896398

J. Nitsch
1973
Highland
Valley
Geochem.

NOTATIONS

30 FOLIATION & DIP

20 JOINTING & DIP

BEDDING & DIP

NOTE: NORTH TO TOP OF PAGE

TERMINOLOGY

Trace Amounts } much less than 1% of O.C. Noticable but insignificant amounts.

Minor Amounts } About 1% of O.C. Easily noticable

Abundant } Pervasive throughout the O.C. Up to 5% of the O.C.

Well defined jointing
- directions & dips of joint planes easily determinable.

poorly defined jointing
- directions & dips of joint planes are dificult to measure accurately

Well developed jointing.
- jointing in the rock is of uniform spacing. may be well or poorly defined

poorly developed
- non-uniform spacing

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May 16/73 Sunny & Warm 1

station: JN 11A-1

Samples: DDH3 0'-502'

-Elevation: 9750'

Drill Hole Samples

DD H3	0 - 136
"	135 - 225
"	225 - 360
"	360 - 502

Volc. Neck porosity = 10%

Med grained: light grey, Uniform

Mod. Sericite & Kaolinite Alt. (10%

Euh. Bio. - < 5% plag. - euh. to (60%

Euh. Hornb. - 10% anh. ÷ altered to

Qtz. - 15%-20% Kaol. & sericite (often porphyritic

plag.

Sta: JN 11A-2

Elev: 9760

Foliation: 80 31

Joints: Alt. along joints (oxide)

90

300

65 320

1' to 2' spacing

Chataway - Coarse Grnd. Uniform

Qtz	-	10%
K-feld	-	30 } 60%
Plag	-	70 }
Hbl.	-	25%
Bio.	-	5%

Station: J.N. 11A-3

Coarse Grained Guichon
looks slightly similar
to Chataway however
Mafics less cubedral
"Chata Guichon"

qtz. - 10
Bio - 10
Hbl. - 25
K-spar 25 } 55
Plag 75

} Mafics subhedral

Joints - Alt. along joints (oxide)
75 } 6" to 2'
320
55 85 } 2' to 3'
60 } 1 - 3'
10

Rock Cut Pipe line Road
Elevation ÷ 4450

Sta. JN 11b-1 Elev. 4250
Road Cut - Pipe line Road
Coarse Grnd. Guichon

HBl. 30
Bio. 5 - fine grnd } anhedral
qtz. 10-15
K-spar 20 } 50-55
plag. 80
(5%) schlieren & pods ÷ mostly biotite

Variable schistosity due to schlieren
(<5%) Some Chataway (interbanded).

joint - spacing 1'-3'
(oxide) alt. along joints.

sta. - JN-11b-2
Elev. 4240
Road Cut Pipeline Rd.

Med. - Coarse Guichon
<5% pods of mafics
(mainly biotite.
Wide jointing > 3 ft.
- no distinguishible
directions of jointing due
to slumping of outcrop.
- Fe oxide along joints.

bio. - 5%-10%
Hbl. - 30%-35%
qtz. - 10-15%
} anhedral.

plag - 80
K-spar - 20
} 35.

Trace of 2-3 mm wide qtz veins.
This rk. is slightly darker
than regular Guichon
"looks like close to
hybrid"

Sta. JN-116-3
Elev. 3740
Road Cut Pipeline Rd.

Med. to Coarse Hybrid
<5% pods of mafics
mainly bio.
Wide jnts. >2-3 ft.
Fe oxide along joints.
outcrop - slumped
from blasting.

bio	- 15%-20	anhedral
hbl	- 25-30	anhedral
qtz	- 10-15	anhedral
plag	- 80	30-35
k-spar	- 20	30-35

- This rk. is darker
than at JN 116-2.
i.e. more mafics.

Minor 2-5mm wide
qtz. veins.
trace of Chalcopyrite along
veins.

JN-6H-1

Elev. 4200
Road Cut - Pipe line Road.

Fine grnd. light grey
purple tinge
Kamloops Volc. ?

Bio. - 5%
Phlogopite - 5%-10% } euhedral
Hbl. - 5%
Plag - phenocrysts - 10%
Plag. - 50%
Qtz - 20%

has small pods (2" long) of
mainly coarse grnd feldspar.

jointing - very poor
oxide coating along
fractures

~~JN-6H-2~~

~~El. 4800~~

MAY 18/73

cloudy, cool, ppt.

Sta. JN-11b-4 Elev. 4200

Road Cut ÷ Newest section

Highland Valley Hwy.

Hybrid Phase ÷

Med. to Coarse grained.

Variable composition.

Abundant Mafic rich inclusions.

Dark very fine grained

mafic rich basaltic dykes.

Bio 5-10%

HBl. 20-30

qtz 10-15

feldspar 50%

— trace chalcopyrite & malachite.

— extensive alteration.

chlorite, epidote, Fe-oxide

clay. along fractures

< 2% of total Rk. — minor qtz veining 2mm to 1cm

joints. 0 F85 } 1-2.5' spacing

1-3' { 40 120

80 95 } 2" to 2' spac

minor narrow fracture zones

JN-116-5 Elev. 4150
Road Side - Newest Sect.
Highland Va. Hwy.

Hybrid Phase
Med. to coarse grained.
Less mafic rich inclusions
than at JN-116-4

Bio - 10%
Hbl. - 25%
qt. - 10-15
Fldspr - 50%
- Minor alt. along fractures.

joints.

4" to 1 ft.

300
87

30
85

1' to 2'

trace of epidote & qtz veins
< 2mm wide.

JN-11a-6 Elev. 4100'

South Side Lornex Upper
Dam site.
Chataway, Guichon &
Chata Guichon

Gradational.
Mafics often chloritized.
Fe oxide & Clay alt. along fractures
& joints.
Trace malachite along fractures.

Joints:

45 100 6" to 3 ft.

85 61 2' to 3'

42 30 1' to 4'

	coarse grnd Chataway:	med. grained Guichon:
Qtz	15	10-7%
Bio	5	5 %
HBl	10-15	10-15
K-spar.	20 } 70	30 } 75
Plag.	80	70

JN-11b-6 Elev. 4080

Hybrid phase:-
Very Dark med. to coarse grnd.
chloritized. Variable mineralogy

qtz.	–	10
hbl.	–	10-20
bio	–	5-15
musc ?		<1 Probably very light coloured biotite.
K-spar	–	15 } 75-65
plag.	–	85 }

joints widely spaced (>1') & poorly defined.

Minor alteration along joints & fractures. (Fe oxide & Chlorite)

May 23/73 Cloudy & Cool

JN-116-7 Elev. 4270

Hybrid (Some looks like dark Guichon.

Moderate weathering.

Med. to coarse grained.

Joints:

107 / 46 — 8" to 3 ft

47 / 61 — > 3'

44 / 86 — > 3'

qtz	10	
Hbl	20-25	} - subhedral
Bio	10%	} - subhedral
K-spar	20	} 60
plag.	80	} 60

JN-116-8 El. 4500'

Medium Grained Guichon
Moderate weathering
Mafic minerals often chloritize
Trace of epidote & qtz veins.

qtz - 10
Bio - 5-10
Hbl - 20
K spar -
Plag. - predominates over K spar } 60

Slight foliation locally.

joints. (poorly defined)

261
85 1'-2'

84 >3'

JN-11b - 9 El. 4360'

Med. Grained Hybrid.
Trench Sample.
d. Trace oxide alteration.
along fractures.

qtz	—	5-10
Hbl.	—	20-30
Bio	—	5
plag	—	80-85 } 55-70
Kspar	—	15-20 }

joints: very poorly defined
widely spaced.

113
85

<5% Mafic rich
inclusions

JN-6g-1 El. 4680

Med. grained Hybrid
Very Dark & Abundant
Mafic inclusions locally
Weathering moderated

qtz	5-10	
Bio	10-15	often chloritized.
Hbl	15-20	
Kspar	55-70	
plag.		

trace of qtz & epidote
veining ≃ 1% of O.C.
. trace of malachite ≃ .001% of O.C.

Joints

∠ 90
170

widely spaced
& poorly defined.

minerals ~~have~~ are anhedral
to subhedral.

JN-6g-2
El. 4800

Coarse grnd. Guichon.
Moderately weathered.
Minor schlieren
(matic rich bands
< 3" wide)

qtz	-	5-10
bio	-	5
hbl	-	15-20
K-spar	-	25 } 70-80
plag.	-	75
epidote	-	< 1

jointing (widely spaced)

47 ⊥ 116 — 6" to 2'

53 ⊥ 2 — 6" to 3'

JN-11C-11

El. 2900

Very fine grained black basalt. (Nicola)

trace of pyrite (disseminated)
Minor alteration to Fe oxides along fractures

Sta. located at top of steep grade along pipeline road near the Thompson River.

May 24 /73.
Cloudy & Cool
Rain Showers

JN-11b-10 EL. 3865

Hybrid zone (could be Spatzum)
moderately weathered.
trace amounts of Fe oxide coating fractures
"Mafics" often chloritized.

bio.	5-10
Hbl.	< 5
qtz	5-10
Felds.	75-85
phlogopite	<5

The whole rk. has greenish colour ∴ probably Spatzum.

joints: well defined.

25 ∥ 227 1" to 2'

∥ 53 292 1' to 3'

JN - 116 - 11 EL ÷ 4100

100' North of Highland Valley Hwy.

Hybrid:
moderately weathered.
trace FeOxide alt.

bio.	10	sometimes chloritized
Hbl.	10-15	
qtz.	5-10	
felds.	65-75	play. pred.

joints ÷ poorly defined.

$\overset{N}{85}$ 122 > 2' spacing.

< 5% "mafic" inclusions

JN-116-12 EL. 3480

Hybrid.
Mod. weathering
trace Fe oxide alteration
along fractures.

bio 10-15
Hbl. 5-10
qtz. 5
felds. 70-75
epidote - trace amounts.

joints. Well defined.

84 / 97 1' to 3'

90 // 99 1' to 2'

81 / 166 ≈ 3' spacing.

JN-11b-13 EL. 4200

Hybrid.
Mod. Weathering.
Minor Fe oxide alt.
along fractures.
& minor chloritization of
mafic minerals.

bio	10	Typically anhedral.
Hbl.	10-15	
qtz.	5	
felds.	70-75	

joints well defined

1' - 4'

3" - 3'

Trace amounts of mafic
mineral rich inclusions.

JN-11b-14 EL. 4080'

Hybrid:
Trace of epidote veining
< 2mm wide.
Minor Kaolinite alteration &
chloritization of "matics"

Jointing - Well defined
& highly variable
spacing 3" spacing
in local areas
otherwise > 1'

90
128

14
62

84

340

epidote along
fractures in
local areas of
closely spaced
joints
trace amounts of
Matic rich inclusions

Bio. - 10
Hbl. - 10
qtz - 5-10
fdd. - 70-75

JN-116-15 EL. 4500

Hybrid.
trace of coarse grained qtz & Kspar veins (< ½" wide)

Minor Fe-oxide Alt & chloritization of "Matics"

Joints:

90 / 331 — 2 to 3'

46 / 313 — 6" to 2'

Bio.	10-15	
Hbl.	10	
qtz.	5	
Kspar		70-75
plag		

trace amounts of kaolinite alteration.

JN-11b-17 EL. 5300'

Coarse grained Hybrid.
Extensive chloritization of "mafics"; also clay altera.
Chlorite & epidote often coat fractures
Trace of qtz - K-spar veinlets (< .5 cm wide)
≃10% of rock is mafic rich inclusions.

bio	5-10
hbl.	10
qtz	10
feld.	70-75.

jointing (poorly defined. due to slumping of O.C.)

~~90~~ 96 1'-3' sp

248 4" to 2'

75

JN-11b-18

EL ÷ 5540

Coarse Hybrid.
Abundant Matic Inclusions
& Matic rich stringers
(≃ 10% of RK) (2 mm wide)

Bio	5-10
Hbl.	10-15
qtz.	5
feldspar	70-80

Jointing (poorly defined)

46
298

1' to 2'

JN-11b-19 EL. 5610

Coarse Hybrid.
minor amounts of matic
rich inclusions. (<5%)

Well Jointed

43
74 — 4" to 1'

82
106 — 1' to 1.5'

Bio	5
Hbl	10-15
qtz	5-10
feldspar	70-80

trace amts of epidote veinlets
(1 mm) <

JN-11b-20

EL. 5660

"Coarse" Hybrid

Trace amts. of Mafic Rich inclusions

Well Jointed.

84 / 144 — 8" to 2'

58 / 261 — ~ 1'

Bio	5	small anhedral grains
Hbl.	10-15	} often large phenocrysts
qtz.	10	
feldspar.	70-75	

trace amts. of qtz. veins < 1cm wide

May 26 / 73
Cloudy & Cool
Snow Flurries

Sta. JN-11b-21
Alt. 3750'

Hybrid.
trace of "mafic" inclusions.
" " chlorite Alt.

Bio	5-10	→ irregular masses of anhedral crystals.
Hbl	10	
Qtz	10	
Felds.	70-75	

Jointing widely spaced.
1' — 3'

23
82.

68
147

JN-116-22

E.L. 3820'

Hybrid

Severly weathered.
Chlorite alt. & Fe oxide along fractures.
Trace of dark inclusions.

Bio	5
HBl	10-15
qtz	5-10
feldsp.	70-80

Jointing - very well defined.

41
60 — 6" to 2'

85 334 — 1' to 2'

82 97 — > 2'

JN-116-23
EL. 4420

Dark grey to black
fine grained basalt.
Kamloops volc.?
Recent vent?
definitely post
Guichon Batholith.

Abundant vesicules.
Some filled with "zeolites"
& clay alteration.
possibly some hematite
in a few vesicules

JN-116-24

EL. 4600'

Hybrid. (med. grnd.)
Trace of qtz veining
(< 1mm wide)

Bio - 5-10
Hbl. - 5-10
qtz - 10
Felds. - 70-80
muscovite? - trace

jointing well defined.
spacing 3' to 4'

JN-11G-1

EL. 3220'

Highland Valley Highway.

Jurassic shales

thinly bedded.
2 mm to 3 cm. thick.

Variable dip & strike
Faulted extensively

1 qtz vein 1 in. wide.
(subhedral qtz crystals
limonite & goethite?))

May 27 / 73
Cloudy & Cool
with Sunny Periods.

Sta. JN-11b-25.
El. 5620

Hybrid
Small o.c.
Extremely competant
Jointing not apparent.
slight foliation.
Extensive chlorite alt.
trace epidote along fracture.

bio - <5
Hbl - 10-15
qtz - 10-15
feldo. - 65-75.

JN-116-26
BL. 5500

V. Dark Hybrid.
Intense fracturing locally with trace of dissem. pyrite along fractures.

Hbl	—	15-20
Bio	—	<5
qtz.	—	10
feldsp.	—	70-75

Jointing (well defined)

42 / 124 — 6" to 1.5'

72 / 142 — 6" - 2'

68 / 228 — 2'

JN-11b-27
El. 5900'

Coarse intensly chloritized & silicified Hybrid? Granophyre?
biotite ≃ 100% chloritized.
Hbl. – intensely chloritized.
qtz veins & epidote – qtz veins.
< 1 cm wide.

Chlorite	≃ 5
biotite	– trace
Hbl.	– 5-10
qtz.	15-20
Feld.	67-75.

Jointing moderately well defined.

72 / 11 – 86 4" to 1'

JN-11b-28

EL. 4280

Highly silliceous fine to medium grained Hybrid. trace of disseminated pyrite.

Sericite alteration.

Magnetic

Bio.	1-5
Hbl.	5-10
qtz.	15-20
Feldo.	≈ 65-75
sericite	1-5
Pyrite	trace

Jointing well defined.

248 / 86 ≈ 2'

75 / 153 ≈ 1'

May 28/73
Sunny

sta. JN-11a-7
EL 5400'
Bethlehem phase

qtz - 15
Bio - <5 some is euhedral
Hbl. - 5-10
K-spar - 25 } 70-75.
plag - 75

jointing 6" to 1'
Variable directions.

78 311

90
180

JN-11a-8

EL. 5025

Coarse grained equigranular
"chata - Guichon" type

bio - 5-10 sub to euhedral
hbl. - 10
qtz. - 10
plag. - 75 } 65-70
K-spar - 25

Jointing: (wide > 3')

4
86

trace of matic rich
oval inclusions
epidote & magnetite.

May 29/73
Sunny & Cloudy

Sta. JN-11b-29
EL. 4260
Hybrid. slightly foliated

Bio	10	
Hbl	10-15	
qtz	10	
Plag.	80	65-75
K-spar	20	

Jointing
widely spaced
>3'
Very poorly developed.
(Approx.)
61 123

JN-69-3

EL. 4560

Hybrid.

Jointing (3" to 1' spacing)

23 / 187

Moderately well developed.

78 // 88

Abundant Fe oxide staining along fractures.

bio	<5	fine grained.
hbl.	15-20	
qtz.	10	
K-spar	15	65-70
plag.	85	

JN-69-4
EL. 4750

Coarse grained Hybrid.
Abundant (20%) mafic
rich inclusions up to
2 ft. dia.
trace of malachite &
pyrite coating alon
fracture surfaces.
Pyrite is sheared.
trace of chlorite alt.
Jointing - mod. well
developed.

90
164

4" - 1'

264
80

> 2'

Bio	-	5
Hbl	-	10-15
qtz	-	10
Plag	-	80 } 70-75
K-spar	-	20 }

JN-69-5
EL. 4440

Hybrid.
minor mafic rich inclusions
Abundant Fe-oxide Alt.
along fractures; qtz &
qtz-K-spar veins (up to
4 in. wide. Also chlorite
& epidote veinlets up
to 4 mm wide.
Minor clay alt. along fractures
jointing - well developed.
closely spaced.
(average < 6")

Bio	10-
Hbl.	10-15
qtz	5-10
plag	80 } 65-75
K-spar.	20 }

JN-6G-6
EL. 4000'

Hybrid
trace of mafic rich inclusions.
Abundant Fe oxide alt.
Trace clay alt.
Jointing - well developed. however O.C. is mostly slumped blocks.

Aprox.

78 / 91 — 6" to 1'

23 / 28 — 6" to 1'

Bio	5-10	often in finely granular clusters
Hbl.	10 +	
qtz.	5-10	
plag.	80	70-80
K-spar	20	

Sta. JN-69-7
EL. 4020

Med. grained Hybrid.
Very dark.

Bio - 5
Hbl. - 70
qtz - 10
feldo. - 75

Jointing : mod. well developed.

29
70 — 1.5 - 2'

80 — 83 — 1 - 2'

105
82 — 8" - 2'

St. JN - 69 - 8
EL. 4320

Hybrid. (Very Dark)
Abundant (≈ 5%) mafic
rich inclusions.
Abundant Fe oxide staining
Trace of pyrite along
fractures & dissem.

Jointing well defined

≈ 2' s/p.

1 - 3'

Bio. - <5 } often
Hbl. - 15 } chloritized
qtz. - 10
Felds. - 70

JN-69-9
EL. 3500

Med. grained Hybrid.
Very Dark

Minor Fe oxide & clay
Alt.

Minor qtz-K-spar veins
(up to 2cm)

Jointing:
Well developed
however O.C. is slumped,
joint density = 6" to 1' spacing.

Bio	5-10
Hbl.	10
qtz.	10
K-spar	70-75
plag.	

May 30/73
Sunny

Sta. JN-6h-1
EL. 5180'

Hybrid.
trace of mafic rich inclusions; trace of malachite & pyrite in mafic inclusions & stringers.
Fe oxide staining along fractures
trace of chlorite alt.

Bio	2-3
Hbl.	15-20
qtz	10 +
K-spar	20? } ≃ 70-75
plag	80 }

jointing: well defined

60
321 ≃ 1'
84 ≃ 2

JN-6h-Z

EL. 5140

Bethsaida.
mod. well developed
biotite "books"

bio.	-	5
qtz	-	15
hbl.	-	5
plag.	-	70-75 } 75
K-spar	-	25-30 }

Jointing
Mod. well developed.

82 ⊥ 233 1'-3'

88 ⊥ 241 8"-2'

JN-6h-3

EL. 5420

Bethsaida.

minor clay, Fe oxide & Chlorite alteration
trace of malachite along qtz stringers

Bio	<5	
Hbl.	5	
qtz.	20-25	} large qtz eyes
plag.	70	} 67-70
K-spar	30	

jointing: Well defined.

33	94	>2'
184	78	1-2'
98	84	6"-1.2'

JN-6h-4
EL. 5320

Bethsaida
minor clay alt. along
fractures trace
Fe oxide

Bio	5
Hbl.	5
qtz.	30
plag	65 } 60
K-spar	35 }

Jointing (Mod. well defined)

78 — 165 6" – 1'

74 — 88 1 – 2'

May 31 / 73
Cloudy & Sunny

Sta. JN-ze-1
EL. 3470

Hybrid (very dark)
trace mafic rich
(inclusions)
Trace of epidote veining

Bio	< 5
Hbl,	15-20
qtz.	5-10
feld	65-75

Minor chlorite alt.

Jointing (well developed.
poorly exposed.)
81 ≈ 1'
261

JN-7c-1
EL. 3210

Drill hole core (Unmarked discards)
Highly chloritized Hybrid.
Depth from 0-300 ft.

JN-7d-1
EL. 4380

Chataway.
Moderate Fe oxide
& chlorite alt.
Minor hematite staining

Bio	5	
hbl.	10	
qtz.	10	
Kspar	25	75.
plag.	75	

JN-6a-1

EL 3240

Chataway

Closely spaced fracturing (K6 ")

Trace clay ¼ Fe oxide Alt.

one ½ in wide coarse qtz-K-spar vein.

Bio	<5	
hbl.	5-10	
qtz.	10-15	
K-spar	30	70-80
plag.	70	

JN-6a-2

EL 3620

Chataway

Abundant clay alteration. Fracture zones; trace of chlorite alt.

Zeolite coating some fractures.

sp. phlogopite near ¼ in fracture zones.

Bio	7.5	
hbl.	7.5	
qtz.	10	
K-spar	25	75
plag.	25	

June 1/73
Cloudy with
intermittant ppt.

JN- Ng-2. EL. 3250

Altered Nicola basalt.
looks like hybrid in
places (however very dark.)
plagioclase is often
porphyritic in a dark
matrix.
Abundant dark inclusions
jointing (well developed)

51 ⊥ 99 6" to 1'

61 ∥ Al 3'

inclusions	-	20%
plag.	-	70%
K-spar	-	5
qtz	-	5

JN - 11g - 3 EL. 3020

Same as at JN-11g-2 only looks slightly more "altered" to hybrid.

JN-11g-4 EL. 3300

Metasedimentary rk.
(Meta Sandstone)
Trace of pyrite
looks very much like hybrid.

Bio - } 10
Hbl. -
qtz - 15-20
feldo. - 70-75

JN-11g - 5. EL. 3400

Very dark nearly "affinitic grained" meta sed.
Abundant biotite (very fine grained) often in aggregate of grains. These being flat & oval shaped.

JN-11g-6 3200

Hybrid (looks like metased in places)
Coarse grained.
trace of pyrite
biotite is fine grained
anhedral.

Jointing (well developed)

8
62 ≃ 1'

84
106 1'-2'

Bio	<5
hbl	<5
qtz	10-15
felds.	75-80

Abundant Mafic Inclusions
in some parts of the O.C,
Appears to be like hybrid
in these parts.

JN-11g-7 EL. 2750

looks vaguely like hybrid

however medium grained metased.
(metasandstone)

trace of pyrite.

qtz.	20-30	Subrounded grains ≃ .3 mm.
Bio, Hbl.	10	
felds	60-70	

JN-11g-8

very dark med. grained hybrid grades into areas of coarse grained lighter hybrid.

Bio	2-3
hbl.	10
qtz.	5
felds.	≃ 82

June 2/73
Sunny

Sta. JN-11g-9
EL. 3050

Coarse grained Hybrid.?
- trace of pyrite. (dissemm.)
- 5+% Mafic rich fine grained inclusions.
- Mafics very poorly developed.
- Clay alteration.

Bio - trace } anhedral.
Hbl. - 15 }
qtz. - 10 } small <1.5 mm & rounded
K-Spar - very 1,2% <5
plag. - greenish colour.
- anhedral to subhedral.
- 70%

Texture & colour of this rock is very similar to "Spatzum".

Jointing: Mod. well developed.

13
287
44
63

1 - 2'
1 - 3' } poorly defined

JN-11g - 10
EL. 3280

"Dark" black, fine grained basalt. (Nicola)
trace of zeolite in trace amts. of amygdules.

JN-11g-11 EL. 3140

Coarse grained Spatzum.
5-10% dark inclusions
plag. - greenish color.
matics - poorly developed.
qtz - rounded up to 2mm
bio - 2-3
hbl. - 17
qtz - 10
plag. 90 } 70
kspar 10 }

Well developed jointing.

JN-11g-12

EL. 3290

Coarse grained Hybrid.
trace Fe oxide alteration

Bio	2-3	
Hbl.	17	
Kspar	20	70
plag.	80	
qtz	10	

faintly greenish on some grains.

Joints - poorly defined

81 — 1.5'

136 — '

88 — 56 — 2

JN-11g-13

EL. 3540

Dark, Black fine grained basalt.
Nicola.

JN-11g-14 EL. 2950
same as 11g-13

JN-11g-15. EL. 2825
grey andesite
(highly scoreacous)
↑
Sp.?
trace amts of large
plag. feldspar phenocrysts (.5 cm across)

JN-11g-16 EL. 2650
dark, v. fig., black
basalt

JN-11g-17 EL. 2500

medium slightly greenish, grey
chert. Abundant disseminated
pyrite = 1-2%
magnetite = 1-2%
Chert fragments (rounded)
& grains cemented by
silica.

JN-11g-18 EL. 2550
Nicola
Dark, Black, fine grained
basalt
Minor. Parts of o.c. are grey basalt

JN-11g-19 EL. 2640

Dark, black, v. fine grained basalt (Nicfolu

JN-11g-20 EL. 2600

Dark, black, v. f. g. basalt. (Nicfolu)

JN-11f-1 EL. 2390

Rhyolite Porphyry.

qtz.	—	5-10	2-3 mm rounded qtz.
bio.	-	2-3	— euhedral
hornbl.	—	2-3	— acicular grains
plag.	≈	80	

Abundant clay alt.

June 3/73
Sunny & Cloudy.

Sta. JN-11g-21 EL. 3575
Coarse grained Hybrid.

Bio.	<5
Hbl.	15
qtz	10
Feldo.	75.

Jointing (Well developed. Widely spaced) >2'

90 133

23 48

JN-11g-22
EL. 3550

Med. — coarse grained Hybrid.
(Trace of inclusions)

Bio	2	
hbl.	18	
qtz.	10	
K-spar	20	70
plag.	80	

Jointing Well defined (>2' spacing)

81 101

JN-11g - 23

Alt. 1360'

grey limestone;
Abundant calcite stringers.

JN-11f-2

EL. 1480

Shales - thinly bedded.
.5 cm to 4 cm.
Unidentifiable fossil fragment
crinoids?

JN-11f-3

EL. 1680

Rhyolite Porphyry

Bio	5	euhedral crystals
Hbl.	2	acicular. (elongate)
Qtz	10	round grains
Plag.	80-85	- extensively altered to clay.

~~May~~ June 4, 1973 Sunny

JN-11h-1

EL. 5320

Kamloops Volc.
Dark grey to black basalt.

JN-11h-2.

EL. 5440

Kamloops Volc.
Dark grey to black basalt.
Trace amts. of zeolite in amygdules.
trace amts. manganese staining.

JN-11h-3

EL. 4140

K.V.
Dark grey to black basalt.

JN-11h-4

EL. 4170

Dark grey to black basalt.
weakly laminated.

JN-11h-5

EL. 4030

dark grey to black andesite (K.V.)
V.f.g.

JN-11h-6.

EL. 3480

Med. grained hybrid. looks slightly like fine grained quartz.

bio — trace < 2%
hbl. — 15%
qtz — 5-10
K-felds. — 25 } 75-80
plag. — 75

closely spaced jointing ≃ 6"

Abundant Epidote along fractures.

JN-11h-7

EL. 3580

Med. grained hybrid.
trace of dark matic rich inclusions.

Bio - 5
Hbl. - 10
Qz - 5-10
K-spar - 15 } 75-80
plag - 85

JN-11h-8

EL. 3610

Coarse to med. grnd. Hybrid.
Bio <5 Some phlogopite.
Hbl. 5-10
qtz 5-10
K-spar 15 } 75-85.
plag 85

JN-11h-9

EL. 3400

K.V. Andesitic basalt.

JN-11h-10 EL. 3450

K.V. olivine andesite.

June 6/73
cloudy & Rain
Showers.

JN-6b-1 EL. 2040 ft.
Spences bridge
grey to reddish grey
tuffaceous volcanic rks

JN-6b-2 EL. 1810'
Spences bridge
grey to greenish grey
tuffaceous volcanic.

JN-6b-3 EL. 2140'
Tertiary Spences Bridge Volc
Mafic rich Tuffaceous
volcanic
Chlorite, bio, hbl. = 15
plag. = 70
rk fragments = 15

JN-6a-3 EL. 2650

Feldspar porphyry
Tertiary Spences bridge
dykes.

JN-6a-4 EL. 3200

Mafic rich Guichon.
Abundant zeolite coating fractures.
The rock is very crumbly.
& also foliated. Tertiary volc.'s are in contact with the Guichon.

bio - 10
hbl. - 10
qtz - 10
K-spar - 40 } 70
plag. - 60

The Guichon is highly altered next to the volcanic rock.
Contacts are sharp.
trace of calcite veining.

June 7 / 73
cloudy & cold.

Sta. JN-6a-5.
EL 3900

Hybrid.

bio = <5
hornbl. = 10 +
qtz = 10
plag. = 75 } 75.
K-spar. = 25

Abundant chlorite alt.
Trace of epidote.

Jointing.
264
88
well defined
(<6" spacing)

JN-6a-6. EL. 4480
Bethsaida
Wide Jointing. > 4'
85
95
Bio - 2-3
hbl. - 5
qtz - 15-20
plag - 70 } 75-80
K-spar - 30

Sta. JN-6a-7

EL. 4720

Bethsaida.
closely spaced jointing (<6")
trace of malachite & chalcopyrite along fractures.
Abundant Fe oxide staining.

Bio	2-3	
hbl.	<5	
qtz	20	
plag.	60	≃ 75
K-spar.	40	

26/78 = 62/149

Sta. JN-6a-8 EL. 5120

Bethsaida
widely jointed > 3'
trace amounts chlorite alt.

Bio	2-3	82/217
qtz	15-20	
hbl.	2-3	
plag	70	75-80
K-spar	30	

JN-7d-2

BL. 5100

Bethsaida.
Well developed widely spaced jointing.

~~40~~ 106 80 ~~40~~

Bio	2 %	
Hbl	5	
qtz	20	
K-spar	30	≃ 75.
plag.	70	

JN-6h-5

EL. 5280

Bethsaida. minor Aplite dykes.

Bio	5	
Hbl		
qtz	20	
plag	70	75
K-spar	30	

Jointing ÷ ~~76~~ 236 1'-2' well developed.

JN-70-1

EL. 5350

Bethsaida

trace of chalcopyrite

along qtz - K-spar veinlet.

minor Aplite dykes.

bio	2
hbl	3-4
qtz	15-20
plag	75 } 75-80
K-spar	25

jointing (well defined.)

10 ∠ 73 ≈ 2'

June 8/73

Cloudy & cold.

JN-6a-9 EL. 5050

Bethlehem ?

Minor chlorite alteration.

Bio	5	sub to anhedral.
hbl.	10-15	- euhedral to subh.
qtz	10	
K-	20	70-75.
Plag.	80	

JN-6h-6

EL. 5500

Hybrid.

trace of hbl.-bio inclusions & schlieren.

JN-6a-10

EL. 5240

Guichon

Bio	5-10	aggregates of platy flakes
hbl.	5-10	
qtz	5-10	
K-spar	25	70-85
plag.	75	

JN-6a-11

EL. 4270

Guichon. (very fresh)

Bio	5	trace epidote
Hbl.	10	trace of chlorite alt.
Qtz	10	
plag	30 } 75.	
K-spar.	20	

~~May~~ June 9/73 Cloudy & cold.
sta. JN-7d-3 EL. 4500

Bethleham.
looks somewhat similar to chatanuga, however matic minerals not "blocky" enough

trace of epidote & trace of chlorite alt.

Bio 5
hbl. 5-10
qtz 10-15
k-spar 30 } 70-80
play. 70

JN-7d-4 ~~780~~
EL. 4780
Bethleham.
trace of chrysocolla & malachite along fracture

Bio 5
hbl. 10
qtz 10-15
feld 70-75 } play 80
k-spar. 20

JN-7C-2

EL. 4820

Bethlehem - "typical type"
trace of malachite &
chrysocolla along fractures.
trace chlorite alteration

JN-2C-2 EL. 2020

Dark grey to black fine
grained basalt. Trace
amounts of euhedral to
subhedral biotite.

JN-2C-3

EL. 2120

Grey fine grained basalt.
trace amounts of malachite?
i.e. Green mineral that looks
like malachite
Minor Clay alteration in amygdule.

JN-2e-4 BL 2240
dark grey to black fine grained basalt.
Abundant Mn ⊙ staining
euhedral hbl. - 5%
" bio - 1-2%

June 11/73
cloudy & cold

Sta. JN-2e-5
ELev. 3950

medium grained hybrid.
minor Fe oxide alt.

Sta. JN-2e-6
EL. 3850

Coarse grained hybrid?
looks more like Guichon
trace amts. of bio-hbl.
inclusions.
Bio - 5 - in clusters of fine grains
hbl. - 10
qtz - 10
plag. - 80 } 75
K-spar - 20

Sta. JN-2e-7
EL. 4300

Hybrid.
Bio 5-10 qtz - 10
hbl. 5-10 feld. 70-80

JN-2e-8

EL. 4830

Hybrid (med. grained)
Abundant chlorite alt.
trace amts. of pyrite

JN-2e-9 EL. 4400

Coarse grained hybrid.

Bio	5
hbl.	10-15
qtz	5-10
feld.	70-80

JN-2e-10 EL. 4660

Coarse grained hybrid.
Very fresh rock.

June 13/73
Sunny & windy

St. JN-2e-11 EL. 2950
med. grained hybrid.
Abundant chlorite alt.
Bio - ≈5 v.f.g.
hbl. - 10+
qtz - 10
feld. - 75

Sta. JN-2e-12.
EL. 3480

Hybrid. (med. grained)
closely spaced fracture system

34
141

80
56

2" to 6" spacing.

Minor chlorite alt.
Mafic min. v. poorly developed
Bio -5 hbl. -10 qtz 10-15
feld. - 70-75

Sta. JN - 7d - 5
EL. 4670
Hybrid? Mafic Guichon? Both!
Minor Chlorite alt.
jointing directions
questionable (slumped O.C.)

bio	5	
hbl	5	
qtz	10-15	
feld.	K - 30	75-81
	plag. - 70	

Sta - JN-7d-6
EL. 4920

Guichon ("typical type"?)
(Poikilitic hornblende)

Sta. JN-2e-13
EL. 4840
Med. grained Hybrid.
Minor chlorite alt.
trace amts. of Epidote.

Bio.	- 10%	
Hbl	- 10%	
qtz	- 10	
plag	- 80	70
K spar	- 20-15	

Sta. JN-2e-14
EL. 5000

leham?

Light to dark grey
med. grained. mafic rich
intrusive (hybrid)
highly variable mineralogy
Bio 0-10
hbl, 5-10
qtz 10-15
feld. ≃ 75-80
Euhedral biotite & hornblende
along fracture surfaces.
trace amounts of qtz-k-spar
veins up to 1 inches
wide.

Sta. JN-2e-15.
Black, fine grained
"meta" volcanic
EL. 5000
trace amounts of malachite

Sta. JN-2e-16
Hybrid. EL 4980
closely spaced jointing
4" to 1'

Sta. JN - 2e - 17
EL. 5080
Biotite rich hybrid.
Bio > Hbl.
Clay alteration

June 14/73
Sunny & cool.

JN-2e-18
EL. 2050
light grey to black, fine grained basalt.

JN-2e-19
EL. 3040

coil Granite.
minor chlorite alt.
trace epidote.
Coarsely crystalline
qtz - 10% distinct "eyes"
bio - 2-3% } euhedral
hbl. - 2-3 } subhedral.
plag. - 55 yellowish
K-spar. - 45

JN-2e-20
EL. 3200
v. f. g. black meta volcanic.
"basalt"
pervasive & ubiquitous
iron staining.
"poor sample"

JN-2e-21

EL. 3440

Black, slightly crystalline medium grained "rock" looks like metavolcanic or dyke rock. abundant epidote along "slikenslided" surfaces.

JN-2e-22

EL. 4050

dark grey to black limestone minor (1cm wide) calcite veins.

JN-2e-23

EL. 5030

V. Light grey rhyolite sp.

Abundant prismatic hbl. crystals ($\simeq$ 3 %) magnetic trace amts. of bio.

JN-2e-24 EL. 5100

Black basalt.
Abundant prismatic hbl.
trace of bio.

JN-2e-25

EL. 4800

Reddish Black andesitic basalt. Trace amts of Bio, hbl. & olivine pervasive manganite staining

JN-2e-26 EL. 4100

Reddish black basalt. euhedral hbl. trace of Bio minor clay alt

JN-2e-27

EL. 2180

dark grey to black, med. grained meta volcanic slightly crystalline distinct quartz is visible.

June 15/73
cloudy & cold.

JN-7d-7 EL. 4500

Bethleham.
poikilitic hbl.
Bio 2%
hbl. 5
qtz 15-20
feld. } ≈ 80-85 K } 35
play } 65

JN-7d-8
EL. 4700

Bethleham.
Bio - 2-3
hbl. - 4-5
qtz - 20-25
K - 25 } ≈ 70-75
play - 75
widely spaced joints.
74 ~~#~~ 304 3-4'

JN-6a-12

EL. 4100

Bethleham
Poikilitic Hornblende
looks very slightly
like Guichon.

Bio - 2-3 } subhedral.
hbl. - 5-6
qtz - 15
play - 75-80 } ≈ 75.
K - 20-25

narrow bands (≈ 3-4 mm wide)
of Chlorite alt.

JN-6a-13

EL. 3350

Bethleham (looks like stream in
coarsely crystalline places)
trace of malachite

3 | bio. subto euhedral (up to 3 mm across.
- in "books"
4 | hbl. - euhedral to subhedral.
13 | qtz. - distinct "eyes" or "grains"
80 | play - 80
K - 20

JN-6a-14

EL. 4200

Guichon.
looks like hybrid in places.
Abundant chlorite alt.
Trace to " epidote veins

bio 5-10 } (clusters) aggregates of small grains
hbl. 5-10
qtz 5-10
feld. 70-85

JN-6a-15

EL. 4180

Feldspar porphyry dyke rock.
Feldspars only stand out on weathered surface. Fresh rock is dark fine grained with feldspars difficult to distinguish.
trace of pyrite disseminated throughout the rock.
trace amts. of epidote along fractures.

JN-6a-16

EL. 3350

Altered Guichon
slight possibility of being hybrid.
trace of malachite (dissem)
intense fracturing
(Abundant epidote
along fractures & as
grains in the rock.)
minor chlorite alt.

Bio — 10 or less
hbl. — 10
qtz — 10
feld. — 70 } K — 20-50, plag — 50-80
epidote — 2%

June 16/73
cloudy with intermittent rain.

Sta. JN-7d-9
EL. 4550

Chataway
trace amounts of
chalcocite, malachite, & bornite
along fractures & in
K-spar veins (1cm. wide)

fracture density ≃ 2/ft.

Sta. JN-7d-10
EL. 4750

Chataway.
Abundant chlorite alt.
along fractures.

Sta. JN-7d-11
EL. 5050

Porphyritic Bethsaida ?
looks like qtz eye d-2 dyke
- only no qtz eyes.

coarse grained { bio - 2-3 euhedral "books"
hornbl. - 1 "

med grained { qtz - 15
ploy - 60 } 80+
K - 40

Sta. JN-7d-12

EL. 5020

Altered Chataway.
Blocky nature of mafic minerals partially destroyed.
Abundant chlorite alteration throughout the rock.

Bio 2-3
Hbl. - 5
qtz - 35%
feldspar - ≈57

JUNE 17/73
cloudy & rain

St. JN-7d-13 EL. 4700
Chataway.
minor chlorite alt. of hbl.
trace Fe oxide along fractures
Bio 2-3
qtz 15-20
plag 90 } 70-75
K. 10
hbl. 7-8

JN-7d-14 EL. 4730

Chataway.
Same as at 7d-13

JN-7d-15 EL. 4810

Chataway. looks similar to Guichon in places.
Bio 4
Hbl. 6
qtz 15
plag 85 } 75
K. 15

JN-7d-16 4610

Fine grained Bethlehem?

bio 1-2 anhedral to subhedral
hbl. 3-4 - (cross aligned)
qtz 15
plag 80 } ≈ 80
K. 20 }

JUNE 18/73
cloudy with sunny periods.

Sta. JN-7d-17
EL. 4450

Dyke rk.
medium grained intrusive.
Looks v. similar to fine grained Bethlehem taken at sta 7d-16
trace amts. of malachite along a few fractures & in the rock.

Bio	2-3	
Hbl.	7-8	
qtz	15-20	
Feld.	70-75	K-5
		play-95

JN-7d-18 EL. 4450
Chatanoy
Very "blocky" "matics"

Bio	2%-3%	play 70	75
Hbl	= 12%	K 30	
qtz	10		

trace to minor chlorite alt.

JN-7d-19 - trench.
EL. 4700

Chataway
trace amts. of malachite.

Bio - 3-4
Hbl. - ≃12
qtz - 15-20
K - 30 } 65-70
play - 70

Sta. JN-7c-3
EL. 4800

Chataway? (considerably finer grained than most chataway seen.
"mafics" are moderately blocky

Bio - 2-3
Hbl. - ≃12-17
qtz - 30-35
play - 90 } 45-55
K. - 10

Zeolite along fractures

Sta. JN-7f-1
EL. 4450

Fine grained Bethlehem.?
Same as at Sta. JN-7d-16

Sta. JN-7f-2
EL. 4500

med. grained Chatawa
Biotite Distribution in this rock
resembles that of Cuichon.

Bio	4-5
Hbl	5-6
qtz	15
Feld	75

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