Office Copy

811892

GEOLOGICAL REPORT

DEASE LAKE COAL EXPLORATION, 1977

N. T. S. 104 J

Lat. 58° 20' Long. 130° 50'

by

T. Mould

for

104 J

CYPRUS ANVIL MINING CORPORATION

October 19, 1977.

GEOLOGICAL REPORT

DEASE LAKE COAL EXPLORATION, 1977

Liard Mining District

British Columbia

N. T. S. 104 J

Latitude: 58° 20'

Longitude: 130° 50'

By

T. Mould

for

CYPRUS ANVIL MINING CORPORATION

October 19, 1977

TABLE OF CONTENTS

GEOLOGICAL REPORT

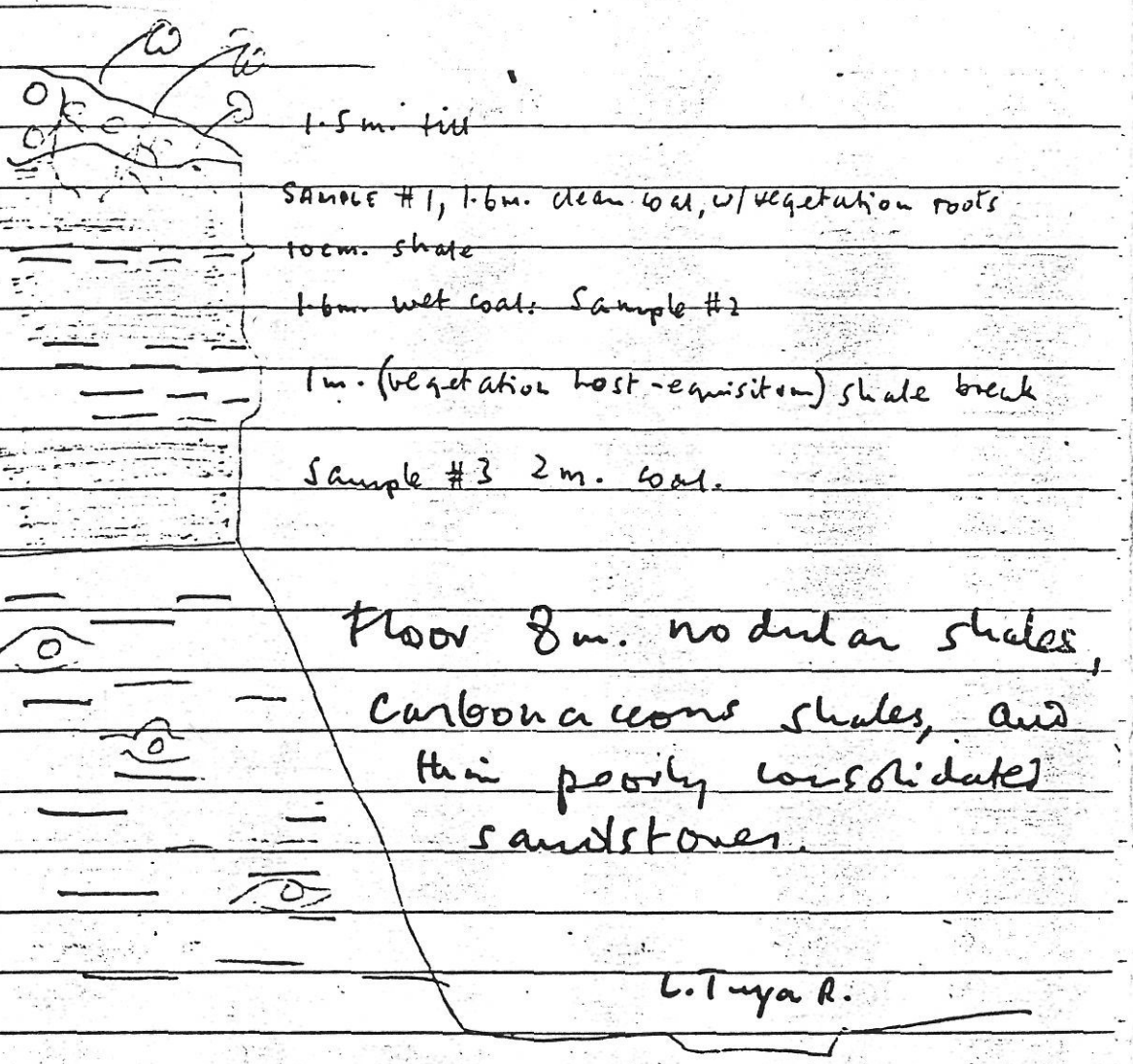
DEASE LAKE COAL EXPLORATION, 1977.

INTRODUCTION

In May/early June 1977 a program of geological exploration was presented by the writer to the officers of Cyprus Anvil Mining Corporation. It was proposed to spend 2 - 3 months in the Dease Lake - Telegraph Creek areas of Northern British Columbia exploring primarily for coal deposits, and if time permitted mineral exploration. The coal seams had been reported on in 1904; this report made the area look attractive - 2 seams 26' and 38' of good thermal grade. One June 25, Dave Samila, pilot for Yukon Airways, Dease Lake, the writer, his partner F. Shigezawa and the local Indian guide, Willie Brown, carried out an aerial reconnaissance of the area in a fixed wing.

COAL

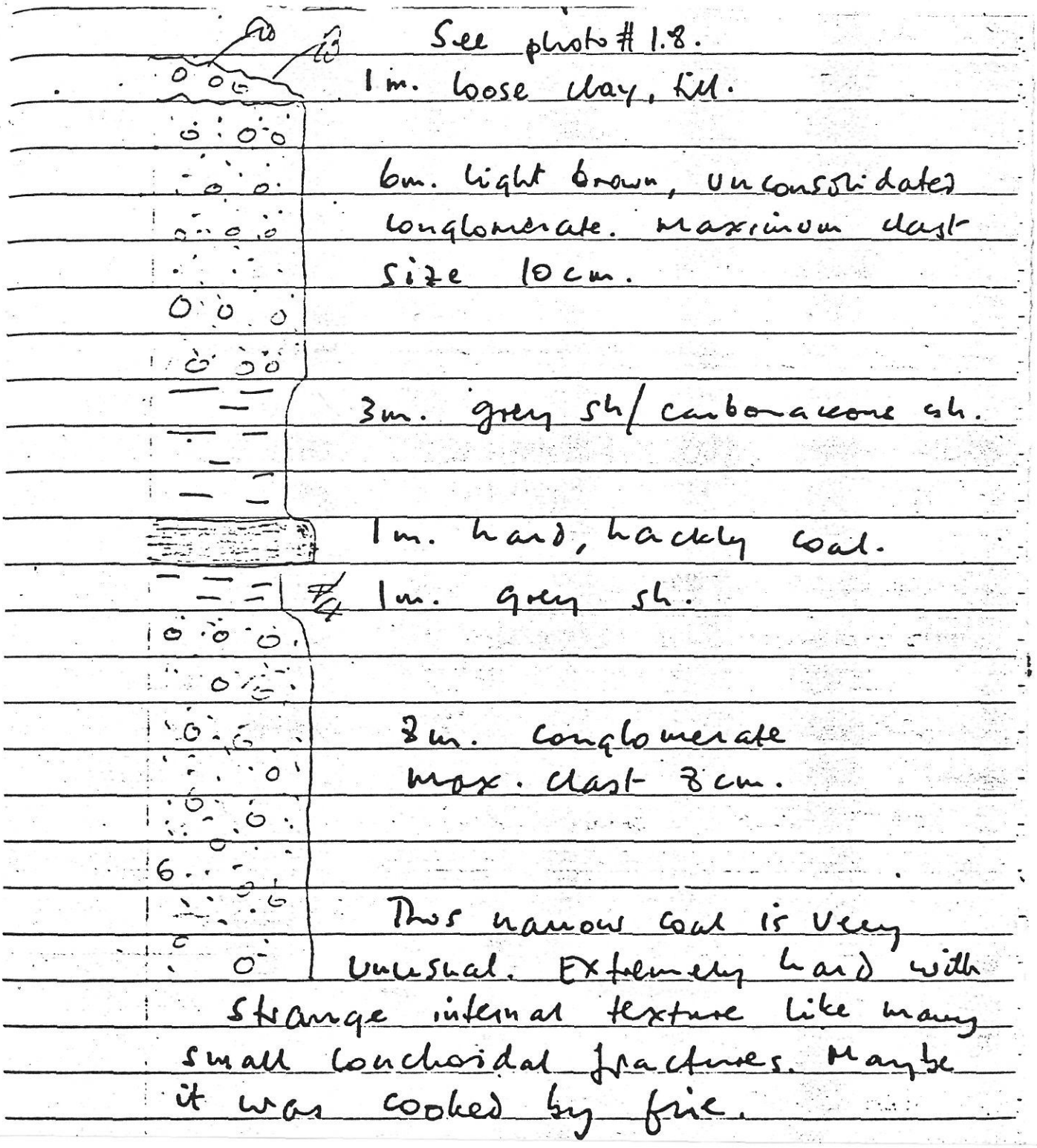
On the Little Tuya River a 5.2m coal seam exposed in the river bank was mapped and sampled. See photos #1.7, 1.6.



For location See enclosed map.

An overturned fold near the top of the coal suggets thrusting from the west, and maybe the thickness is increased by 0.6m. The seam is covered with drift and vegetation, so we are looking at a diminished thickness, due to erosion and glaciation. The attitude is flat to rolling. Burning coal on campfire gave about 10% ash.

On the north bank of Little Tuya River at its confluence with the Tuya River a thin unusual "canol" coal was noted - sample #4.



On Mansfield Creek within 2 kms. of its confluence with Little Tuya River 2 major seams 8m and 11m thick were mapped and sampled. See sections enclosed. The seams and their associated sediments were mixed with basalt flows and crossed by trap dykes probably synchronous with the activity of the adjacent shield volcanoes, Level Mountains and the Edziza complex to the immediate west and east. Significantly natural coke was found in the creeks. It is remarkable that with the poor outcrop along Mansfield Creek, (perhaps $<$15%) most exposures have coal in them. Perhaps there is more coal in this basin than meets the eye. Structurally its hard to say whats going on. There could be repetitions due to thrusting, and there is certainly later small scale block faulting probably dating back to vulcanism and recent uplift of the area, which also created the spectacular river canyons. Attitudes are recorded on the sections. One good strike attitude can be seen on air photos though this may be a dyke, it is 32^{0} E of N. The general attitudes suggest that the coal should be striking into the topographic low area of Mincho Lake and on Grassy Creek. This latter creek gave a section of distorted lacustrine shales, with no coals. Coal is again picked up in Hartz and Beatty Creeks to the southwest and east. These seams are contorted and inaccessible.

Coals worthy of little more than mention were visited on Matsatu Creek - NW Level Mountains, and Nahlin River. They are thin, slickensided, and very dirty (shaley), and of no economic interest.

In summary: the area between and adjacent to Little Tuya River and Mansfield Creek is of economic interest - depending on assays.

All other areas of outcrop of Unit 15 - the coal age sections coloured yellow on the accompanying G.S.C. map "Operation Stikine 1957", were explored by the writer. No coal was found.

In the area of Helveker and Kirk Mountains south of Telegraph, Unit 15 was composed of thick (1500m) slices of coarse conglomerates derived from underlying triassic volcanics. The multi-coloured ash tuffs and sombre hued intermediate flows contained sparse copper mineralization disseminated through the rocks and along fractures.

The sections of trachyte, pantellerite and comendite domes, vents, and tephra on Level Mountain were studied. These contain unknown amounts of rare earths, with a radiation count of 200 x background. The underlying coal sediments could be uraniferous.

In September Bill Storie's claims near Cassiar were visited by the writer. This is a complex area of Ag, Pb, Zn, Cu, Mo mineralization and would require study by an expert.

A 360 oz Ag/Pb/Zn find in Caribou Mountains was visited in October. Extent unknown. Snow closed the season.

Respectfully submitted,

Tony Mould

October 19, 1977

DEASE LAKE

CASSIAR DISTRICT

BRITISH COLUMBIA

Scale 1:250,000 Échelle

Miles 5 0 5 10 15 20 Miles

Kilometres 5 0 5 10 15 20 25 30 Kilomètres

CONTOUR INTERVAL 500 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1927
Transverse Mercator Projection

Copies may be obtained from the Map Distribution Office, Department of Energy, Mines and Resources, Ottawa.

ÉQUIDISTANCE DES COURBES 500 PIEDS
Élévations en pieds au-dessus du niveau moyen de la mer
Système de référence géodésique nord-américain,1927
Projection transverse de Mercator

Ces cartes sont en vente au Bureau de distribution des cartes, ministère de l'Énergie, des Mines et des Ressources, Ottawa.

Produced, 1969, by the SURVEYS AND MAPPING BRANCH, DEPARTMENT OF ENERGY, MINES AND RESOURCES.
Printed 1971

Magnetic declination 1969 varies from 29°22' easterly at centre of west edge to 29°26' easterly at centre of east edge. Mean annual change 4.3' westerly.

Roads:
loose or stabilized surface, all weather..... 2 lanes or more / less than 2 lanes
loose surface, dry weather.....

FOR COMPLETE REFERENCE SEE REVERSE SIDE

Établie en 1969, par la DIRECTION DES LEVÉS ET DE LA CARTOGRAPHIE, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES. Imprimée en 1971

La déclinaison magnétique pour 1969 varie de 29°22' est au centre de la limite Ouest à 29°26' est au centre de la limite Est. Variation moyenne annuelle 4.3' Ouest.

Routes:
gravier aggloméré, toute saison..... 2 voies ou plus / moins de 2 voies
de gravier période sèche.....

POUR UNE LISTE COMPLÈTE DES SIGNES, VOIR AU VERSO

RELIABILITY DIAGRAM - CROQUIS D'EXACTITUDE

A. Second edition map, derived from large scale mapping.

A. Deuxième édition, tirée de cartographie à grande échelle.

Refer to this map as: 104 J EDITION 2 MCE SERIES A 502

CONVERSION SCALE FOR ELEVATIONS
Metres / Feet

TEN THOUSAND METRE
UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 9

GRID ZONE DESIGNATION	100,000 M. SQUARE IDENTIFICATION
9V	UR VR / UQ VQ

EXAMPLE OF METHOD USED TO GIVE A REFERENCE TO NEAREST 1000 METRES
THE FOLLOWING GRID REFERENCE IS A SAMPLE ONLY AND DOES NOT REFER TO A POINT ON THIS MAP

REFERENCE POINT	ROCKS (as above)
SQUARE: Read letters of 100,000 m. square	NU
EASTING: Read number on grid line immediately to left of point. Estimate tenths of a square from this line eastward to point.	54
NORTHING: Read number on grid line immediately below point. Estimate tenths of a square from this line northward to point.	04
EXAMPLE MILITARY GRID REFERENCE	NU5404
If reporting beyond 18° in any direction, prefix Grid Zone Designation as:	15VNU5404

inches / centimetres

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

Index to adjoining Maps of National Topographic System
Tableau d'assemblage du Système National de Référence Cartographique

DEASE LAKE
104 J
EDITION 2

TO ACCOMPANY REPORT BY T. MOULD 1977

PRELIMINARY SERIES

LEGEND

SEDIMENTARY AND VOLCANIC ROCKS

CENOZOIC

QUATERNARY
RECENT

- **20** Unconsolidated glacial and fluvial clay, silt, sand, gravel; till; peat, muskeg
- **19** Tufa, hot spring deposits
- **18** Olivine basalt, ash, cinders

TERTIARY
PLEISTOCENE AND (?) EARLIER

- **17** Basalt, rhyolite, ash, tuff, agglomerate; locally may include 16; 17a, rhyolite, pisolitic siliceous tuff, chalcedonic rhyolite breccia

EOCENE

- **16** Basalt, rhyolite and associated volcanic rocks; minor conglomerate, sandstone, shale

CRETACEOUS AND TERTIARY
UPPER CRETACEOUS AND PALEOCENE

- **15** Conglomerate, sandstone, shale, minor coal

MESOZOIC

CRETACEOUS
POST LOWER CRETACEOUS

- **14** Volcanic rocks, breccia

JURASSIC AND CRETACEOUS
UPPER JURASSIC AND LOWER CRETACEOUS

- **12** Argillite, greywacke, conglomerate, coal; 12a, andesite, chert, tuff, conglomerate, shale, greywacke

CRETACEOUS AND /OR EARLIER
PRE UPPER CRETACEOUS

- **13** Mainly volcanic rocks; minor conglomerate, greywacke; chert, argillite

JURASSIC
LOWER AND MIDDLE JURASSIC

- **11** Conglomerate, greywacke, grit, siltstone, shale; 11a, may include younger rocks

TRIASSIC

- **8** Tuff, siltstone, limestone, conglomerate, breccia

PERMIAN AND/OR TRIASSIC

- **7** 7, Volcanic and sedimentary rocks undivided; 7a, mainly andesitic and basaltic volcanic rocks; flows, breccia, tuff breccia, tuff; 7b, mainly greywacke, siltstone, conglomerate; 7c, mainly limestone

JURASSIC AND /OR EARLIER
PRE UPPER JURASSIC

- **9 | 10** 9. Mainly volcanic rocks; minor conglomerate; greywacke, argillite
10. Mainly sedimentary rocks

PALAEOZOIC

PERMIAN AND (?) EARLIER

- **6** Limestone, greenstone, chert, argillite, phyllitic quartzite, greywacke; meta-andesite and meta-diorite locally abundant near ultramafic bodies. May include younger greenstone; 6a, Carboniferous or Permian, mainly andesitic flows, breccia, tuff; minor sedimentary rocks

DEVONIAN AND MISSISSIPPIAN
UPPER DEVONIAN AND MISSISSIPPIAN

- **5** Chert, argillaceous quartzite, argillite, greywacke, greenstone, conglomerate, limestone

DEVONIAN
MIDDLE DEVONIAN

- **4** Limestone, dolomite, quartzite

ORDOVICIAN AND SILURIAN
UPPER ORDOVICIAN AND LOWER SILURIAN

- **3** Limestone, cherty limestone, quartzite, red and green chert, shale

CAMBRIAN AND ORDOVICIAN
MIDDLE AND (?) UPPER CAMBRIAN, LOWER AND MIDDLE ORDOVICIAN

- **2** Shale, phyllite, slate, calcareous slate, limestone

CAMBRIAN
LOWER CAMBRIAN

- **1** Limestone, dolomite, quartzite, slate, phyllite

INTRUSIVE ROCKS

- **A** Felsite, felsite porphyry
- **B** Mainly quartz monzonite, granodiorite, granite.
- **C** Mainly diorite; minor gabbro
- **D** Granite porphyry, granophyre, syenite and related rocks
- **E** Serpentinite, peridotite; locally includes meta-andesite and meta-diorite

METAMORPHIC ROCKS

TRIASSIC OR EARLIER

- **F** Phyllite, sericite schist, hornfels, granulite, fine-grained biotite-hornblende gneiss; Fa, may include or be equivalent to 9

PERMIAN AND/OR EARLIER
PRE MIDDLE PERMIAN

- **G** Ga, Gneiss; Gb, phyllite, quartzite, minor crystalline limestone, highly altered and sheared greywacke and volcanic rock

MAINLY CARBONIFEROUS AND PERMIAN

- **H** Biotite-quartz-feldspar gneiss, biotite-muscovite schist, crystalline limestone, greenstone, quartzite, phyllite

MISSISSIPPIAN AND EARLIER

- **J** Gneiss, schist, crystalline limestone, crystalline dolomite, quartzite

Geological boundary (defined, approximate, assumed)

Limit of geological mapping

Bedding (horizontal, inclined, vertical, overturned) (dip, g, gentle; m, medium; s, steep)

Bedding, inclined (direction of tops unknown, overturning suspected)

Schistosity, gneissosity (inclined, vertical, dip unknown)

Fault (defined, approximate, assumed)

Anticline (defined, approximate)

Syncline (defined, approximate)

Anticline, syncline (overturned)

Trend of complexly folded beds (direction of plunge known, unknown)

Belt of quartz diorite and quartz porphyry dykes

Glacial striae (direction of movement known, unknown)

Placer mine

Mine or prospect

Cinder cone or recent volcanic crater

Geology by officers of the Geological Survey of Canada: 'Operation Stikine' 1956, and earlier surveys

Road, tractor route

Trail

International boundary

Intermittent stream

Marsh

Falls and rapids

Glacier

Contours (interval 1,000 feet)

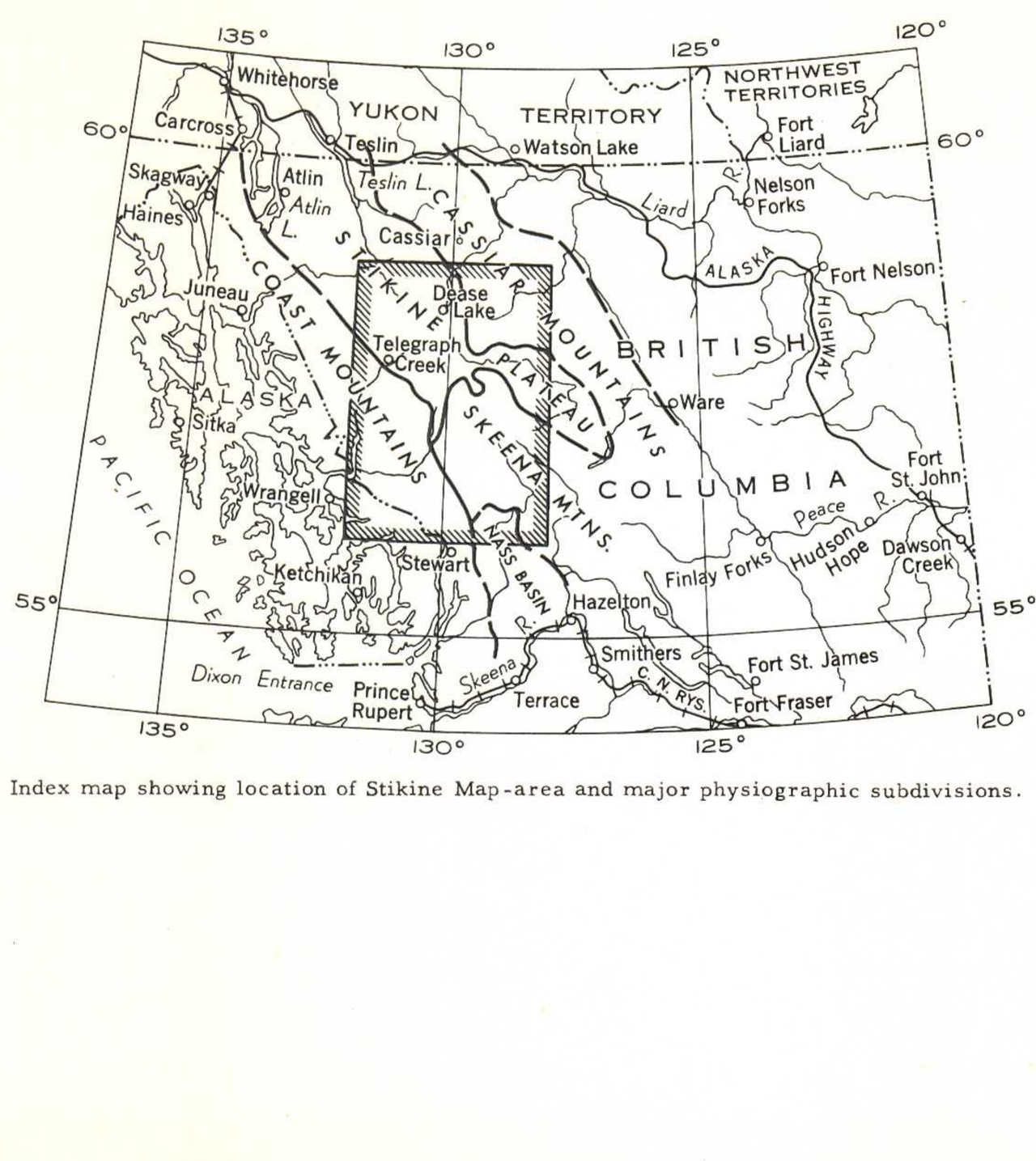
Height in feet above mean sea-level 6372

Approximate magnetic declination, 30° 33' East

Cartography by the Geological Cartography Unit, 1957

In response to public demand for earlier publication, Preliminary Series maps are now being issued in this simplified form, thereby effecting a substantial saving in time. There is no loss of information, but the maps will be clearer to read if all or some of the map-units are hand-coloured.

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario



Index map showing location of Stikine Map-area and major physiographic subdivisions.

CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

MAP 9-1957

STIKINE RIVER AREA
CASSIAR DISTRICT
BRITISH COLUMBIA

Scale: One Inch to Four Miles = 1/253,440

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

PUBLISHED, 1957

To accompany report by T. Mould 1977

Section on Mansfield Creek, above Writer's Camp

1. On North side of Mansfield Creek is a 42m bank of shales/sandst. dipping 20°E

2m. carbonaceous shales.

26m. fine, loosely consolidated sandstone.

2m. grey shale

3m. sandstone.

1m. brown siltstone/shale.

5.6m. variicolored sst.

0.5m. shale

3.0m current bedded sandst.

0.5 shale

2.8m. ssts.

4.0m alternating grey/black shales

6m. of grey/brown ssts. with lens of coarser materials conglomerate maximum clast size 4 cms.

0.5m green shale

2m. silty sandst.

.3m shale

2.8m silty sandst

0.5m lens of conglomerate

1.6m grey/green sandst.

100m. downstream on south bank is 26m section, dip 18°E; this seems to be stratigraphically higher than the column pictured above.

Glacial conglomerate roof.

≫ 11m coal seam on slope of 35°
The trench picked out for sampling kept caving in and only 2 good samples, #7, #8, were acceptable.
See also photos 2.14, 15, 16.
Dip ~ 18°E. Some amber, shale.
The coal is mainly clarain, lesser durain, with two thin shale partings grading into
6m. carbonaceous shales in footwall.

#7 & #8

2m. samples only somewhat selective sampling o/c.

8m. shale/greywackes.

100m. downstream on south bank: contained in large landslide

Sample #5, 1.3m. Vitrain, increasingly dirty to
Sample #6, 1.1m somewhat dirtier coal.
Floor not exposed, see photo 2.13
Downstream 200m. Creek has fairly steep gradient with many large blocks of basalt, and some coke.

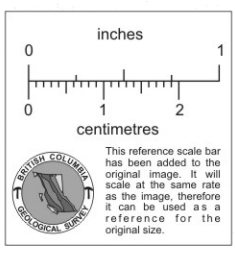
Drift.

3.5 m. carbonaceous shale

Dipping 20°SE

3.2 m. basalt flow, columnar jointing forming resistant bedrock and waterfall
1.6m. cooked, indurated shale
0.6m clean coal, no sample
disappears under water.
100m. downstream, writers camp.

1 cm = 2m.



2. Section on Mansfield Creek, below writer's camp.

240 m. downstream on N. side

Drift.

8m. coal seam. Samples # 9, 10, 11, 12, all 2m. each, top down.
2m. from top of seam 30cm shale ~~break~~.
Good clean coal, clarain > durrain

5.5m. down 6cm. shale break, maybe ash fall horizon, which would be good for drill hole correlations.
Dip 18°E. Some sulphur, and rust. Photo 2.17
Bottom not exposed, seam maybe >8m.
There is no exposure since the basalt flow 340+m. upstream and true stratigraphic relation hard to say.

200m. downstream at 16m. cliff exposure:

Drift. See photo 2.19

2-3 m. red-brown shale - ancient forest fire?

4m. very carbonaceous shale almost coal.
Dip 5°E

1m. channel fill sandstone. calcareous greywacke w/ leaf fossils.

8m. alternating carbonaceous shale, nodular shale, thin coals.

60m. downstream is 23m. section which may well overlie the last

Drift

4m. coal - could be thicker top eroded. 2.5m. up thin shale break. This break the nature of the coal and rusty base remind me of 8m seam above. Floor is rusty paper thin carbonaceous shales.

10m. alternating shales, carbonaceous shales, and sandy horizons.

See photo 2.18

4m. grey shales grading

grading into:

3.5m. nodular shales

4.2m. graded and current bedded sandstones w/ fossil leaves. nodular shales.

180m. downstream:

4m. trap dyke, maybe feeder dyke for the basalt flow above. Dip 55°E. Crosscuts coal sequence sands/shales, which may therefore be older than the 11m. seam.

300m. downstream

40m. uniform nodular grey shales with several more resistant brown shale horizons, up to 40cm. thick, dip 20°ESE. These lacustrine shales may overlie all previous sections.

16m. coarse greywacke and conglomerates. maximum clast size 6cm., angular to sub-rounded, green-purple-black volcanic breccia. No imbrication, no sense of origin.

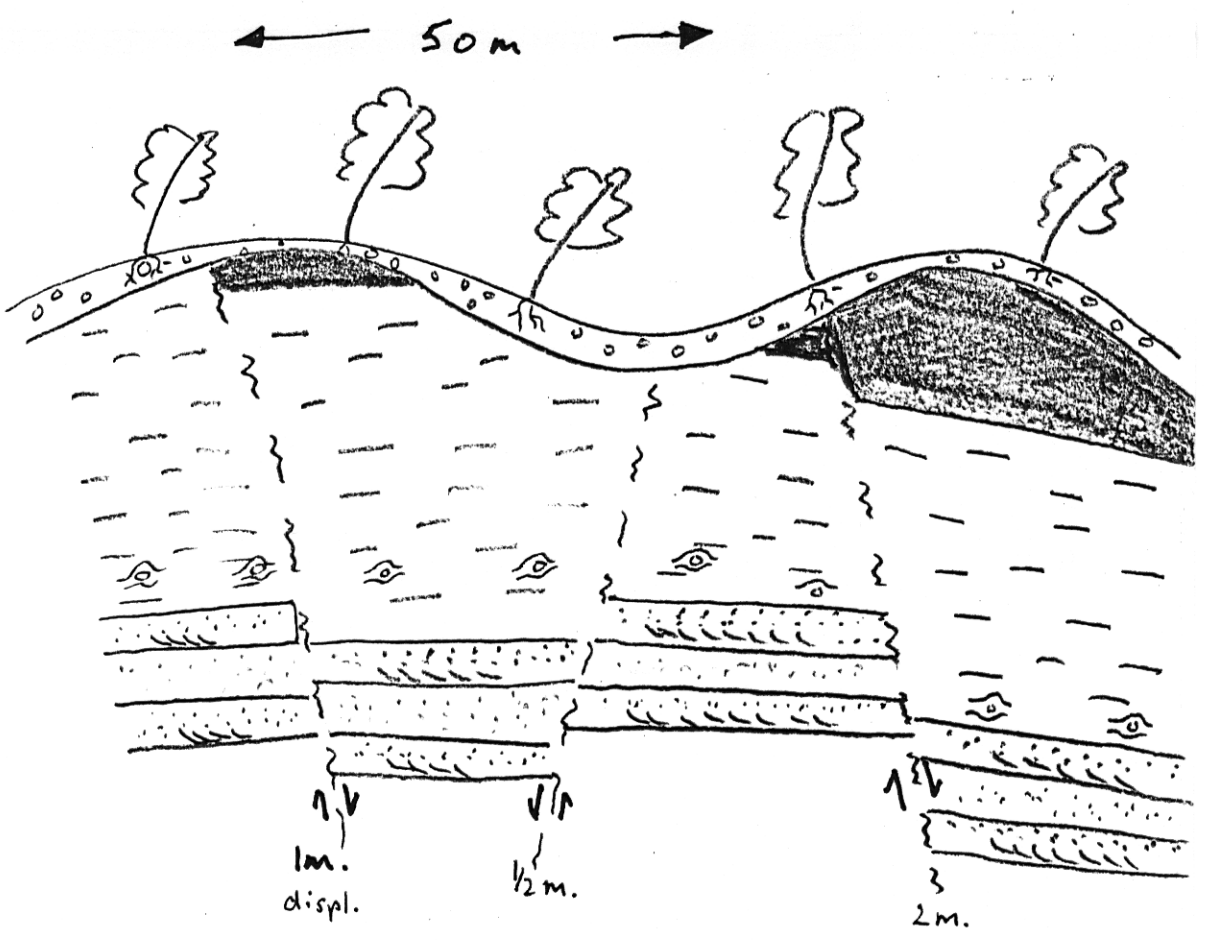
500m. downstream:

25 m. thick basalt flow.

20m. very coarse conglomerate Rounded boulders up to maximum clast size 60cms. No directional sense.

400m. downstream, Mansfield Creek flows into Little Tuya River.

Along the course of Mansfield Creek one sees big blocks of granite, gneiss, augen gneiss (dents de cheveaux K-felspar phenocrysts upto 4cms) which must have been dropped by alpine glaciers from west.



This picture illustrates small scale block faulting. Normal faults are steep, striking N-S, bedding rolling around horizontal. Specific attitudes fairly meaningless.
4m. seam not sampled, too steep.
These structures parallel trap dyke below.