896477

1988

Shulepo – Tom Calon et al

STOP 1 gabbro { Harz-des melange serp

2 Photos

look westerly (NW)

- serp with knockers of harz tectonite (chromespinel layers) Opx → bastite

serp mylonite - scaly, small scale folds
- late C mylonites
- folded stuff is older HT mylonites

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older S - unrelated because some @ 70° to C - not same age

also - S folded
- some knockers of
- folds in (PHOT 3) is light roddenite (after gabbro) dykes

• approach look @ less alt knockers to get protoliths

- Two kinds of serp - dk scaly → silic? gray green
— lighter brown serp after dunite?

• gabbro f-mg leucogabbro - roddenetized
- calcium metasom - wollast / vesuv, amphibole
- ductile defm zones
• protoliths plag rich
Ho MOG. high level gabbro

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Top / layer 3
↓ layered cpx-rich gabbro
segmented layers
near roof (vapor charged)
of magma chamber
w some orig amph.
(PHOTO)

* the layered gabbro are deeper
Highest Homog. (leucogabbro) & peg pods &
fine scale layering

To East a bit — Hills in background 70% Hbl 30% diorite

Less alt peridotites have
old penetrative foln @
∠ to ⊂ mylonite orients
- w two mylonite / serpentinite episodes

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second sep melange

#2 after χ^m cumulates

two melange after

#1 Hangtungites

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- C mylonite - relatively cool

early serpentinization can't be more than ≈ 400 - 450°C either ∴ whole thing is cool

* dykes propade serp + cause olivine porphyroblasts to grow

• altn - high CO_2 <450°C

- serp charged with gabbro blocks

• Bluff opposite - fm wtrq Qtz Dio dykes ∴ gabbro prob all leucogabbro

Swarm of Dykes dips 20 - 30° - give pseudo-layered structure

some gabbro dykes in #1 serp melange are aligned in first (oldest) serpent. fabs ∴ older in pgm 1ST serp altn

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PHOTO composite gabbro
dyke + shell zone

STOP 2 Ridge
Climbed up from drop-off

m pods in u/m rx - cumulates?
dunite wehrlite websterite
cpxite ol + cpx cpx + opx
trace ol, plag
- big xeno lithos in
dom family layered gabbro
intruded by peg gabbro
+ 2 sets of dykes

Ex fersowe dyke swarm
· gabbros intruded the u/m
cumulates (xenos) xenoliths

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many parallel dykes -
60% dykes 40% gabbro
& very signif. extension

gabbro solid, cool before
dykes emplaced

- Dykes differentiated
- possibly are related?
ie may not be related
to gabbros

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IDEA

* Bridge R also layer 1 oc crust but prob deep tel
* these rocks

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BUT none of dykes cut serp melange without being disturbed

(photo) Dyke contact again

Two sets of dykes - more silica is younger

- The Dykes cut the whole above moho section of the ophiolite

Source magma? related to ophiolite? need chemistry

- rusty, shallow younger dykes cut steep dykes

- knockers where are pillow lavas + cherts layer 1 of oc crust

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Layered gabbros, minor fault offset

over & down to U/M zone

- wehrlite w cpx pods
- websterite
-

silic shear zones - strong foln - may alter U/M's

↓

- chilled diff. dyke
  silic related to dykes probably

Base of layer 3
near Petrol
Moho

melt depleted mantle
/ in lower plate - water
from subd. zone

dyke w olivine xls

as phenos -
Bonnite?
x reddish w trg -
Possibly hypersthene

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(Photo) Dunite (vd)
wehrlite

* no penetr. defom in
cumulates

cycle
cpx-ite
wehrlite
wehrlite
dunite
↑ up

Dyke frequency in u/m
cumulates is lower but
there are some thick ones!

- serpentinite melange
chromite + ol. rich
just above MOHO
- gabbroic dykes - boudined
-

N on helicopter
lherzolite + plg
NO layering

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from mantle
serp melange 1

gabbro

serp melange 2
from u/m cum

serp
sed knocker

chert pebble cgl

photo - look N from sed knocker

Dyke - sheared, talc alt
margins - CK has
porphyroblasts altered
now → siderite + talc
- chilled border of
dykes foliated
- dyke split - u/m
between - porphyroblasts

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ol very local -> normal
dunite over short distances

STOP 4

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Rel massive basaltic rock
Can see pillows down in
the draw
mixed sheeted dykes +
pillow lavas?

- scrambling down slope
to see Hurley seds

folded black arg +
siltstone with 1st pods
strong AxPl Clear
high K & beds

— END —

Bridge R Field Trip 86/10/5

Cloudy, cool

STOP 1 Gold Bridge qc - Bridge Xing

soda granites - not partial melting

- see bx with albitite

bedrock altered c/n, diorite,

greenstone

ie greenstone pre-albitite

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IDEAL OPHIOLITE

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Levon - Howard Deposit

- manganese altn with
  Py - Gn stockworks

- diff follows a Qtz-ank
  altn zone (vein?)

  - chalcedony

  - Gn
  - stibnite
  - arsenic

Face - photo - gouge -

  vein averages Au

  - zone varies 60 - 20° dip

west drift

  OR to galleries

88/10/7

Alpine Traverse
(North of Tyax) Sunny / warm

BLUESCHIST

- Crossite lawsonite sphen
white mica albite epidote?

- ~~Pseudo~~ Tremolite actinolite higher

Possibly higher T → Cooler → apparently
~ cores of amphiboles

higher pressure

K/Ar Whole rock
195 222 250
meaning uncertain
TRIASSIC? ie same age as Pinchi
Klamaths, etc

Interlayered greenschist –
blueschist

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Brett Deposit - Vernon area 88/8/30

me / Greg / John Morey / Glen Daughtry

Rocks Eocene

volcs - and,

tuff, lahar

Flat lying

Tuffs - flat lying mentlgd

Hole 20 pyritic bleached andesite -
Lap Tuff or bx ?

~16m Heterolithic frag volc - py in
matrix + in cracks in
clasts - can run $\frac{1}{2}$ oz
~20 goes to amyg andesite

Clay alt zones carry pieces of mineralized @ the vein

- mineralization best in porous zones in FW of structure (HW or FW of pipe dyke @ Brett)

- Epidote when grades better?

* Brett 'shear' is actually an alt zone but the vein matter in it is pulled apart

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BRETT –
Corona (Lacana)
Huntington

- Ron Wells - Corona - Kamloops
- Warner Gruenwald
Huntington - Penticton
Laurie Walters - helper

Tours by Ken Daughtry

- just up from cow shack - argillic
altn zone "shear zone" - remnant
lenses of ? FSPPY ?

Left home 0530
Whoremans Cr ~1500
Vernon ~1915

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start 0630 (leave Vernon)

leave field 1745

arrive Lillooet _____

- strained diorite/gabbro
- unevenly distributed strain
- folin poorly developed
- possibly intrudes fol. tonalite ?

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Nicola Lk area 88/8/31

Tour with J Moore

me / Greg / Ken Daughtry / Rick Mayes

sunny / warm

Nicola 'Granite' cuts already uplifted amphib grade meta Nicola

Fol. Tonalite - cut by early white later pink aplite dykes

- no Kspar
- mylonite in places

Bridge R Trip 88/10/15

→ Pillow lavas - Bridge River

- chemically MORB to OC Id

- interbedded basalts with chert

→ Cadwallader IAArc affinities

Ages Cadwallader Carnian/Norian

Bridge River Triassic - L Jur (FOSSILS)

(1.) Age = contemporaneous

(BUT) ~~also~~ Diorites OLDER

BR is a melange - no good internal stratigraphy left.

· Perhaps ~~Cadwall~~ Bralorne Block 'Cadwallader' is older

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Local sheeted
dykes ∴ related
to Shulaps ?

Pulmite Pumpelly →
Greenschist grade
Local Blueschist

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TALKS - EVENING -

Jura-K Tyaughton

Cadwallader

Bridge River

Stuke slip faults

- Fraser - Eocene
- Yalakom Late K
- Tchaikazan sp? Late K
  pinned by 86Ma CPC

also Riley Ck

BR

Bedded chert

Pillow - massive bas

Lst

Arg

Conodonts Late T

Radiolaria

mid T - E J

BUT Hozameen PM so could be older

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Cadwallader
nomenclature problem -
defined near Broborne -
may be older.

Pillowed Grnstne
Pioneer

Cgl / fmn clastics
Karn / Nona

↓
younger

fg thinbedded
turbidites
poss. big J

Trangleton Ap
Relay Mtn
J - K shallow marine
lots of fossils
Taylor Creek
Sedo - Albian

Battlement Ridge Ap
Eocene volcs

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Plutonic Rx

~70

~50

~28

27 Big Sheep Mtn

- sensate

Poison Mtn 58-60 Ma

Hg - Sb veins + diss with

strike slip flts

John Garver -

Fraser Flt - young

N-S

Yalakom, etc - older

NW

Strike slip on Yalakom

7100 km offset

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Good fossil control

Kingsvale
Taylor Mt
Relay Mtn
Tyaughton
Cadwallader

mid J - Cadwallader +
Bridge R juxtaposed
COLLISION ??

Cadwallader Terrane
Tyaughton
+
Cadwallader

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Blueschist - $\overline{K}$
metamorphism?

Cadwallader
cgl has volc, lst
granitic clasts

Dash cgl - coarse braided river deposit
↓ Lizard sst

Battlement R Volcs

Dash - deposited in front of Thrusts?

THRUSTING - MID K

Eocene N - strike slip

Lt - Paleo NW strike slip

Mid K Shortening basin filling

mid J Terrane amalgamation

- Relay Mtn - overlaps Cadwallader - BR?
mid - up J

Mid K Thrusting
large folds + thrusts
+ ~ unconf
similar to Methow

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Faults

Tyaughton Ck
Castle Pass
Riley Ck
/ Strike Slip

carbonate altered U/M (serpentinite) along strike slip faults - recistant

Eocene

Minor in the area

Transtensional (pullapart)

Dextral

Reactivates older structures - rerend?

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Craig Leitch

Bralorne Intrusives Diorite / Soda Granite

10-11 Zircon ~272

K/Ar 284, 287

Rb/Sr whole rock 320

Early Pan

Menlyn -

albitite 91.4Ma

Hb Porp 85.7Ma

post-Min

Lamprophyre 44

Deep mesoth-mal

85-90

Mento

67-69

Blackdome

~45Ma

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BR

Soda Gr / Diorite
complexly interpenetrate

Both intrude serpentinite ?

Portal → Kamp Section

Diorite - stockwork of
veinlets typical

albitite dykes - wh plag phenos

altn
chloritic

Ribbon Vein

carb after Hb

chl after Hb

carb-ser

qtz carb ser fuchsite
Foliated

Soda granite - most intense
altn produces "symplectite ?"
/
myrmekitic

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Ribbon Veins

- gold in the dark ribbons

arsenopyrite

galena, sphal = both grades

VEINS

Main shear vein set | REIDEL SHEAR

E-W comp.

Sinistral shear needed

Vert extent ~2km

Ore shoots - steep w plunge

Last movement - reverse

FLUID INCLUSIONS

Surface 250

Deeper 300

Gradient 30°C/km

Salinity <5%

bi-modal

signif CO_2 in fl. incl.

minor CH_4

Filling T 350°C

P 1kb

MODEL

pH ~ 4.5 Na:K = 9:1

$fCO_2 \sim 10^{2.5}$ $fCH_4 \sim 10^{0.5}$

$fO_2 = 10^{-30}$ $fS_2 \sim 10^{-7}$

reducing

$a_u \sim 10^{-10}$ m

(.1 ppb)

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Ore formation

/Fluid CO_2-rich reacts with wall rock - linked to ~~form~~ formation of pyrite

(Paper)

Sibson et al

Fault activated pump model

---

soda granite - brittle - did not hold fracts. open

- Albitite dykes - veins follow them

(PROSPECTING)

DISTRICT ORE TYPES

Bralorne/Pioneer Mesoth

↓ Congress Minto Xtal

outward

Blackdome Epithermal

Pb Isotopes –
all deposits (incl.
Blackdome) are along
an isochron (I think)
– all from a similar
solution

Breakfast 0730

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800 level Bralorne Mine

>4M ounces Au prod.

well sec 51 vein x 857B

FW vein (main exploration target)

~ 1½ mile in from face, ~ 1000' below surface

Helen down dip

- new ok into old stope

- veins pinch + swell structures persistent

51 vein ~ Bralorne diorite

PHOTO 51 vein

- Diorite gtz pinch stockwork of veinlets

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albitite dykes
aplite dykes

Hb Pxy

Lamprophyre

albitites follow veins
structures — often
alongside veins

Soda Granite
< 15% Hb + pyrox
Qtz up to 30%
(phenos)

Photo Lamprophyre

" 52 B FW vein

" small stope 51B FW vein
Banded — manganese —
banded veins

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