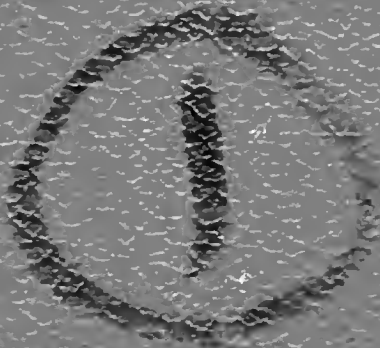


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Flying hours

	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. Metaseds locally
contain sillimanite as 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 of schlieren
of biotite-rich material). Granite
is marked heterogeneously and

range from med. even-grained to
coarsely pegmatitic. It is grosser
near the contact and compositionally
larger.

Immediately to E of major valley,
across spur is largely unaltered
and has 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
rem cutting 2 mica granite

Many K-feldspar inclusions, ranging
from biot schist, to biot gneiss
Biotite (+ gk + feld) - rich schlieren
may represent resitite material.

Near contact well unaltered,

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

2-3cm clots of biotite may be

associated with fracture zones -
probably a metasomatic 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 ^{body} ? diorite forms a small (pre-granite)
14. November 1981

E part of central Thompson Spur

W contact of pluton with metasediments
highly migmatitic. 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 quartz-feldspathic.

They are migmatitic near granitic
bodies (formed 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 igneous 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 pegmatite. Some of the pluton is relatively melanocratic (~15% biitke).

Much biitke? schist 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 sediments 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 margin.

Diffuse plastic folds in brittle-rich
migmatitic zones of granite. Later
etc. earlier (?) folds in schists.

5503 Pegmatite with pink mica (x2)

18 November 1981

Andehule 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 lightly folded and cleavage / bedding intersection lineation present.

No granite veins seen.

20 November 1981

N Simon Glacier - E outcrop

Gneiss with diorite inclusions.

(variably foliated). Schlieren and migmatitic zones with biotite-rich material. Also porphyroblastic (? recrystallized & metamorphic).

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

tanomahri pegmatite. The youngest intrusion is the grey ^{biotite} 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 tanomahri pegmatite and biotite granite.

Locally they are hydrothermally altered and show traces of

Cu, ? Zn mineralization

21st November 1981

Outcrops of micasites NE of Llanon Glacier

Biotite granite + aplites (locally pegmatitic) with inclusions of biot schist (partially migmatized) and dioritic material (sph). Much like E outcrops on N side of Llanon Glacier. The inclusions are variably relict and show different stages of migmatite development. Feldic veins in schist are plagioclase rich and folded. Some xenoliths appear to be of mafic composition. The outcrops are predominantly of granitic intrusives, but with quite a high xenolith/migmatite 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 + quartz veins xenoliths (trace
of Cu mineralization in one) Local
"rosettes" 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 + quartz inclusions
showing evidence of rotation. Granite
various from ^{quite} massive to st. layered (best
rich). Locally porphyroblastic. 9

(Kesper megacrysts) Cutting grey
granite dykes with aplite 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 rock
porphyroblastic white somewhat aligned
Kesper megacrysts. Layers and parts
of front face phase ~~is~~ 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 partly by white aplitic

to pegmatitic dykes and veins.
Granite intrudes amphibolite with
randomly orientated, prismatic
amphiboles at one locality.
Possible calc albite 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 lined version of
fruitcake type. Many migmatitic
veins and schists of pegmatite / aphte.
Schist includes, variably deformed
and separated by biotite granite gneiss
(st foliated). ~~the~~ X outcrop 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. **L**
XFD

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

29 Nov 1981

Valley S of White Spur

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

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

5505 Diorite with randomly orientated amphiboles.

30 Nov 1981

Alleghen Valley - N side

Rather foliated frotcake 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 leucated (top) granite)

Diorite further west cuts
tho? drops of 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
garnet 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
are cut by syn-plutonic ? diorite dykes
& and late grey granite veins.

Fronzite & 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 Penrose Bluff

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

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

5507 Garnet rich breccia

5508 Green mineral (XRD)

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

Outcrops to west are fountcake
(~50% Xenoliths) cut by sl. later larger
cake granite ~~=====~~, and later aplitic
granite.

This grades into xenolith-poor
(5-10%) fountcake, 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 druse xenoliths.

Diorite intrusion high on cliffs.

5 Dec 1981

Outcrops E of Penasco Bluffs

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

Outcrops NE side of Navajo

Largely migmatitic schists cut by leucocratic layered 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 layered 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/regional
dykes.

Lee 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 / McVero 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 megacrysts
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. Hess,
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. calcites. ? 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, zirconiferous c. g. out.
Much pegmatitic ~~material~~ material
also present. There is also a
darker coloured ? granodioritic
phase.

5509 Possible cordierite in ^{qtz} schist (or bluish qtz)
(XRD)

10 Dec 1981

W outcrops of Peneiros Bluff

Diorite (+ frotcake) breccia - prob
granitic matrix. Diorite (w/ some
dykes) intrudes frotcake + light,
layered leucocratic 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 (√ 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-plitonic dykes (these X-cut
foliation in granite. **==**)

The granite has zones rich in inclusions.

At one place, frotcake (rather inclusion poor) grades into a foliated, migmatitic granite.

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 (bi qtz feld) + calc-silicate (dip, qtz, amphibole, qtz, carb) layers
Cut by pink to white granite and refractory veins.

Frotcake type granite is intruded by grey to white biotite granite, cut in turn by pink, red leucocratic qtz biotite 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
disruptive 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
intensive relations with schist)

13 Dec 1981

Bystander Nks

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

Nks at head of Alleppo Valley

Rel low grade biot schist

with carbonate/calc silicates
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 ^{Schists} xenoliths and schlieren. Diopside xenoliths locally. Strongly layered in parts (large calc + et 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 (not the same), has numerous grey [?] diopside or schist xenoliths whereas pinkish type is almost

Xenolith - free.

16 Dec 1981

mt. Treadwell

Diorite and schists intruded
by pale biotite muscovite granite

Bounty Hill

2 mica granite intruding
diabase and schist

It is granite and associated peg.

mt. Buchanan E

Pale 2 mica granite (fairly homogeneous,
but small megacrysts) 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

Fishers Peak

massive 2 mica granite

Big Brother Bluff

Frontalite 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-lamination 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 homogeneous **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 biotite 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-enocryptic) 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. Still quite abundant

Further west still - metasediments

cut by relatively few tourmaline

pegmatites. Seds are largely

calc-silicates + carbonate with

some qtz-feld-biot prisms - pelitic

layers. No sill seen in center

21 Dec 1981

Central Schroeder Spur

Largely rather massive granite
with some rofts 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
(low m, low qt, biot, musc)
Most of the remaining outcrop
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 cores (W end of spurs) -
diopside + plag + qtz + rare garnet
cut by granitic and pegmatitic
dykes (no tourmaline seen)
Some host \pm musc rich pelitic lenses
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 ? chlorite (dk green mineral)
5517 pale green feldspar
5518 Orange ? garnet
5519 fibrous ? allimantite
5520 ? foyite or pyroxene

5521 McMurdo volcanic with abundant olivine

5522 Kevynite

5523, 4 N of Pebbly head)

0004

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

5599

8428 ~~8428~~ 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)

