWN BY K.B.McH.
LIARD & OMINECA M.D.
TRACED BY "
MAP No.
MAP REF. 94G/4 W
CHECKED BY "
S-18 ts 0.06% Pb 8.20% Zn 0.11 oz ton Ag
S-27 ts 0.04% Pb 2.52% Zn 0.04 oz ton Ag
S-19 ts 0.04% Pb 1.25% Zn 0.03 oz ton Ag
S-20 ts 0.03% Pb 3.78% Zn 0.06 oz ton Ag
S-21 ts 0.02% Pb 3.42% Zn 0.04 oz ton Ag
S-22 ts 0.04% Pb 4.92% Zn 0.07 oz ton Ag
S-23 ts 0.04% Pb 3.33% Zn 0.04 oz ton Ag
S-24 ts 0.06 % Pb 3.92% Zn 0.04 oz ton Ag
S-28 ts 0.02% Pb 0.93% Zn 0.03 oz ton Ag
S-26 ts 0.17% Pb 4.07% Zn 0.06 oz ton Ag
S-25 oc 0.81% Pb 3.17% Zn 0.07 oz ton Ag
S-30 ts 0.07% Pb 1.92% Zn 0.04 oz ton Ag
S-29 oc 0.03% Pb 3.00% Zn 0.06 oz ton Ag
S-32 ts 0.06% Pb 2.05% Zn 0.06 oz ton Ag
S-34 oc 0.02% Pb 0.56% Zn 0.03 oz ton Ag
S-33 oc 0.02% Pb 1.36% Zn 0.04 oz ton Ag
S-31 oc 0.22% Pb 0.95% Zn 0.07 oz ton Ag
S-37 oc 0.05% Pb 3.40% Zn 0.09 oz ton Ag
S-35 oc 0.02% Pb 3.26% Zn 0.06 oz ton Ag
S-36 oc 0.02% Pb 2.08% Zn 0.07 oz ton Ag
S-40 oc 0.02% Pb 0.82% Zn 0.04 oz ton Ag
S-39 oc 0.02% Pb 2.16% Zn 0.04 oz ton Ag
S-38 ts 0.03% Pb 5.00% Zn 0.10 oz ton Ag
S-41 oc 0.01% Pb 1.15% Zn 0.06 oz ton Ag
P-1 % 40 ppm Pb 45 ppm Zn
P-2 % 62 ppm Pb 0.46% Zn
P-3 % 39 ppm Pb 65 ppm Zn
P-4 % 72 ppm Pb 155 ppm Zn
P-5 65 ppm Pb 75 ppm Zn
74-17
74-18
74-16
74-15
74-19
74-21
74-20
74-22
N
19100 N
19000 N
18900 N
18800 N
18700 N
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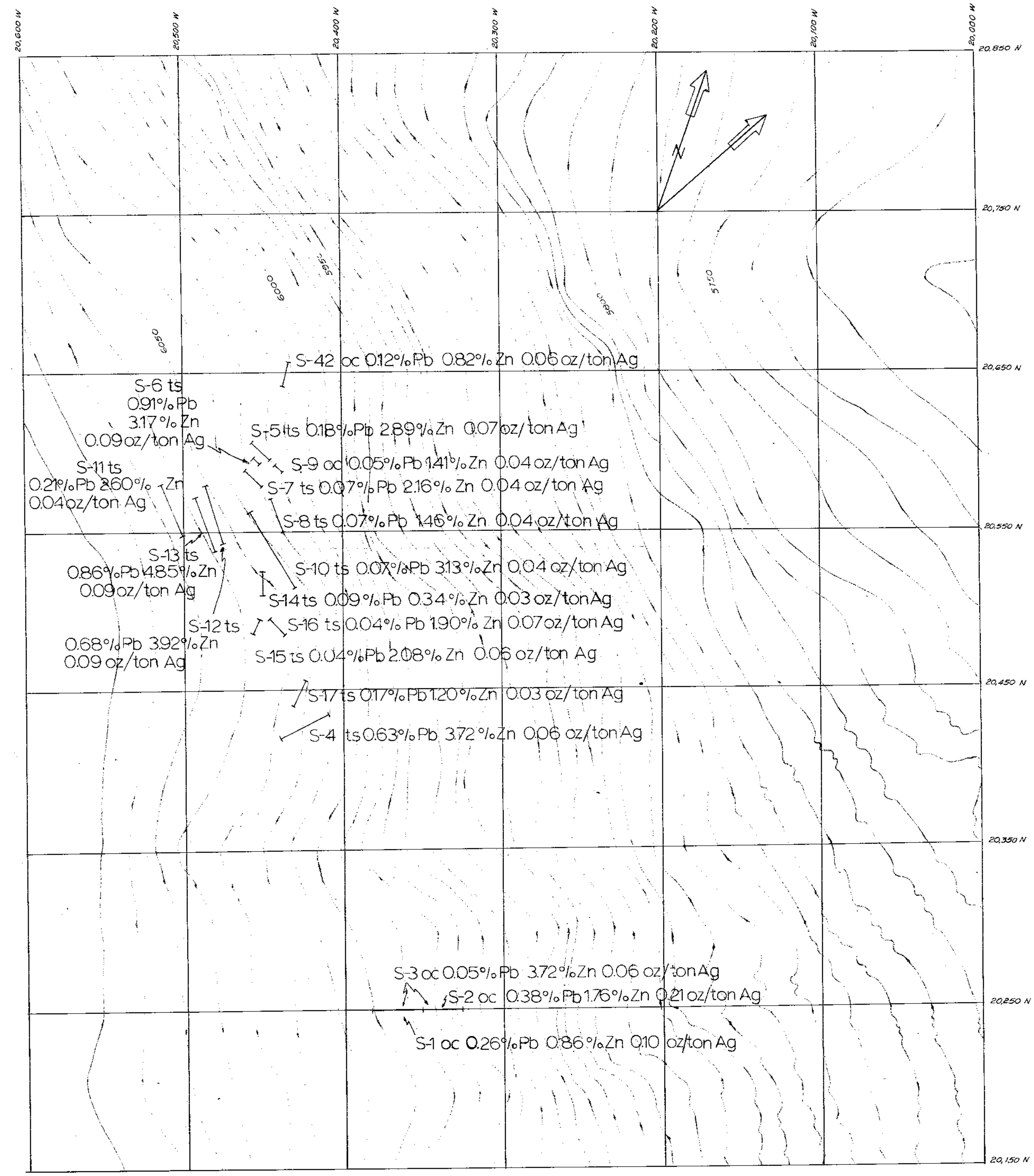
18300 N
18200 N
19900 W
19800 W
19700 W
19600 W
19500 W
19400 W
19300 W
19200 W
19100 W
19000 W
18900 W
6800
LEGEND
S-23 SAMPLE LOCATION (ts talus, oc outcrop)
P2 SAMPLE LOCATION (ROCK GEOCHEMICAL ANALYSIS)
PROPOSED DRILLHOLE LOCATION (VERTICAL, ANGLE)



LEGEND

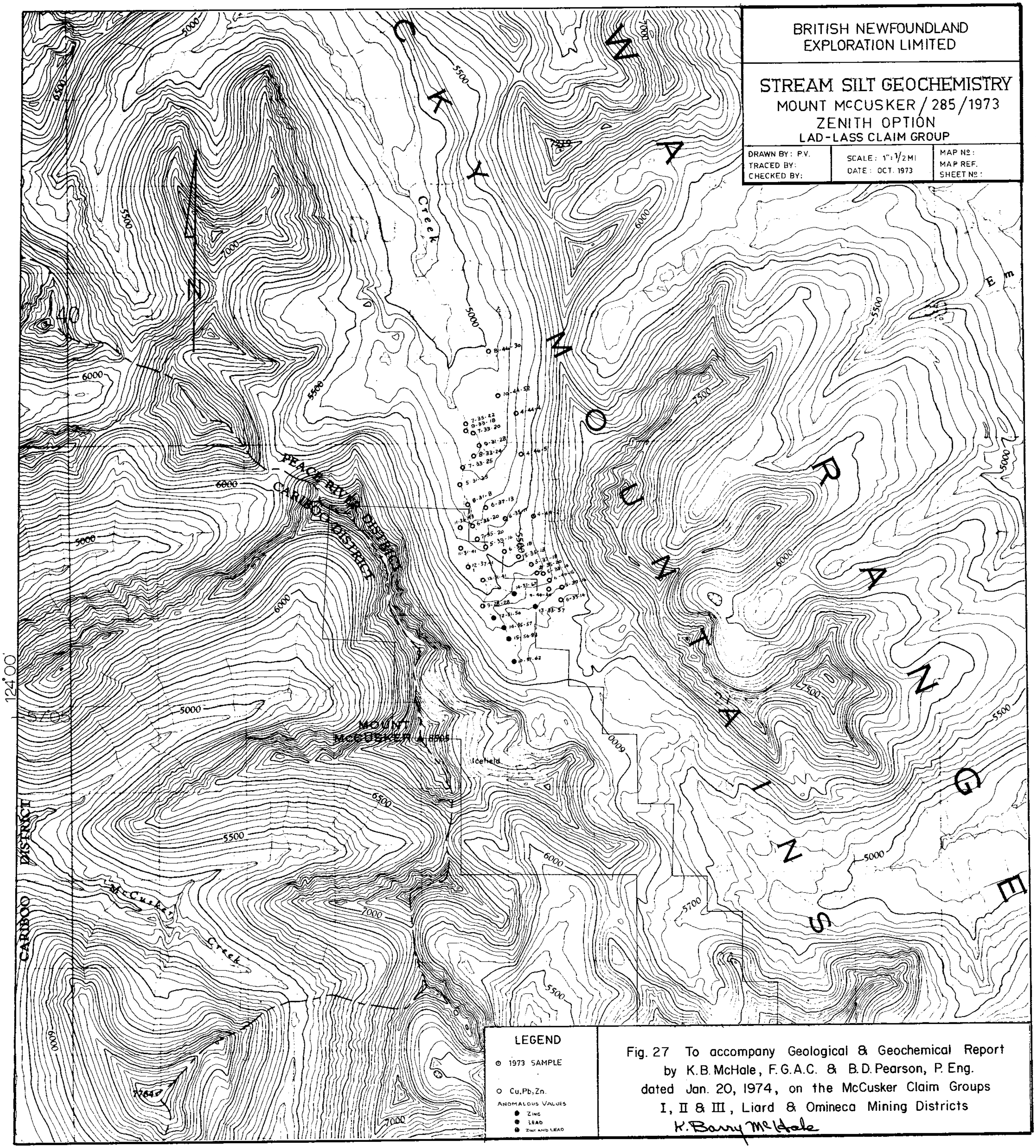
T/S Talus Chip Sample
O/C Outcrop Chip Sample
S-10 Sample Number

K.B. McHale
B.D. Pearson

BRITISH NEWFOUNDLAND EXPLORATION, LTD.		
SAMPLE LOCATION MAP : NORTH ZONE Mt. McCUSKER / 285 / 1973		
DATE : JAN. 1974	SCALE : 1" = 50'	DRAWN BY K.B.McH.
LIARD & OMINECA M.D.		TRACED BY "
MAP No.	MAP REF. 94G/4W	CHECKED BY "

Fig. 18 To accompany Geological & Geochemical Report by K.B. McHale, F.G.A.C. & B.D. Pearson, P.Eng., dated Jan. 20, 1974, on the McCusker Claim Groups I, II & III.


LEGEND
interbedded calcareous shale and siltstone, dark brown weathering
micritic limestone, dark grey, fossiliferous
calcareous shale, banded black and brown weathering, sheared
medium grained arenite with dolomite cement
clay to fine dolomite, buff weathering, occasional fossiliferous bed
dolomite breccia, intermittent Pb, Zn mineralization dolomite
medium to coarse grained quartz arenite, orthoquartzite, dolomite
weak dolomite breccia, light grey weathering
dolomite, sandy dolomite, arenite, minor fossil content
fine dolomite, light grey weathering, fossils common
thick bedded fine dolomite, grey weathering, minor crinoids
Facies Equivalents
dolomitic shale, shaley dolomite, fossiliferous
thin bedded silty dolomite, buff weathering
7000
5000
6000
5500
6500
5700
8505
Icefield
Creek
Fig 33 To accompany Geological & Geochemical Report by K.B. McHale, F.G.A.C. & B.D. Pearson, P.Eng., dated Jan 20, 1974, on the McCusker Claim Groups I, II & III, Liard & Omineca Mining Districts
K.B. McHale
BRITISH NEWFOUNDLAND EXPLORATION LIMITED
GEOLOGY
MOUNT McCUSKER / 285 / 1973
ZENITH OPTION (Lad-Lass Claim Group)
DATE
AUGUST, 1973
SCALE 1:12000
MAP NO
MAP REF
1:50,000 94G/4W
DRAWN BY: MF
TRACED BY: MF
CHECKED BY: BP



BRITISH NEWFOUNDLAND EXPLORATION LIMITED

STREAM SILT GEOCHEMISTRY
MOUNT McCUSKER / 285 / 1973
ZENITH OPTION
LAD-LASS CLAIM GROUP

DRAWN BY: P.V. TRACED BY: CHECKED BY:	SCALE: 1":1/2 MI DATE: OCT. 1973	MAP No: MAP REF. SHEET No:

LEGEND

- 1973 SAMPLE
- Cu, Pb, Zn.
- ANOMALOUS VALUES
  - ZINC
  - LEAD
  - ZINC AND LEAD

Fig. 27 To accompany Geological & Geochemical Report by K.B. McHale, F.G.A.C. & B.D. Pearson, P. Eng. dated Jan. 20, 1974, on the McCusker Claim Groups I, II & III, Liard & Omineca Mining Districts

K. Barry McHale

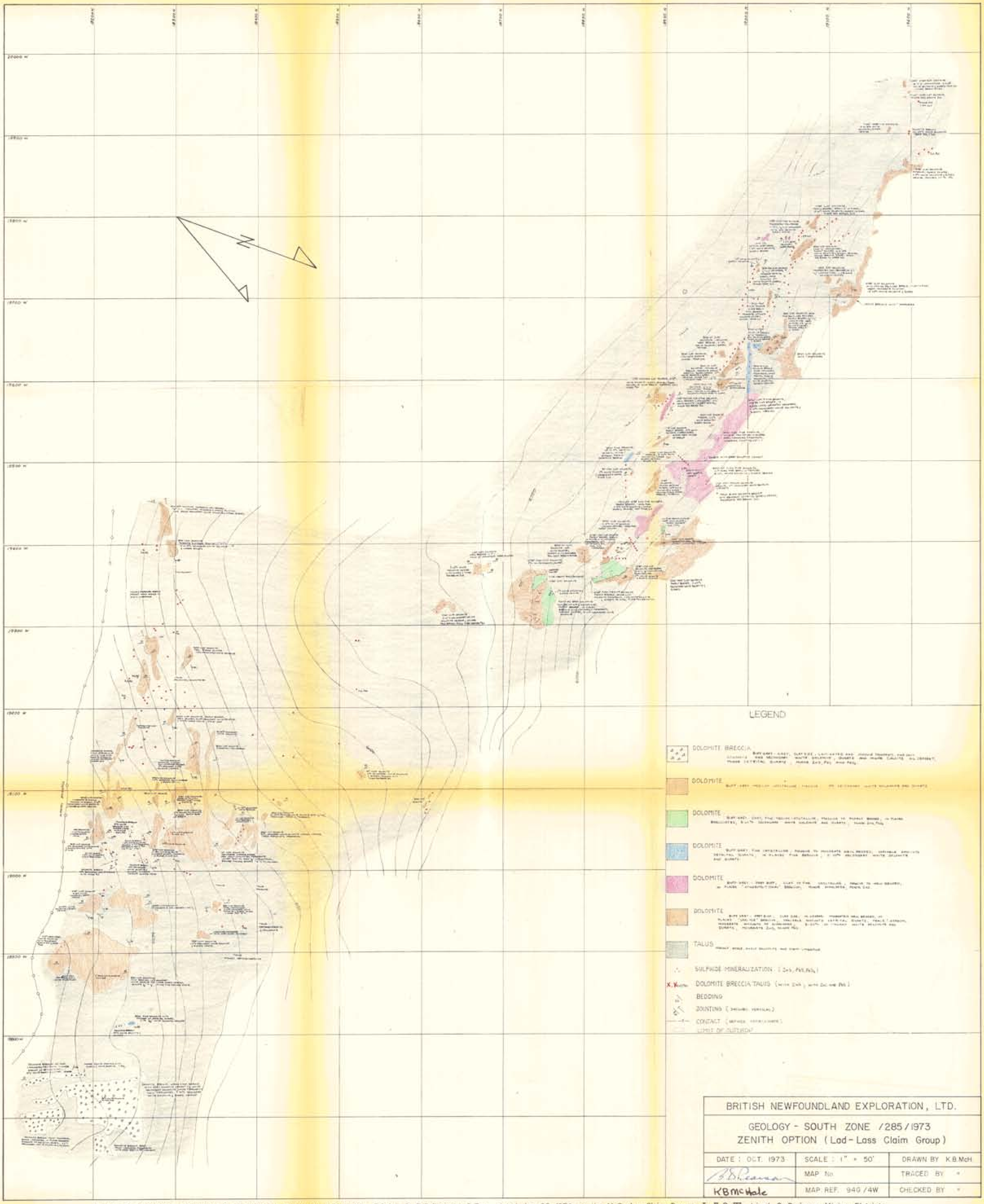


Fig.12 To accompany Geological & Geochemical Report by K.B. McHale, F.G.A.C. & B.D. Pearson, P.Eng., dated Jan. 20, 1974, on the McCusker Claim Groups I, II & III, Liard & Omineca Mining Districts.

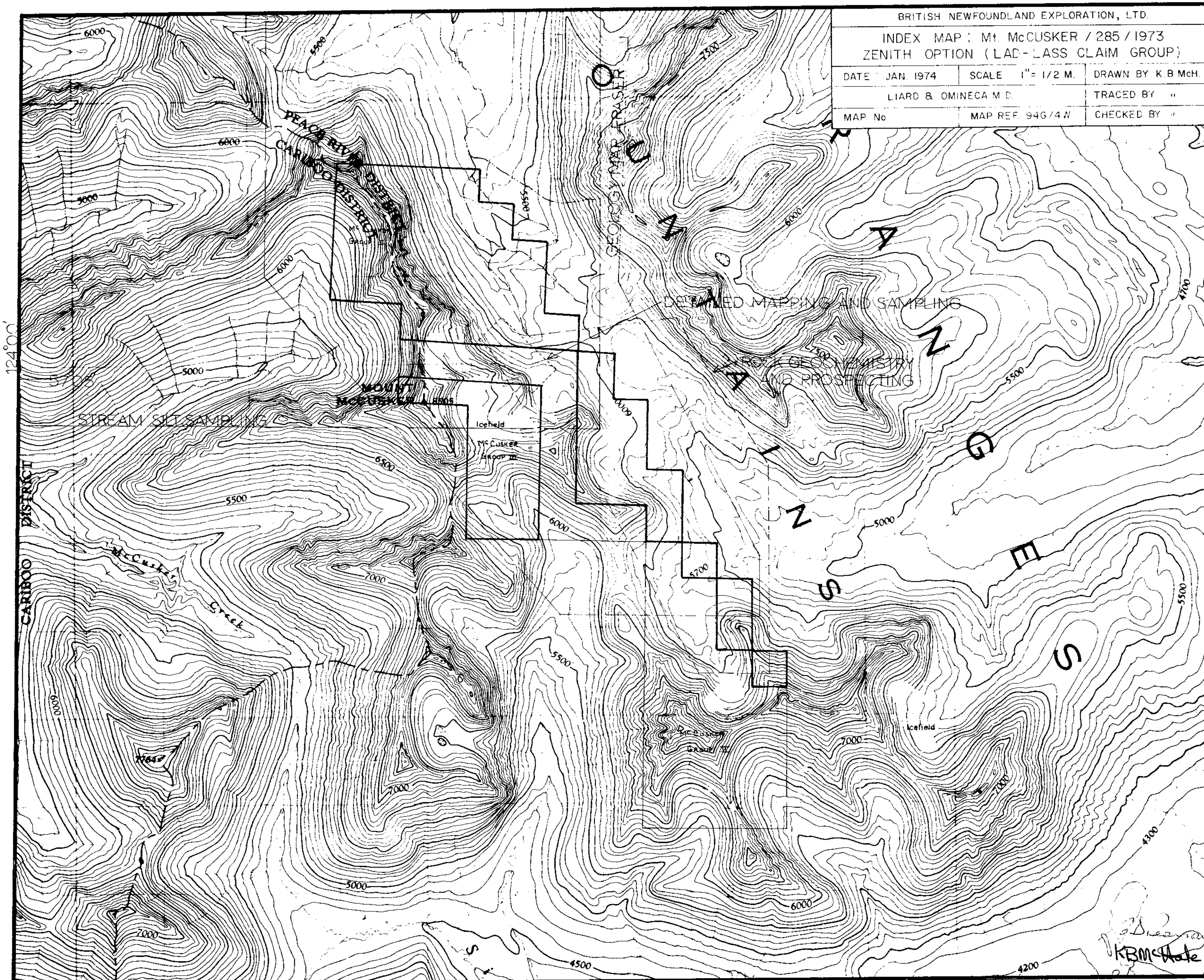
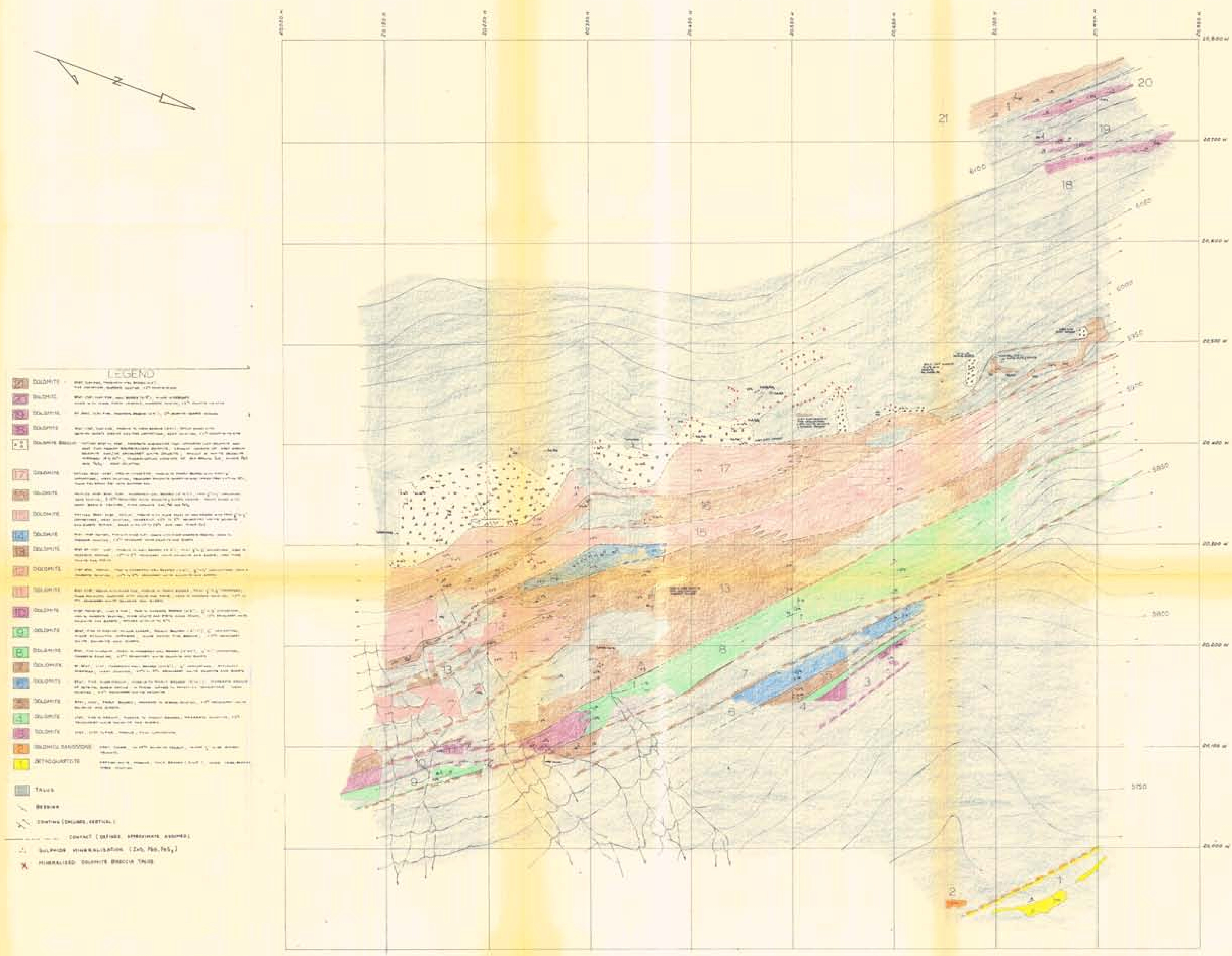
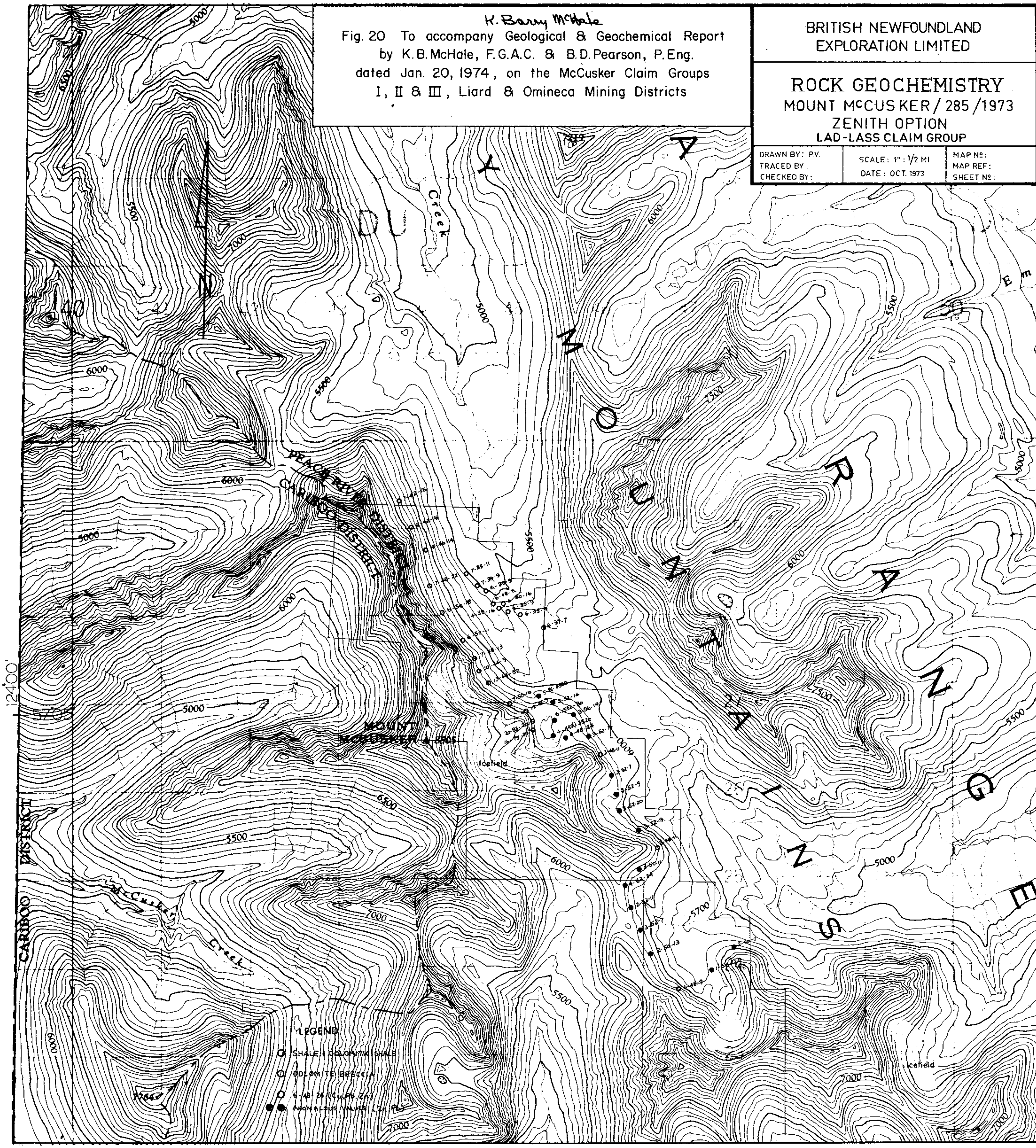


Fig. 4 To accompany Geological & Geochemical Report by K.B. McHale, F.G.A.C. & B.D. Pearson, P.Eng., dated Jan. 20, 1974, on the McCusker Claim Groups I, II & III.



BRITISH NEWFOUNDLAND EXPLORATION, LTD.		
GEOLOGY - NORTH ZONE /285/1973 ZENITH OPTION (Lad - Lass Claim Group)		
DATE: OCT. 1973	SCALE: 1" = 50'	DRAWN BY K.B.McH.
K.B. McHale	MAP No.	TRACED BY "
B.D. Pearson	MAP REF. 94G/4W	CHECKED BY "

Fig. 5 To accompany Geological & Geochemical Report by K.B. McHale, F.G.A.C. & B.D. Pearson, P.Eng., dated Jan. 20, 1974, on the McCusker Claim Groups I, II & III, Liard & Omineca Mining Districts.


K. Barry McHale
Fig. 20 To accompany Geological & Geochemical Report
by K.B.McHale, F.G.A.C. & B.D.Pearson, P.Eng.
dated Jan. 20, 1974, on the McCusker Claim Groups
I, II & III, Liard & Omineca Mining Districts
BRITISH NEWFOUNDLAND
EXPLORATION LIMITED
ROCK GEOCHEMISTRY
MOUNT McCUSKER / 285 / 1973
ZENITH OPTION
LAD-LASS CLAIM GROUP
DRAWN BY: P.V.
TRACED BY:
CHECKED BY:
SCALE: 1" : 1/2 MI
DATE: OCT. 1973
MAP No:
MAP REF:
SHEET No:
DUNLEVY
MOUNTAINS
MURRAY RANGE
Creek
PEACE RIVER DISTRICT
CARIBOO DISTRICT
MOUNT McCUSKER
Icefield
McCusker Creek
LEGEND
SHALE & DOLOMITIC SHALE
DOLOMITE BRECCIA
ANOMALOUS VALUES
5000
5500
6000
6500
7000
7300
5700