

ANT/SHE/07

0046



Flying hours

	y		date
ChCh - McM	5.	20 mins	28/10
McM NVL	1.	30 mins	7/11
Reece	2.	15 mins	9/11
NVL - Dan R.	1.	00 mins	11/11
Reece	0.	30 mins	6/12
Thompson Spear	1.	30 mins	16/12
Forsyth - Thompson	0.	30 min	14/12
Thompson Spear - NVL	0.	55 mi	24/12
NVL - McMurdy	1.	30 min	30/12
McMurdy - ChCh	8.	00 min	4/1

Total 23 hours.

Flying Disability Allowance.

12 November 1981

Thompson spur - E tip

largely biotite schists + calc silicate/carb  
lenses and layers, cut by early  
folded qtz veins and pegmatites, and  
by pegmatite / aplites (granitic dykes  
(not folded). latter contain  
biotite, some muscovite, and locally  
tourmaline. Metareds locally  
contain sillimanite and commonly  
muscovite. Calc silicates contain  
amphibole, and form reaction rims  
around brown carbonate rich lenses,  
as well as discrete lenses.  
More massive mica granite  
on prominent ridge contains  
abundant inclusions of country  
rock (the schist) and shows  
very strong flow banding. Inclusions  
appear to be variably digested  
(some are just trails or schlieren  
of biotite-rich material). Granite  
is marked heterogeneously and

ranges from med. even-grained to  
coarsely pegmatitic. Dk is granitic  
near the contact and compositionally  
larger.

Immediately to E of major valley,  
across spur is largely metaseds  
int. by massive granitic dykes  
82285504 Calc silicate layer

13. November

W. side of large valley

Large granitic (snow patch pluton) with  
2 micas (biot most abundant), locally  
garnetiferous, includes some gk granite  
thin cutting 2 mica granite.

Many pelitic inclusions, ranging  
from biot schist, to biot gneiss  
Biotite ( $\pm$  gk, & feld) - rich schlieren  
may represent restite material.

Near contact well metaseds,

granite is migmatitic - shows  
strong comp (? flow) banding

2-3cm clots of biotite may be

associated with fracture zones -  
probably a metamorphic phenomenon  
resulting from action of late magmatic  
fluids. Near centre of pluton  
granite is more homogeneous,  
but still has local concentrations  
of xenoliths. Grey, red, melanocratic  
biotite <sup>body</sup> dyke forms a small (pre-granite)  
14 November 1981

E part of central Thompson Spur

W contact of pluton with metasediments  
highly irregular. Led out by  
granite veins and dykes, and a  
small stock. These granites are locally  
rich (~ 3-4%) in tourmaline  
and also the associated pegmatites  
sets locally very rich in musc  
and sillimanite, but others are  
relatively stzo-feldspathic.

They are migmatitic near granitic  
bodies (crossed by leucocratic material)  
locally calc. indicates an  
abundant

15 November 1981

E of large valley

Biitke granite (granodiorite) pluton, is relatively homogeneous compared to pluton to W. However, it contains some migmatitic zones with schist xenoliths. Also areas of irregular, 'wavy' shearing with development of allanite. Much tourmaline locally, especially in pegmatitic phases, as well as pale pinkish mica, and muscovite. Green apatite locally prominent in pegmatites. Some of the pluton is relatively melanocratic (~15% biitke).

Much biitke? diorite in massive, with small mafic xenoliths, but none seen in outcrop.

82285501 Tourmaline bearing

pegmatite cutting schist

5502

Schist + tourmaline bearing

aplitic granite vein

Some xenoliths of diorite

material present in granite

16 November 1981

N side of Swanson Glacier

Low grade (sericite - ? chlorite)  
schists and slaty rocks, +  
calcareous sediment, and psammite  
rocks. Cleavage / bedding at  $\sim 20^\circ$   
Some etc veins and tightly folded  
veinlets || to  $F_1$  folds.  
No granite seen

17 Nov. 1981

E Thompson spur

Foliated ? diorite inclusions cut by  
granitic veins etc. Schistose diorite  
contains small mafic inclusions like  
massive diorite observed in moraine.  
Diffuse, plastic folds in biotite-rich  
migmatitic zones of granite. Later  
etc. earlier (?) folds in schists.  
5507 Migmatite with pink mica (x40)  $\rightarrow$



18 November 1981

Andehute ridge

Intabbed psammite, pelitic, and calcareous metaseds, like N side of glacier, but rather higher grade.

Small garnets present in some pelitic schists, + muscovite. Pos. sillimanite in a few layers.

Calc silicates contain ? diopside and grossular. (+ amphibole?).

Small qtz veins are tightly folded and cleavage / bedding intersection lineation present.

No granite veins seen

20 November 1981

N Simon Glacier - E outcrop

Granite with diorite inclusions (variably foliated). Schlieren and migmatitic zones with biotite-rich material. Also porphyroblastic (? recrystallized & metasomatized)

diabase. Granite is strongly flow  
banded locally with net veined  
white leucogranite (aphite) and grey granite.

### Central outcrops

Injection complex - with biotite schist  
cut by partly foliated diabase.

These are cut by rare relatively  
mafic dykes. The whole is intruded  
by biotite granite, aphite and  
tonalitic pegmatite. The youngest  
intrusion is the grey <sup>biotite</sup> granite which  
forms dyke and veins, cutting peg/aphite.

The host rocks are quite migmatitic  
(layered) and show all gradations to granitic gneiss.

Further west the predominant  
rocks are mica ( $\pm$  sillimanite) schists  
cut by garnet tonalitic pegmatites  
and biotite granite.

Locally they are hydrothermally  
altered and show traces of  
Cu,  $\pm$  Zn mineralization.

21st November 1981

Outcrops of nunataks NE of Loran Glacier

Biotite granite + aplites (locally pegmatitic) with inclusions of biot schist (partially migmatized) and dioritic material (spls). Much like E outcrops on N side of Loran Glacier. The inclusions are variably re-exposed and show different stages of migmatite development. Felitic veins in schist are plagiocratically being folded. Some xenoliths appear to be of mafic composition. The outcrops are predominantly of granitic intrusives, but with quite a high xenolith / migmatitic component. The host rock is probably predominantly of biotite schist composition.

22nd Nov 1981

S tip of White Spur - small ntk

Large granite + inclusions of partly  
migmatized biotite schist (rare garnet)  
1 inclusion looks pos. volcanic (foliated)  
or hypabyssal cut by late grey granite veins

N tip of Spur

Generally similar - zones of "freckle  
phase" - rounded inclusion - rich, i.e.  
Schist + gty vein xenoliths (trace  
of Cu mineralization in one) Local  
"resisters" of tourmaline along fractures  
Many xenoliths show evidence  
of rotation.

23 Nov 1981

Outcrop at SE end of valley S of Allegro

Heterogeneous granite + zones of  
freckle phase - schist + gty inclusions  
showing evidence of rotation. Granite  
various from <sup>quite</sup> massive to st. layered (best  
rich). Locally porphyroblastic. 9

(Kesper megacrysts) Cut by grey  
granite dykes with aplitic selvages.  
Mafic dykes cut dioritic phase  
but are disrupted. Xenoliths  
locally contain garnet and sillimanite.  
Foliation has variable orientation -  
may be domal structure.

24/5 November 1981

Outcrops on S side of White Spur

Large layered granite, in part  
porphyroblastic, white somewhat aligned  
Ksp megacrysts. Layers and parts  
of front face phase ~~with~~ with numerous  
inclusions and clots of schist and  
quartz. Probable syenitic/dioritic  
dykes cut layers in granite but  
tend to be bondaged. Large  
dioritic (to gabbroic) intrusion cuts  
granite at Wookies Knob, both  
are cut by lighter grey dykes  
and locally by white aplitic

to pegmatitic dykes, and veins  
Granite intrudes amphibolite with  
randomly orientated, prismatic  
amphiboles at one locality.  
Possible calc silicate layers in one  
schist xenolith.

26 November 1981

Outcrops on N side of Allegro Valley

Fruitcake type granite? intruding (relations  
not seen clearly) schists. latter definitely  
cut by st orientated (Ksp) granite dykes.  
Gneissic migmatite appears to be  
more deformed and reX'ed version of  
fruitcake type. Many migmatitic  
veins and schlaesen of pegmatite / aphte.  
Schist including variably deformed  
and separated by biotite granite gneiss  
(st foliated). ~~the~~ X cutting granitic  
veins are folded. Numerous qtz inclusions  
(in clauing) well more found (also in schists)  
the aphte / pegmatite (with biot, musc, tourm,  
? kenzl) vein & dykes cut migmatites. ✓  
XFD

Foliation sub-parallel to that in adjacent schists, but no contact seen. The gneissose frontcake like may be near-source zone material.

29 Nov 1981

Valley S of White Spur

Intolayered frontcake phase and layered gneissoid. Latter intrudes former which shows various degrees of plastic deformation, and "dissolution" of xenoliths.

Some quartzitic material with leucocratic veins and ?tonalitic or granodioritic inclusions, partly as schlieren (where flow deformed).

5505 Diorite with randomly orientated amphiboles.

30 Nov 1981

Allegan Valley - N side

Rather foliated frontcake grades

into strongly foliated (gneissose)  
foultcake. Intolayered with  
massive, (aphitic, st. layered) granite.  
Gneiss may be intimately mixed,  
deformed foultcake + layer cake  
Schist may be large inclusions  
(cut by lineated (top) granite)

Diorite further west cuts  
the ? dikes of the fold schist (or gneiss) -  
calc-silicate. Foultcake appears  
to intrude diorite, and is cut  
by layered, aphytic granite  
(sharp, angular contacts)

3 Dec 1981

S Cirque of Penevoro Bluffs

largely foultcake, variably foliated  
much of it in inclusions, and abundant  
gneiss at southern locality (also  
some calc-silicate layers). There  
are also several small bodies  
of layer cake type granite.  
These appear to intrude foultcake ∞



(sharp contacts) in S crease, and  
or cut by syn-plutonic? diorite dykes  
& and late grey granite veins.

Frontal & layered types are  
intimately interfingered, and both  
appear to have been deformed (probably  
immediately post intrusion)

5506 Gt-bi schist inclusion

4 Dec 1981

N Crease of Penserzo Bluff

NE outcrop largely schist with abundant  
garnet cut by some pegmatite &/granite  
dykes. Prob breccia pipe with  
abundant quartz & some schist  
inclusions cuts schist foliation.

Matrix of breccia is highly  
garnetiferous (up to 50%,  $\leq 2$  cm) +  
qtz, biot, green mineral (dipyroide?),  
carbonate, muscovite  
etc. Pegmatite cutting breccia  
has dk green mineral (? dipyroide,  
andalusite?). Much of the muscovite  
may be associated with pegmatite intrusions.

5507 Garnet rich breccia

5508 Green microssit (XRD)

(Some of the material may be of magmatic (dioritic) origin)

Outcrops to west are foincacke  
(~50% xenoliths) cut by sd. later layer  
cake granite ~~and~~, and later aplitic  
granite.

This grades into xenolith-poor  
(5-10%) foincacke, which in turn  
passes (intended by) larger cake  
type. latter has some garnet-  
rich layers & schlieren. It is  
cut by thin ? dioritic dykes,  
cut in turn by pegmatitic dykes.  
Larger cake has some xenolith-  
rich (schist) zones || to foliation  
and also dark xenoliths.

Diorite intrusion high on cliffs.

5 Dec 1981

Outcrops E of Penevoro Bluffs

Largely frotcake, but relatively rich  
in xenoliths. Orange mineral in quartz  
inclusions for XRD.

Outcrops NE side of Nevada

Largely migmatitic schists cut by  
leucocratic coarse granite and aplitic/  
pegmatitic veins.

Schist at one outcrop is subhorizontal  
but cut by vertically foliated  
structures (more deformed) apparently  
associated with intrusion of  
frotcake type magma (also some  
layercake type). This is thus  
probably an early stage of  
frotcake development.

7 Dec 1981

Outcrop 1 1/2 mi NE of Lee Nbk

Migmatitic schist cut by grey  
syn-plutonic? granodioritic dykes;

Cut, in turn, by aphytic / pegmatitic  
dykes.

## See Ntk

Largely rather inhomogeneous light  
biotite granite. Rel. Numerous  
migmatitic schist xenoliths & rafts  
+ schlieren of biotite-rich material,  
etc. Cut by syn-plutonic  
? granodioritic dykes.

5510 Migmatitic biotite schist

8/9 Dec 1981

## Fisher Spur / de Vero area

Largely fruitcake with schist xenoliths.  
Variable amounts of inclusions (~5-40%)  
and variable degree of foliation.  
Some v. st foliated fruitcake  
has layers of rel xenolith-rich megacryst  
and layers of more massive porphyroblastic  
biotite granitoid (locally quite large  
Ksp megacrysts). Lighter, more  
even grained but granite is

interlayered, but locally has  
 intrusive relations. Intrusive into  
 the foidcake is E white, porphyritic  
 granite. All cut by late aplitic  
 veins. On spur of mt. here,  
 and E wall - very contorted foliated  
 foidcake with quite abundant  
 garnet and green? clinopyroxene  
 (XRD). Schist inclusions are  
 particularly rich in garnet, and  
 include calc-schists. ? Cpx  
 is commonly associated with  
 qtz and muscovite. Tourmaline-  
 bearing pegmatite is quite abundant  
 Towards top of Fisher Spur,  
 rather light coloured biotite  
 granite with some schist xenoliths  
 and biotite, zehreran crops out.  
 Much pegmatitic ~~material~~ material  
 also present. There is also a  
 darker coloured ? granodioritic  
 phase.

5509 Possible cordierite in <sup>qtz</sup> schist (or bluish qtz)  
 (XRD)

10 Dec 1981

W outcrops of Penneros Bluff

Diorite (+ frotcake) breccia - prob  
granitic matrix. Diorite (conc  
dykes) intrudes frotcake + light,  
layered melanocratic granite (latter  
is intrusive into frotcake)

Whole is intruded by thin  
granitic veins. Nearby, migmatitic  
~~frotcake~~ schist intruded by  
light granite (qtz) cut by breccia  
veins (v fine grained matrix  
+ biot, qtz, musc & schist &  
granite inclusions)

Outcrops to S are largely  
light coloured granite (rather  
layered), locally strongly  
megacrystic (Ksp) with inclusions  
of schist and diorite. Cut by  
melanocratic (? diorite or mafic)  
dyke-plutonic dykes (these X-cut  
foliation in granite. ==)

The granite has zones rich in inclusions.

At one place, fruitcake (rather inclusion poor) grades into st-foliated, migmatitic granitoid.

This is intruded by light granite. The lot is cut by a probable syn-plutonic mafic dyke (disrupted) late grey granite veins X-cut these.

12 Dec 1981

McNess / Fisher Spur area

Schist (br of fld) + calc-silicate (dwp, qtz, amphibole, qtz, carb) layers. Cut by pink to white granite and pegmatite veins.

Fruitcake type granite is intruded by grey to white biotite granite, cut in turn by pink, red leucocratic st brats granite (all cut by late veins).

Grey granite apparently intrudes  
dark grey diorite ( $\rightarrow$  gabbro)  
locally, but contacts are rather  
diffuse and almost gradational.

There is a major vertically  
disfused zone where grey (white veined)  
granite grades into a st foliated  
vein which intrudes schist

There are septa and inclusions  
of schist in all the granite types.  
(See gabbro which shows  
intrusive relations with schist)

13 Dec 1981

### Bystander Nkls

Massive megacrystic biotite granite  
cut by tourm + qt + bi + musc +  
apat pegmatites cut by thin (cm)  
? syn plutonic dioritic dykes

Nkls at head of Alleppo Valley

Rel low grade biot schist



with carbonate/calc silicate  
intercalations and qtz veins  
(orange gt?). Much amphibole  
(?actinolite) locally in calc-  
silicate layers. Tight folds  
and steeply plunging lineation  
(qtz veins also folded)

Ntk to E is higher grade  
calc-silicates with epidote  
and hornblende. Qtz veins  
contain orange gt? and epidote  
Folds less tight than other  
locality.

Cut by massive pegmatite  
(biot, tourmaline etc) with  
large (10cm) ksp megacrysts

Small Ntk's to NW are  
schists (calc biot and musc)  
and dioritic intrusions

15 Dec 1981

E Schroeder Spur

Largely leucocratic granite with numerous migmatite <sup>Schists</sup> xenoliths and schlieren. Diorthic xenolith locally. Strongly layered in part (layer calc + at flow banded material and xenolith-rich layers)

Some granite has relict? bubbles (+ musc + chlorite), possibly after garnet, dots with depleted (leucocratic) reaction haloes. These appear to grade into unrelict xenolithic material.

Schists contain biot + musc, but no sillimanite seen.

Further west massive pinkish biot + musc granite (and associated pink pegmatite). White granite (pres. the same), has numerous grey <sup>?</sup> diorthic or relict xenoliths whereas pinkish type is almost

Xerohill - free

16 Dec 1981

mt. Topwood

Diorite and schists intruded  
by pale biotite muscovite granite

Bounty Hill

2 mica granite intruding  
diorite and schist.

It is granite and associated peg

mt. Buchanan E

Pale 2 mica granite (fairly homogeneous,  
but small inclusions) intruded  
by massive tonalitic pegmatite  
containing large K-spar (near white)

Further E, monotonous low  
grade dark grey schists. (v few  
calc silicates) dip 210/75

Fisher Peak

massive 2 mica granite

Big Brothers Bluff

Frostcake cut by dioritic  
dykes cut by late pegmatite  
aplite

18 Dec 1981

S Thompson Spur

Diorite and schist cut by red homogeneous to layered granite.

"Orbicular" granite breccia in marauder has schist, diorite and qtz xenoliths in a granitic matrix (locally rare garnet). Some ( $\approx 5-10\%$ ) of xenoliths have X-titination rims of granite up to 2cm thick with wavy concentric layering. Boundaries with xenoliths (mostly schist, some dioritic) are sharp. Not seen in outcrop.

19 Dec 1981

E Thompson Spur

Largely strongly layered and foliated biotite granite with mafic schlieren and a variety of dioritic and schist inclusions. Septa of schist also present. Intruded by relatively concentric **14**

garnet + biotite granite. Garnet  
in clots and sparsely distributed  
through granite; muscovite also  
present, and biotite-rich clots.

Cut by grey granite veins, cut  
in turn by reddish-weathering  
aplitic veins.

Zones of migmatitic schlieren  
and schist xenolith (partly streaked  
out) - rich leucocratic granite.

Rather similar to fruitcake, but  
xenoliths less well-defined  
and matrix more leucocratic  
(schlieren-cake)

5511 Calc-silicate schist (folded)

20 Dec 1981

S Thompson Spur - W of Glacier Gap

massive biot granite - somewhat  
layered locally and cut by  
leucocratic ± garnet ± musc + biot

pegmatites Some ? sillimanite

in pegmatite is v coarse (2-3 cm - XRD)

Green feldspar in pegmatite also for XRD. Some all muscovite is associated with wisps of biotite (? X-ray amorphous) Schist inclusions contain same

sillimanite and muscovite and are locally rather migmatitic

Further west are largely metasediments

biot ± musc ± sillimanite cut by

tourmaline-rich pegmatites like those

described above. Sill quite abundant

Further west still - metasediments

cut by relatively few tourmaline

pegmatites. Seds are largely

calc-silicates + carbonate with

some quartz-feld-biotite prisms - pelitic

layers. No sill seen in center

21 Dec 1981

Central Schroeder Spur

Largely rather massive granite  
with some reefs and xenoliths  
of schist. At eastern locality  
charitic dykes intrude carbonate/  
calc-silicate / semipelitic schists  
and are cut by pegmatitic dykes.  
Granite here is rather pegmatitic  
(town, some qt, biot, musc)  
Most of the remaining outcrops  
are granite - biot + musc (some  
silicified in schlieren) - largely  
commonly with even-grained  
and more leucocratic, pegmatitic  
material. Cut by grey  
(? granodiorite) and black (diorite  
to gabbro?) Egm-plutonic dykes.  
Some of the granite is megacrystic  
and cut by pink granite and  
white aplite granite veins.

27/28 Dec 1981

S end of Salamander Range

rather massive

Largely  $\frac{1}{2}$  white qtz schists with calc  
silicate gneiss (W end of spurs) -  
diopside + plag + qtz + rare garnet  
cut by granitic and pegmatitic  
dykes (no tourmaline seen)

Some host  $\pm$  musc rich pelitic - larger  
Sillimanite occurs locally + schist  
with muscovite aggregates.

5512, 3 Schists with musc clots  
and pos sillimanite

5514 Hornblende (rare field) dyke -  
X cutting, apparently undeformed,  
but very irregular contact.



## XRD samples

- 5515, 6 ? chloasite (dk green mineral)  
5517 pale green feldspar  
5518 Orange ? garnet  
5519 fibrous ? allimante  
5520 ? foyl or pyroxene

5521 McMurdoo volcanic with  
abundant olivine

5522 Kevyite

5523, 4 N of Pebbly head)

0004

8228 ~~1160~~ - R.S. Barcood samples (33  
for chemical analysis).

5599

8428 ~~1161~~

Iceberg sample for RST



69

ABCD

Ac

Bd

ACBD

AB

BA

CD

ABDC

AD

Bc

1

Bc

YRGW

x ?

YGWR

YGRW

V Cr Ni Cu Zn Ga Pb Sr

Y Zr Nb Y La Ce Pb Th U

+ As, Sn, (Mo), Be, Li, Ba

(W, Bi)



