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Sample localities, descriptions, major- and trace-element abundances of rocks from the Lamarck Granodiorite and associated mafic rocks, eastern Sierra Nevada, California

by

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Introduction

This report is a compilation of sample localities, abbreviated sample descriptions, and major- and trace-element determinations of samples from the Lamarck Granodiorite, Sierra Nevada, California. The data presented in this report forms the basis on which Frost (1986, 1987) and Frost and Mahood (1986a, 1986b, 1987) made their interpretations. Table 1 presents sample locality latitude and longitudes for the samples on which major- and trace-element determinations were made. Tables 2 and 3 present the major and trace element data. Tables 4 and 5 report major and trace element data and standard deviations made on replicate determinations of element abundances in international geological reference materials which were performed concurrently with the determinations presented in Tables 2 and 3. Fifteen minute U.S. Geological Survey quadrangle maps covered are: Mt. Tom, Mt. Goddard, Big Pine, Marion Peak, and Mt. Pinchot. Seven and one-half minute quads are: Mt. Tom, Mt. Darwin, Mt. Thompson, Mt. Goddard, North Palisade, Split Mountain, and Mt. Pinchot.

Geological overview

The Late Cretaceous Lamarck Granodiorite (Bateman, 1965; Moore, 1963; Stern et al, 1981) hosts a broad range of mafic-felsic rock relations that Frost (1986, 1987) and Frost and Mahood (1986a, 1986b, 1987) interpret as resulting from combined effects of physical interaction between mafic and felsic magma during crystallization of the Lamarck Granodiorite and fractional crystallization of both the mafic and felsic magmas before and during interaction. Field relations preserve the results of magma interaction as ellipsoidal mafic enclaves (inclusions) in granodiorite, localized hybrids between mafic and felsic magmas, and discrete mafic intrusions into granodiorite. Much of the compositional variation in individual rock types,

excepting recognized hybrids, appears to be due to fractional crystallization of the individual magmas.

Sampling Methods

All coarse grained samples collected in the field weighed at least 5 kg; samples taken from areas accessible by automobile weighed at least 20 kg. Sizes of samples of mafic enclaves were limited by enclave size and ease of removal; in most instances, the entire enclave, excepting a thin section billet, was crushed. Wherever possible, a sample of both enclave and host granodiorite were taken.

Samples were coarsely crushed to thumb-joint size with a steel sledge hammer with the sample sandwiched between at least 5 sheets of blank computer paper. After coarse crushing, the samples were inspected visually and any fragments of computer paper adhering to them was removed. A small tungsten carbide jaw crusher was then used to reduce the samples to 1-3 mm. The interior and exterior of the crusher was scrubbed with a toothbrush and thoroughly blasted with filtered compressed air between each sample. The first several handfuls of each sample passed through the crusher were discarded. After jaw crushing, each sample was repeatedly split in a baffle-splitter to yield a sample of about 50 g.

A tungsten carbide shatterbox was used to pulverize the samples to approximately -200 mesh. Between each sample, the shatterbox was scrubbed with a toothbrush, washed in tap water, and dried with compressed air. Final cleaning was performed by crushing a split of the next sample for one minute. The shatterbox was then emptied, brushed with a clean toothbrush, rinsed in deionized water, and dried before the split to be analysed was loaded for crushing. Crushing times varied between 3 and 5 minutes, with biotite-rich samples requiring the longer times. Quartz subjected to the same procedure

showed measurable contamination in Co and W; contamination by other elements was below detection limits for energy-dispersive XRF spectrometry.

X-Ray Fluorescence Spectroscopy

Major-element determinations were made by standard wavelength-dispersive XRF spectroscopic techniques. Reported abundances were made by averaging two determinations on replicate fused discs made with lithium tetraborate flux. A sample-flux ratio of 1:8 was utilized. The complete fusion technique is described in Taggart et al (1987). Determinations were made on a Diano 8600 wavelength-dispersive XRF spectrometer. Calibration curves for the major oxides were made by standard methods described by Taggart et al (1987). Minor- and trace-element abundances reported are averages of triplicate determinations on replicate powders made on a secondary-target EDXRF (Kevex 0700) spectrometer by the Compton peak ratio method (Johnson, 1984). The data in Tables 4 and 5 represent means and standard deviations for major- and trace-element abundances determined by at least ten determinations per international standard.

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Table 1. Sample localities and descriptions, Lamarck Granodiorite and associated mafic rocks.

Sample	N.Lat	W. Long	Description
PIUTE PASS-LAKE SABRINA AREA			
4A	37.12'36"	118.38'40"	Coarse-grained homogeneous (hb)-bio grd.
4B	37.12'36"	118.38'40"	Coarse bio-hb grd. Intruded by 4A with sharp ctc.
6A	37.12'37"	118.38'39"	Felsic hb-bio grd. Host to 6B inc.
6C	37.12'37"	118.38'39"	Fine-grained inc. Pl phenoxts to 4 mm.
10B	37.13'03"	118.38'24"	Felsic hb-bio grd. Intrudes 10C.
10C	37.13'03"	118.38'24"	Homogeneous, unfoliated mafic bio-hb grd w/ abundant incs.
11A	37.13'08"	118.38'22"	1.5 m diam. well-rounded inc. Hb, pl phenos to 4 mm.
11C	37.13'08"	118.38'22"	Same as 11A
12	37.12'28"	118.38'30"	Medium grained homogenous bio grd.
15A	37.14'01"	118.39'32"	Homogeneous bio-hb grd. Host to 15C.
15C	37.14'01"	118.39'32"	Heterogeneous mafic bio-hb grd. Abundant inc.
16A	37.14'18"	118.40'07"	Fine grained inc. pl phenoxts, bio, hb pl groundmass.
16B	37.14'18"	118.40'07"	Heterogeneous mafic bio-hb grd host to 16A.
16C	37.14'18"	118.40'07"	Fine grained inc.
16D	37.14'18"	118.40'07"	Heterogeneous inc. Pl, Hb as phnos. to 3 mm.
16E	37.14'18"	118.40'07"	Homogeneous hb-bi grd host to 16D.
87A	37.13'50"	118.39'07"	Mafic intrusion. 30 m from ctc. Pl, hb, as phenoxts to 4 mm, pl,hb, bio grndmass.
87B	37.13'50"	118.39'07"	Fine-grained inc.
87C	37.13'50"	118.39'07"	Host to 87B. Heterogeneous mafic grd.
87D	37.13'50"	118.39'07"	Fine grained inc.
87E	37.13'50"	118.39'07"	Homogeneous hb-bio grd. Host to 87E.
87F	37.13'50"	118.39'07"	Hybrid schlieren in grd similar to 87E.
87G	37.13'50"	118.39'07"	Nearly homogeneous intrusion. Hb, pl, bio to 4 mm. hypidiomorphic.
87H	37.13'50"	118.39'07"	Heterogeneous hybrid.
87I	37.13'50"	118.39'07"	Heterogeneous hybrid.
87J	37.13'50"	118.39'07"	Heterogeneous hybrid.
87K	37.13'50"	118.39'07"	Heterogeneous hybrid.
88	37.13'50"	118.39'08"	Fine-grained inc. in homogeneous grd.
88C	37.13'50"	118.39'08"	Host to 88. Coarse, homogeneous hb-bio grd.
91	37.14'03"	118.38'55"	Homogeneous mafic bio-hb grd 30 m from ctc w/ metasedimentary rocks of Pine Creek pendant.
92	37.14"04"	118.38'45"	Coarse foliated mafic bio-hb grd from ctc w/ metasedimentary rocks.
LL-1a	37.13'20"	118.38'00"	Coarse hb-bio grd. unfoliated.
LL-4a	37.13'18"	118.38'13"	Fine-grained bio-hb inc.
LL-4b	37.13'18"	118.38'13"	Heterogeneous bio-hb qtz diorite host to LL-4a.
LL-5b	37.13'14"	118.38'15"	Fine-grained bio-hb inc.
PP-6a	37.14'22"	118.40'43"	Mafic bio-hb intrusion. Grades to more felsic rock.
LL-5a	37.13'14"	118.38'15"	Coarse heterogeneous bio-hb diorite intrusion.
LL-3	37.13'17"	118.38'10"	Coarse foliated bio-hb diorite or qtz diorite intrusion.
LL-2c	37.13'20"	118.38'06"	Coarse foliated bio-hb qtz diorite intrusion.
PP-2L	37.13'59"	118.39'29"	Heterogeneous hb-bio grd.
PP-2M	37.13'59"	118.39'29"	Heterogeneous hybrid schlieren from PP-2L.
PP-3	37.13'58"	118.39'28"	Heterogeneous hb qtz. diorite intrusion.
PP-7	37.14'43"	118.40'34"	Heterogeneous bio-hb mafic grd.

Table 1. Continued.

Sample	N.Lat.	W. Long	Description
SOUTH LAKE - ECHO PASS AREA			
20A	37.10'19"	118.33'51"	"Borrow pit" at South Lake Dam. Coarse homogeneous hb-bio grd.
20B	37.10'19"	118.33'51"	Fine inc. 10x17 cm.
21A	37.11'16"	118.33'29"	Coarse homo. hb-bio grd.
21B	37.11'16"	118.33'29"	Fine-grained pl. phyric inc.
23A	37.09'13"	118.34'17"	Coarse homo. hb-bio grd.
23B	37.09'13"	118.34'17"	Fine-grained pl. phyric inc.
24A	37.09'09"	118.34'17"	Medium grained mafic hb-bio grd.
24B	37.09'09"	118.34'17"	Fine-grained inc. in 24A.
24C	37.09'09"	118.34'17"	Heterogeneous mafic bio-hb grd. Sharply intrudes 24A.
25	37.09'06"	118.34'13"	Large inc., 150x30 cm. fine-grained, pl, hb, bio, sphene.
31A	37.08'52"	118.34'33"	Inc from swarm. 50% of rock is incs. trailside boulder on way to Treasure Lakes.
31B	37.08'52"	118.34'33"	Mafic grd host to 31A. Small sample.
44C	37.11.22"	118.37'08"	40x70 mm inc. in heterogeneous hybrid mafic grd.
45	37.11'40"	118.37'15"	Homogeneous mafic qtz diorite intrusion. Hypidiomorphic, medium grained.
SL-1a	37.10'09"	118.32'54"	Coarse homogeneous hb-bio grd. unfoliated.
SL-3	37.12'40"	118.36'33"	Heterogeneous bio-hb mafic granodiorite.
SL-4	37.12'31"	118.36'42"	Coarse homogeneous hb-bio grd.
SAB-1b	37.11'12"	118.37'15"	Heterogeneous fine- to medium-grained bio-hb diorite.
SAB-2	37.11'14"	118.37'16"	Heterogeneous bio-hb qtz diorite 20 m inside of Lake Sabrina mafic intrusion.
SAB-4	37.11'36"	118.37'23"	Heterogeneous bio-hb qtz diorite.
SAB-5	37.12'46"	118.36'46"	Heterogeneous bio-hb qtz diorite.
SAB-9	37.12'46"	118.36'46"	Heterogeneous bio-hb qtz diorite.
EC1dL	37.08'52"	118.38'24"	Coarse-grained bio-hb grd.
EC-1b	37.08'52"	118.38'24"	Coarse-grained heterogeneous hb qtz diorite.
EC-1a	37.08'52"	118.38'24"	Coarse-grained bio-hb grd. Faint foliation.
EC-1c	37.08'52"	118.38'24"	Pl-phyric fine-grained inc.
EC1dI	37.08'52"	118.38'24"	Pl-phyric fine-grained inc.
MT. GILBERT AREA			
76A	37.08'34"	118.34'51"	Coarse-grained homogeneous hb-bio grd.
76B	37.08'34"	118.34'51"	Gradational to schlieren. Mafic bio-hb grd.
76C	37.08'34"	118.34'51"	Cumulus schlieren. Euhedral hb (60%), mt (3%); subhedral bio (10%); anhedral pl, qz, ksp. Abundant sphene, zircon.
80C	37.08'46"	118.35'00"	Hb gabbro of Mt. Gilbert intrusion. Euhedral pl phenoxts to 1 cm, hb is subhedral. 1 m from ctc with Lamarck.
80E	37.08'46"	118.35'00"	same as 80C.
80F-L	37.08'45"	118.35'00"	Coarse homogeneous bio-hb grd at ctc with mafic intrusion.
80F-I	37.08'45"	118.35'00"	Mafic intrusion at ctc. From same hand specimen as 80F-L.
81A	37.08'44"	118.35'10"	Coarse heterogeneous hb gabbro. Euhedral pl phenoxts comprise 15% of rock.

Table 1. Continued.

Sample	N.Lat.	W. Long	Description
81B	37.08'44"	118.35'10"	Pl-rich (30%), otherwise similar to 81A. Ctc between A and B is gradational.
83	37.08'38"	118.35'19"	Angular, cumulus-textured hb gabbro inc. 1x1.5 m.
83B	37.08'38"	118.35'19"	ellipsoidal inc. from hb diorite that cuts 83c.
83C	37.08'38"	118.35'19"	Coarse grained hb diorite-gabbro. Host to 83B.
84A	37.07'59"	118.35'13"	Homogeneous coarse-grained hb-bio grd at ctc with mafic intrusion.
84B	37.07'59"	118.35'13"	Medium-grained pl-phyric hb gabbro at ctc.
84C	37.07'59"	118.35'13"	Ellipsoidal medium-grained pl-phyric inc. in grd 20 m from ctc of Mt. Gilbert intrusion.
84D	37.07'59"	118.35'13"	Homogeneous coarse-grained hb gabbro 5 m from ctc. Pl-phyric.
84F	37.07'59"	118.35'12"	Fine-grained inc. 40 m from ctc.
85A	37.07'59"	118.34'58"	Coarse, homogeneous bio-hb grd 200 m from Mt. Gilbert intrusion.
85B	37.07'59"	118.34'58"	Fine-grained inc. 5% pl phenoxts.
86A	37.08'39"	118.34'54"	Homogeneous bio-hb grd.
86B	37.08'39"	118.34'54"	Fine-grained inc.
GB-1a	37.08'48"	118.35'00"	Coarse bio-hb grd at ctc. unfoliated.
GB-1b	37.08'48"	118.35'00"	Coarse bio-hb grd dike cutting Mt. Gilbert intrusion. Dike has non-matching walls and rotated incs.
GB-2	37.08'47"	118.35'00"	Coarse, pl phenoxts to 1 cm hb gabbro. homogeneous.
GB-8	37.08'31"	118.35'24"	Coarse, pl phenoxts to 1 cm hb gabbro. heterogeneous.
GB-9	37.08'30"	118.35'24"	Coarse, pl phenoxts to 1 cm hb gabbro. homogeneous.
GB-10	37.08'32"	118.35'14"	Coarse, pl phenoxts to 1 cm hb gabbro. homogeneous.
GB-5a	37.08'38"	118.35'19"	Angular, cumulus-textured hb gabbro inc. in gabbro. Green hb to 1 cm with igneous lamination, partly replaced by brown biotite. Mt euhedral, pl interstitial.
GB-5b	37.08'38"	118.35'19"	Same.
GB-5c	37.08'38"	118.35'19"	Same.
GB-6	37.08'37"	118.35'19"	Same.
DUSY BASIN-PALISADE BASIN AREA			
93A	37.06'40"	118.32'50"	Pink Kspar phenoxts to 1 cm in hb-bio granite-grd.
93B	37.06'40"	118.32'50"	Fine-grained bio-rich inc in 93A.
95B	37.06'29"	118.33'02"	Fine-grained bio-rich inc.
96A	37.06'18"	118.33'09"	hb-bio grd.
96B	37.06'18"	118.33'09"	Pl-phyric inc.
102	37.06'08"	118.32'22"	Coarse bio-hb grd.
103	37.06'09"	118.32'16"	Coarse k-spar phenoxt bio-hb granite.
106A	37.05'19"	118.33'16"	Giant inc, 10x15 m. 10 cm from ctc. Inc has sharp cuspate ctcs w/ grd. Pl-phyric bio-hb diorite.
106B	37.05'19"	118.33'16"	From core of giant inc. Similar to 106A.
106C	37.05'19"	118.33'16"	Coarse homogeneous bio-hb grd. Host to giant inc.
110	37.05'34"	118.31'07"	White kspar phenoxt-bearing felsic (hb)-bio granite. No inclusions present.
112	37.05'26"	118.31'24"	Pink-weathering kspar phenoxt-bearing (hb)-bio granite. No inclusions present.

Table 1. Continued.

Sample	N.Lat.	W. Long	Description
113A	37.05'28"	118.31'36"	Bio-hb granodiorite.
113B	37.05'28"	118.31'36"	Pl-phyric fine-grained mafic inclusion.
114A	37.05'19"	118.31'46"	Coarse, homogeneous bio-hb grd.
114B	37.05'19"	118.31'46"	Fine-grained inc. from 114A.
114C	37.05'19"	118.31'46"	Fine-grained pl-phyric inc from swarm that cuts 114A, B.
115A	37.05'17"	118.31'40"	Homogeneous bio-hb grd.
115B	37.05'17"	118.31'40"	Hybrid matrix to inc swarm. Host to 115C. Bimodal hb size distribution.
115C	37.05'17"	118.31'40"	Fine-grained inc from swarm.
115D	37.05'17"	118.31'40"	Same as 115B.
116	37.05'09"	118.32'17"	Coarse bio-hb grd.
117A	37.05'00"	118.32'32"	Coarse bio-hb grd at Knapsack Pass.
117B	37.05'00"	118.32'32"	Fine-grained pl-phyric inc.
118	37.05'06"	118.32'46"	Coarse homogeneous hb-bio grd.
119A	37.05'13"	118.32'56"	2x3 m rounded inc. Fine grained, pl-phyric.
123A	37.05'16"	118.33'41"	Homogeneous coarse-grained hb-bio grd.
123B	37.05'17"	118.33'40"	Heterogeneous, schlieren-bearing hybrid intrusion. Gradational over 3 m to 123A.
PC-1a	37.04'09"	118.32'33"	Foliated coarse grained hb-bio grd.
PC-1b	37.04'09"	118.32'33"	Heterogeneous hybrid bio-hb grd.
PC-1c	37.04'09"	118.32'33"	Heterogeneous hybrid bio-hb mafic qtz diorite.
PC-2	37.04'08"	118.32'38"	Coarse-grained pl-phyric hb diorite intrusion.
PC-4b	37.04'07"	118.32'57"	Heterogeneous hybrid bio-hb mafic qtz diorite.
PC-4c	37.04'07"	118.32'57"	Heterogeneous hybrid bio-hb mafic qtz diorite.
DB-7b	37.06'14"	118.03'11"	Coarse hb-bio grd.
MATHER PASS - UPPER BASIN			
UB-1a	36.59'04"	118.24'25"	Coarse bio granite.
UB-1b	36.59'07"	118.25'17"	Heterogeneous matrix to inc swarm. Med-coarse grained.
UB-1c	36.59'07"	118.25'17"	Same.
UB-2a	36.57'00"	118.25'26"	Foliated bio-hb granodiorite at margin of intrusion.
UB-2b	36.56'56"	118.25'18"	Foliated bio-hb qtz diorite hybrid.
UB-1d	36.59'05"	118.25'36"	Cumulus-textured hb gabbro inc 40x50 cm.
UB-3d	36.59'05"	118.27'02"	Same, 40x50 cm.
UB-5	37.01'29"	118.27'55"	Homogeneous bio-hb diorite intrusion.
UB-6	37.01'26"	118.28'09"	Heterogeneous bio-hb diorite hybrid.
UB-7	37.01'28"	118.28'22"	Same, pl phenoxts to 60% of rock.
UB-9	37.01'07"	118.29'03"	Same.
PC-5a	37.03'12"	118.29'50"	Angular, cumulus-textured hb gabbro inc.
PC-7b	37.03'20"	118.29'37"	Heterogeneous pl-phyric hb qtz diorite.
PC-8	37.03'22"	118.29'33"	Angular, cumulus-textured hb gabbro inc.
PC-9	37.03'24"	118.28'58"	Heterogeneous, foliated bio-hb diorite or gabbro.
PC-10	37.02'38"	118.27'56"	Heterogeneous, foliated bio-hb diorite.
APLITE, COMPOSITE, AND MAFIC DIKES			
21C	37.11'16"	118.33'29"	Homogeneous aplite dike.
29-0	37.08'40"	118.34'12"	Homogeneous aplite dike. 2 m thick, horizontal.
49C	37.12'42"	118.36'49"	Homogeneous aplite dike.

Table 1. Continued.

Sample	N.Lat.	W. Long	Description
81C	37.08'38"	118.35'10"	Homogeneous aplite dike.
97A	37.05'58"	118.32'54"	10 cm wide homogeneous aplite dike.
111	37.05'32"	118.31'10"	50 cm wide aplite dike cutting Inconsolable Granodiorite. Sample from boulder at base of N. Palisade.
7A	37.12'38"	118.38'40"	Composite dike- aplite phase comprises 70% of area of dike. Froms matrix between and is in sharp ctc with 7B.
7B	37.12'38"	118.38'40"	Fine-grained diorite core of dike. Masses of diorite in sharp, pillowlike masses.
27A	37.08'58"	118.34'15"	Composite dike- aplite phase.
27B	37.08'58"	118.34'15"	Fine-grained bio-hb diorite pillow in dike.
46A	37.11'50"	118.37'02"	Composite dike, diorite pillow.
46B	37.11'50"	118.37'02"	Composite dike, aplite matrix to pillows.
104A	37.06'25"	118.33'04"	Composite dike. Aplite from marginal part of dike against grd.
104B	37.06'25"	118.33'04"	Fine-grained diorite pillow.
105A	37.06'07"	118.33'10"	Composite dike. Intermediate phase composed of aplite with discrete crystals of hb and bio derived from diorite pillow.
105B	37.06'07"	118.33'10"	Aplite matrix of composite dike.
121A	37.05'48"	118.33'32"	Aplite matrix of composite dike.
121B	37.05'48"	118.33'32"	Aplite with some mafic crystals intermixed.
121C	37.05'48"	118.33'32"	Fine-grained diorite pillow.
121D	37.05'48"	118.33'32"	Fine-grained diorite pillow.
122	37.05'49"	118.33'32"	Intermediate phase composed of aplite with intermixed mafic xls.
DB7af	37.06'14"	118.03'11"	Composite dike- aplite matrix.
DB7ai	37.06'14"	118.03'11"	Intermediate phase composed of aplite with intermixed mafic xls.
DB7am	37.06'14"	118.03'11"	Fine-grained diorite pillow.
29A	37.08'40"	118.34'12"	Fine-grained mafic dike.
29B1	37.08'40"	118.34'12"	Fine-grained mafic dike
29B2	37.08'40"	118.34'12"	Fine-grained intermediate dike.
29E	37.08'40"	118.34'12"	Fine-grained mafic dike.
79A	37.08'36"	118.34'55"	Fine-grained mafic dike.
107	37.05'12"	118.32'19"	Fine-grained mafic dike.
WALL ROCKS AND METASEDIMENTARY INCLUSIONS			
54C	37.13'28"	118.36'01"	Calc-silicate wall rock.
74A	37.09'02"	118.34'35"	Calc-silicate wall rock.
30A	37.07'40"	118.33'00"	Strongly foliated hb-bio gneiss of Bishop Creek roof pendant.
BP-1a	37.07'42"	118.32'58"	Same.
BP-3	37.07'14"	118.32'30"	Coarse grained bio-hb Inconsolable Grd. Dark color due to dark colored pl.
BP-5	37.07'13"	118.32'27"	Same.
UB-1e	36.59'04"	118.24'54"	Strongly foliated, fine- to medium grained bio schist.

Table 1. Continued.

Sample	N.Lat.	W. Long	Description
UB-8	37.01'23"	118.28'40"	Medium-grained alaskite of Evolution Basin. Sugary-textured.
PC-X	37.03'15"	118.30'03"	Same.
DB-5	37.05'38"	118.34'04"	Same.
UB-3c	36.59.00"	118.27'10"	Mafic bio-hb grd of Cartridge Pass Pluton.

Abbreviation used in Table 1: bio - biotite; ctc - contact; grd - granodiorite; hb - hornblende; inc - inclusion; mt - spinel (magnetite); phenoxts - phenocrysts; pl - plagioclase.

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
PIUTE PASS - LAKE SABRINA AREA													
Lamarck	4A	70.6	0.30	14.4	2.55	0.05	1.10	2.51	3.10	4.40	0.11	0.34	99.46
Lamarck	4B	62.9	0.67	16.8	5.25	0.10	2.20	4.53	4.00	2.76	0.25	0.58	100.04
Lamarck	6A	69.5	0.36	15.1	3.05	0.06	1.10	2.95	3.10	4.48	0.14	----	99.84
Inclusion	6C	51.4	1.07	18.8	9.20	0.15	4.80	7.70	3.90	2.10	0.36	0.60	100.08
Lamarck	10B	73.2	0.15	13.7	1.08	0.02	0.24	1.36	3.00	5.64	0.06	0.11	98.56
Lamarck	10C	63.1	0.65	16.7	4.93	0.12	2.10	4.38	4.20	2.86	0.22	0.23	99.49
Hybrid Inc.	11A	58.2	0.74	16.9	7.08	0.16	4.10	6.54	3.50	2.14	0.18	0.40	99.94
Hybrid	11C	59.4	0.70	15.9	6.50	0.20	3.90	6.25	3.70	2.45	0.17	0.55	99.72
Lamarck	12	69.9	0.32	15.3	2.44	0.64	0.70	2.61	3.80	3.80	0.12	0.47	100.10
Lamarck	15A	67.4	0.42	15.5	3.76	0.07	1.53	3.54	3.40	3.79	0.16	0.46	100.03
Lamarck	15C	57.1	0.92	17.8	7.40	0.12	3.58	6.32	3.60	2.40	0.31	0.35	99.90
Inclusion	16A	50.7	0.90	17.7	9.47	0.21	5.90	8.00	3.90	1.78	0.25	0.57	99.38
Hybrid	16B	60.7	0.74	17.2	6.02	0.10	2.70	5.36	4.20	2.32	0.26	0.46	100.06
Inclusion	16C	52.1	0.90	17.2	9.37	0.19	5.70	7.66	3.60	2.15	0.23	0.91	100.01
Hybrid Inc.	16D	56.0	0.82	16.3	7.64	0.19	5.60	7.20	3.80	1.81	0.23	0.54	100.13
Lamarck	16E	61.5	0.68	16.5	5.40	0.10	2.50	4.93	4.20	1.99	0.23	0.57	98.60
Intrusion	87A	52.6	0.95	17.6	9.17	0.15	5.30	8.22	3.30	1.90	0.25	0.64	100.08

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
PIUTE PASS - LAKE SABRINA, continued													
Inclusion	87B	52.4	1.00	18.6	8.90	0.15	4.10	8.25	3.60	1.99	0.25	0.51	99.75
Hybrid	87C	54.1	0.98	18.8	8.27	0.12	4.10	7.08	3.70	2.16	0.32	0.36	99.99
Inclusion	87D	50.8	1.02	18.5	9.95	0.29	5.30	6.90	4.10	2.33	0.31	0.45	99.95
Lamarck	87E	67.5	0.39	15.7	3.56	0.07	1.50	3.15	3.30	4.09	0.14	0.25	99.65
Schleieren	87F	63.1	0.63	16.7	5.15	0.12	2.30	4.60	4.00	2.33	0.22	0.52	99.67
Hybrid	87G	57.7	0.83	17.6	6.94	0.11	3.60	6.33	3.70	1.85	0.27	0.40	99.33
Lamarck	87H	66.5	0.54	15.7	4.04	0.08	1.70	3.55	3.20	3.79	0.20	0.37	99.67
Hybrid	87I	61.4	0.80	17.0	5.90	0.11	2.80	5.12	3.60	2.95	0.27	0.27	100.22
Hybrid	87J	60.6	0.78	17.1	6.16	0.11	2.90	5.55	3.90	2.06	0.26	0.50	99.92
Hybrid	87K	62.2	0.69	16.7	5.66	0.10	2.50	4.81	3.60	2.94	0.24	0.40	99.84
Inclusion	88	52.2	0.91	17.1	9.42	0.24	5.40	7.92	3.90	1.95	0.29	0.76	100.09
Lamarck	88C	65.6	0.43	15.7	3.90	0.07	1.60	3.70	3.50	3.88	0.16	0.65	99.19
Lamarck	91	63.0	0.60	16.5	5.15	0.09	2.30	4.79	3.40	3.39	0.19	0.45	99.86
Lamarck	92	58.8	0.82	16.8	6.85	0.11	3.20	5.38	3.10	3.24	0.25	0.75	99.30
Lamarck	LL-1a	67.4	0.40	14.9	3.51	0.07	1.43	3.13	3.30	4.29	0.12	----	98.55
Inclusion	LL-4a	49.8	1.29	18.6	9.88	0.15	5.10	7.41	3.95	2.44	0.42	----	99.04
Hybrid	LL-4b	56.7	0.89	17.7	7.13	0.12	3.11	6.25	4.21	2.07	0.32	----	98.50

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
PIUTE PASS - LAKE SABRINA, continued													
Inclusion	LL-5b	51.0	0.91	17.3	10.1	0.16	6.70	7.67	3.53	2.30	0.40	----	100.07
Inclusion	PP-6a	51.1	1.17	17.9	9.85	0.15	5.49	6.41	4.21	2.22	0.41	----	98.91
Intrusion	LL-5a	51.9	1.02	19.2	8.74	0.14	3.55	7.36	4.31	2.12	0.45	----	98.79
Intrusion	LL-3	55.5	1.09	18.0	7.26	0.12	3.20	6.46	4.42	2.14	0.39	----	98.58
Intrusion	LL-2c	56.6	1.03	17.8	6.80	0.10	2.97	6.36	4.23	2.20	0.37	----	98.46
Lamarck	PP-2L	67.3	0.35	14.9	3.04	0.05	1.30	4.07	3.45	3.01	0.14	----	97.61
Hybrid	PP-2M	61.2	0.67	16.3	5.53	0.10	2.42	4.97	3.53	3.20	0.24	----	98.16
Hybrid	PP-3	53.9	1.00	17.8	8.28	0.14	4.26	6.58	3.75	2.35	0.34	----	98.40
Lamarck	PP-7	58.6	0.85	17.4	6.44	0.10	2.67	5.64	4.26	2.32	0.30	----	98.58
SOUTH LAKE - ECHO PASS													
Lamarck	20A	65.0	0.53	16.2	4.60	0.08	2.00	4.23	3.60	3.45	0.18	0.30	100.17
Inclusion	20B	50.3	1.11	19.7	10.0	0.19	4.60	7.00	4.10	2.33	0.35	0.60	100.28
Lamarck	21A	63.4	0.57	16.9	5.00	0.08	2.20	4.44	3.25	3.36	0.18	0.42	99.80
Inclusion	21B	52.6	0.93	19.2	8.60	0.15	3.90	7.24	4.30	1.92	0.31	0.85	100.00
Lamarck	23A	63.1	0.61	16.5	5.38	0.09	2.30	4.83	3.40	3.21	0.20	0.50	100.12
Inclusion	23B	51.8	0.82	16.5	9.45	0.24	6.60	9.38	3.50	1.14	0.20	0.56	100.19
Lamarck	24A	61.9	0.60	16.9	5.42	0.09	2.20	5.12	3.20	3.08	0.22	0.71	99.44

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
SOUTH LAKE - ECHO PASS, continued													
Inclusion	24B	55.7	0.83	18.1	8.07	0.14	3.30	7.07	3.40	1.93	0.33	0.64	99.51
Hybrid	24C	58.0	0.78	17.3	7.32	0.13	3.20	6.20	3.30	2.26	0.25	0.48	99.22
Inclusion	25	53.4	0.97	19.6	9.76	0.11	2.30	7.23	4.40	1.53	0.48	0.45	100.23
Lamarck	31A	62.5	0.70	16.5	5.37	0.09	2.30	4.84	4.00	2.69	0.23	0.56	99.78
Inclusion	31B	51.0	1.23	19.1	9.65	0.17	4.00	7.23	4.40	1.85	0.37	0.57	99.57
Inclusion	44C	50.4	1.10	18.7	9.78	0.17	4.86	7.56	3.90	2.05	0.30	0.60	99.42
Intrusion	45	57.0	0.96	17.7	7.22	0.11	3.20	6.15	3.90	2.46	0.32	0.52	99.54
Lamarck	SL-1a	65.2	0.48	15.7	4.49	0.07	1.84	4.18	3.18	3.49	0.16	0.49	99.28
Hybrid	SL-3	58.8	0.75	17.2	6.30	0.11	2.80	5.60	3.81	2.86	0.29	----	98.52
Lamarck	SL-4	67.9	0.41	15.1	3.42	0.06	1.38	3.28	3.18	3.83	0.13	0.52	99.21
Intrusion	SAB-1b	51.4	1.22	18.4	9.35	0.16	4.59	7.66	3.81	1.96	0.38	0.90	99.83
Hybrid	SAB-2	61.1	0.72	16.9	5.76	0.09	2.44	5.24	3.68	2.70	0.24	0.47	99.34
Hybrid	SAB-4	63.4	0.61	15.8	4.88	0.08	1.96	4.52	3.87	2.80	0.20	----	98.12
Hybrid	SAB-5	62.6	0.69	16.0	5.14	0.10	2.16	4.48	3.75	3.08	0.23	----	98.23
Lamarck	SAB-9	62.8	0.52	16.3	4.88	0.09	2.05	4.72	3.59	3.27	0.23	----	98.45
Lamarck	EC-1dL	59.7	0.79	16.0	6.41	0.10	2.58	6.64	4.06	2.17	0.25	----	98.70
Hybrid	EC-1b	54.8	1.05	17.5	8.00	0.12	3.43	7.25	3.91	2.01	0.35	----	98.42

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
SOUTH LAKE - ECHO PASS, continued													
Lamarck	EC-1a	62.7	0.60	15.8	5.22	0.60	2.20	4.85	3.37	3.21	0.18	----	98.73
Inclusion	EC-1c	50.8	1.07	17.2	9.68	0.16	6.47	8.63	3.42	1.80	0.40	----	99.63
Inclusion	EC-1dI	52.7	1.05	18.4	9.20	0.13	3.58	7.23	3.78	2.22	0.39	----	98.68
MT. GILBERT AREA													
Lamarck	76A	64.6	0.60	15.5	5.03	0.08	2.20	4.22	3.30	3.66	0.18	0.50	99.87
Schleiren	76B	60.6	0.80	16.5	6.70	0.11	3.00	5.59	3.90	1.87	0.22	0.50	99.79
Schleiren	76C	51.4	1.42	12.4	13.1	0.28	7.00	7.97	2.40	2.29	0.43	0.50	99.19
Intrusion	80C	50.6	1.23	17.9	9.99	0.13	5.40	8.44	3.40	1.60	0.31	---	99.0
Intrusion	80E	50.5	1.24	17.6	10.2	0.14	5.40	8.02	3.60	1.84	0.34	0.72	99.6
Lamarck	80F-L	60.7	0.86	16.5	6.75	0.10	2.80	5.25	3.80	1.55	0.29	1.03	99.63
Intrusion	80F-I	49.0	1.30	18.3	10.5	0.18	5.50	7.13	3.80	1.69	0.36	2.27	100.03
Intrusion	81A	47.6	1.52	17.8	11.4	0.15	6.20	9.35	2.70	1.72	0.37	1.30	100.11
Intrusion	81B	53.0	1.03	17.8	9.15	0.12	4.80	8.25	3.20	1.34	0.33	0.82	99.84
Gabbro Inc.	83	48.8	1.61	14.8	10.3	0.12	9.64	7.75	2.34	2.77	0.21	1.60	99.94
Inclusion	83B	50.2	1.16	19.0	10.3	0.16	4.50	8.28	3.90	1.70	0.40	0.71	100.31
Intrusion	83C	54.2	1.06	18.6	8.22	0.14	3.60	7.08	4.10	1.93	0.38	0.54	99.85
Lamarck	84A	60.5	0.77	17.5	6.10	0.11	2.60	5.56	4.10	1.77	0.26	0.46	99.73

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
MT. GILBERT AREA, continued													
Intrusion	84B	52.3	1.13	17.7	9.81	0.19	5.00	7.31	3.80	2.00	0.35	0.35	99.94
Inclusion	84C	49.8	1.40	16.6	9.89	0.26	6.90	7.47	3.40	2.46	0.35	0.56	99.09
Intrusion	84D	51.8	1.17	18.2	9.72	0.13	5.04	8.18	3.40	1.62	0.34	0.45	100.05
Lamarck	84E	63.5	0.73	16.6	5.42	0.09	2.30	4.46	3.40	2.99	0.23	0.20	99.92
Inclusion	84F	50.9	1.23	17.7	9.60	0.23	5.60	7.51	4.10	1.92	0.36	0.80	99.95
Lamarck	85A	62.8	0.70	16.7	5.40	0.09	2.30	4.93	3.90	2.86	0.25	0.11	100.04
Inclusion	85B	51.3	1.26	18.8	9.10	0.17	4.50	7.36	4.60	2.01	0.40	0.60	100.10
Lamarck	86A	62.6	0.68	16.4	5.23	0.09	2.30	4.64	3.60	3.05	0.22	0.51	99.32
Inclusion	86B	49.9	1.33	19.2	9.97	0.20	4.40	7.34	4.40	2.01	0.37	0.80	99.92
Lamarck	GB-1a	63.7	0.60	16.2	4.83	0.08	1.99	4.36	3.29	3.51	0.21	0.42	99.19
Lamarck	GB-1b	60.4	0.81	17.8	5.58	0.07	2.40	4.89	4.10	3.02	0.38	----	99.45
Intrusion	GB-2	51.3	1.16	16.7	9.65	0.12	5.42	8.55	3.61	1.55	0.33	----	98.39
Intrusion	GB-8	51.0	1.34	17.1	9.74	0.13	5.13	8.31	3.67	1.56	0.39	----	98.37
Intrusion	GB-9	51.5	1.35	17.7	9.15	0.12	5.01	8.23	3.34	1.06	0.33	1.06	98.85
Intrusion	GB-10	51.5	1.17	17.3	9.67	0.13	5.09	8.65	3.56	1.43	0.35	----	98.85
Gabbro Inc	GB-5a	48.4	1.41	17.4	12.1	0.14	5.50	9.10	3.02	1.35	0.40	0.53	99.35
Gabbro Inc	GB-5b	51.1	1.59	15.3	10.4	0.10	7.05	8.09	2.95	2.01	0.25	----	99.84

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
MT. GILBERT AREA, continued													
Gabbro Inc	GB-5c	47.9	1.87	13.6	11.5	0.18	10.4	8.09	2.02	2.57	0.09	0.94	99.16
Gabbro Inc	GB-6	47.2	1.76	14.0	11.6	0.15	10.6	8.01	1.99	2.95	0.18	0.94	99.38
DUSY BASIN - PALISADE BASIN													
Lamarck	93A	66.7	0.48	15.8	3.45	0.08	1.30	3.32	4.1	3.04	0.15	0.53	98.95
Inclusion	95A	50.5	1.30	19.1	9.80	0.19	4.30	7.06	4.10	2.18	0.36	0.71	99.60
Inclusion	95B	50.7	1.22	18.8	9.53	0.19	4.20	7.65	4.30	1.71	0.36	0.68	99.34
Lamarck	96A	62.0	0.66	16.9	5.40	0.09	2.30	4.86	3.93	2.71	0.22	0.59	99.66
Inclusion	96B	49.9	1.25	18.8	9.89	0.19	4.40	7.27	4.20	2.01	0.36	0.70	98.97
Lamarck	102	67.9	0.43	15.9	3.30	0.07	1.10	3.27	4.21	2.81	0.14	0.53	99.66
Lamarck	103	68.6	0.36	15.5	2.65	0.08	0.92	2.58	4.20	3.50	0.12	0.45	98.96
Giant Incl.	106A	51.4	1.29	18.2	9.00	0.14	4.70	7.37	4.05	2.31	0.43	0.50	99.39
Giant Incl.	106B	51.7	1.25	18.4	8.70	0.13	4.60	7.20	4.10	2.33	0.42	0.65	99.48
Lamarck	106C	62.7	0.69	16.1	5.32	0.09	2.30	4.48	3.76	2.95	0.21	1.02	99.62
Lamarck	110	67.2	0.54	15.6	3.65	0.10	1.20	3.05	4.00	3.35	0.15	0.60	99.44
Lamarck	112	69.4	0.41	15.0	3.08	0.08	1.00	2.60	3.60	3.50	0.13	0.30	99.10
Lamarck	113A	62.7	0.65	16.6	5.29	0.09	2.10	4.50	3.70	2.90	0.22	0.40	99.15
Inclusion	113B	49.3	1.47	19.2	10.2	0.19	4.60	6.82	4.00	2.55	0.43	0.80	99.56

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
DUSY BASIN - PALISADE BASIN, continued													
Lamarck	114A	63.8	0.62	16.4	4.77	0.08	1.90	4.34	3.80	3.02	0.20	0.53	99.46
Inclusion	114B	51.4	1.26	18.6	9.83	0.18	4.60	6.00	4.00	2.66	0.35	1.01	99.89
Inclusion	114C	49.5	1.28	19.7	9.87	0.15	4.40	5.99	4.20	2.94	0.48	1.11	99.62
Lamarck	115A	64.1	0.64	15.9	4.91	0.09	2.00	4.30	3.70	3.20	0.21	0.22	99.27
Hybrid Lam.	115B	60.0	0.92	16.8	6.31	0.10	2.90	5.42	3.90	2.76	0.29	0.36	99.76
Inclusion	115C	52.5	1.35	18.0	8.90	0.14	4.50	7.33	3.90	2.07	0.36	0.55	99.60
Hybrid Lam.	115D	59.9	0.91	16.4	6.35	0.11	3.10	5.40	3.70	2.70	0.28	0.50	99.35
Lamarck	116	63.4	0.67	16.3	5.23	0.09	2.20	4.49	3.90	2.93	0.22	0.44	99.87
Lamarck	117A	62.5	0.70	16.3	5.46	0.09	2.30	4.67	3.80	2.83	0.23	0.58	99.46
Inclusion	117B	49.5	1.27	18.3	10.3	0.20	5.60	6.85	3.80	2.60	0.32	0.90	99.64
Lamarck	118	62.3	0.67	16.5	5.17	0.09	2.10	4.50	3.90	3.04	0.22	0.57	99.06
Hybrid Inc.	119A	53.4	1.20	17.9	8.23	0.12	4.20	6.97	3.90	2.88	0.46	0.58	99.84
Lamarck	123A	63.4	0.66	16.4	4.96	0.08	2.10	4.41	3.80	2.97	0.22	0.50	99.50
Hybrid Int.	123B	56.1	1.07	17.9	7.12	0.11	3.50	6.08	4.00	2.74	0.36	0.62	99.60
Lamarck	PC-1a	64.4	0.56	15.8	4.37	0.08	1.81	4.06	3.58	3.09	0.19	1.70	99.64
Lamarck	PC-1b	63.4	0.70	15.2	5.10	0.09	2.02	4.62	3.47	3.18	0.30	----	98.08
Hybrid	PC-1c	55.6	1.04	17.2	7.29	0.11	3.91	6.66	4.02	2.50	0.11	----	98.44

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
DUSY BASIN - PALISADE BASIN, continued													
Intrusion	PC-2	54.4	1.15	18.2	7.94	0.11	4.20	6.66	4.05	2.19	0.11	----	99.01
Hybrid	PC-4b	56.2	1.02	17.1	7.64	0.13	3.22	6.27	3.91	2.31	0.40	----	98.20
Hybrid	PC-4c	58.4	1.00	16.9	6.56	0.10	3.00	5.50	3.84	3.43	0.29	----	99.02
Lamarck	DB-7b	61.8	0.69	16.0	5.47	0.10	2.29	4.90	3.91	2.71	0.23	----	98.10
MATHER PASS - UPPER BASIN													
Lamarck	UB-1a	69.5	0.38	15.1	2.77	0.07	0.90	2.66	3.82	3.50	0.12	0.49	99.31
Intrusion	UB-1b	52.3	1.13	17.5	9.64	0.15	4.62	7.80	3.54	1.69	0.26	----	98.63
Intrusion	UB-1c	51.9	0.89	18.8	9.54	0.13	3.71	7.75	3.33	1.88	0.40	----	98.33
Lamarck	UB-2a	67.9	0.43	15.0	3.21	0.09	1.16	2.67	4.05	3.73	0.14	----	98.38
Hybrid	UB-2b	58.9	1.00	16.8	6.76	0.10	2.83	5.33	3.76	2.44	0.28	----	98.20
Gabbro Inc	UB-1d	48.7	1.62	15.4	10.9	0.18	8.05	8.78	2.36	2.30	0.21	----	98.50
Gabbro Inc	UB-3d	46.8	1.53	14.8	11.2	0.14	10.3	8.36	1.91	2.65	0.18	----	97.87
Intrusion	UB-5	53.2	0.95	18.5	8.29	0.11	3.02	7.34	3.87	1.97	0.42	----	97.67
Intrusion	UB-5b	52.7	1.20	17.5	8.69	0.12	4.43	7.71	3.71	1.78	0.39	----	98.23
Hybrid	UB-6	57.4	1.10	16.5	7.37	0.12	4.55	6.58	3.57	1.84	0.23	0.55	99.81
Hybrid	UB-7	56.4	0.99	16.5	7.53	0.11	3.66	6.95	3.91	1.49	0.33	----	97.87
Hybrid	UB-9	55.9	1.08	16.7	7.52	0.12	4.13	6.68	3.70	2.25	0.30	----	98.38

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
MATHER PASS - UBBER BASIN, continued													
Gabbro Inc	PC-5a	48.2	1.12	12.2	10.1	0.20	12.5	7.83	1.68	3.36	0.28	1.15	98.62
Hybrid	PC-7b	57.1	1.04	17.0	7.02	0.11	3.37	6.20	4.16	2.01	0.34	----	98.35
Gabbro Inc	PC-8	51.8	1.39	15.0	8.93	0.21	7.09	9.27	2.87	1.39	0.21	1.19	99.35
Intrusion	PC-9	51.3	1.35	18.3	8.95	0.12	4.18	7.27	4.15	2.18	0.38	0.81	98.99
Hybrid	PC-10	55.6	0.80	17.6	7.91	0.14	3.06	7.03	4.02	1.45	0.30	----	97.91
APLITE, COMPOSITE, AND MAFIC DIKES													
Aplite dike	21C	76.7	0.05	12.8	0.48	0.05	0.10	0.83	3.27	5.38	0.04	0.17	99.87
Aplite dike	29-0	74.3	0.12	13.3	1.12	0.05	0.21	0.53	2.20	7.61	0.07	0.21	99.72
Aplite dike	49C	76.5	0.06	13.0	0.50	0.02	0.08	0.87	3.73	4.76	0.04	0.11	99.67
Aplite dike	81C	72.4	0.19	15.1	1.20	0.01	0.35	1.70	3.21	5.51	0.06	0.11	99.84
Aplite dike	97A	76.8	0.05	12.5	0.51	0.02	0.09	0.67	3.26	5.50	0.04	0.10	99.54
Aplite dike	111	76.3	0.08	12.8	0.54	0.01	0.18	0.93	2.46	6.20	0.05	0.17	99.72
Comp. dike	7A	76.7	0.05	12.8	0.50	0.01	0.18	1.02	3.19	5.21	0.04	0.17	99.87
Comp. dike	7B	57.6	0.93	17.4	7.55	0.15	3.12	6.04	4.62	1.51	0.33	0.73	99.98
Comp. dike	27A	73.7	0.12	13.8	1.13	0.01	0.28	1.70	2.70	5.77	0.05	0.05	99.31
Comp. dike	27B	58.9	1.00	17.8	7.00	0.10	2.75	5.26	4.00	2.28	0.27	0.42	99.78
Comp. dike	46A	59.3	0.72	17.4	7.05	0.13	3.07	5.70	4.42	1.60	0.23	0.50	100.12

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
APLITES, COMPOSITE DIKES, MAFIC DIKES, continued													
Comp. dike	46B	75.8	0.05	13.4	0.73	0.01	0.15	1.35	3.21	4.81	0.03	0.30	99.84
Comp. dike	104A	75.8	0.06	12.6	0.47	0.06	0.01	1.00	3.40	5.12	0.04	0.10	98.66
Comp. dike	104B	52.6	1.60	17.6	9.10	0.11	4.42	7.50	4.30	1.70	0.41	0.60	99.94
Comp. dike	105A	68.5	0.37	14.6	2.62	0.04	0.93	2.55	3.60	3.93	0.12	0.34	97.60
Comp. dike	105B	67.0	0.56	15.1	3.75	0.06	1.60	3.30	3.40	3.99	0.17	0.71	99.64
Comp. dike	121A	76.0	0.06	13.0	0.45	0.01	0.09	1.12	2.60	5.84	0.04	0.11	99.32
Comp. dike	121B	74.2	0.09	14.5	0.66	0.01	0.10	1.73	3.30	4.56	0.04	0.35	99.54
Comp. dike	121C	56.3	1.10	17.0	7.66	0.15	3.70	6.40	3.90	1.95	0.33	1.05	99.54
Comp. dike	121D	55.4	1.23	17.1	8.00	0.13	4.40	6.45	3.90	2.16	0.40	0.75	99.92
Comp. dike	122	57.7	1.08	16.8	7.22	0.13	4.10	6.51	3.50	2.20	0.28	0.62	100.14
Comp. dike	DB7af	72.4	0.13	15.0	0.75	0.01	0.35	2.26	4.00	3.90	0.09	0.46	99.35
Comp. dike	DB7ai	65.2	0.59	17.3	4.18	0.05	1.50	4.22	4.60	1.85	0.23	0.50	100.22
Comp. dike	DB7am	50.5	1.30	18.4	9.75	0.16	5.20	7.10	4.30	2.05	0.40	1.00	100.16
Mafic dike	29A	54.3	1.02	19.1	8.37	0.14	3.00	6.29	5.20	1.50	0.32	----	99.24
Mafic dike	29B1	49.6	1.06	19.5	10.2	0.22	4.10	7.49	4.30	1.94	0.42	1.00	99.83
Mafic dike	29B2	57.9	0.69	18.7	6.71	0.12	2.40	5.73	4.70	1.54	0.32	0.80	99.61
Mafic dike	29E	53.2	1.03	18.0	8.78	0.18	4.60	7.34	4.10	1.53	0.24	0.66	99.66

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
APLITE, COMPOSITE, MAFIC DIKES, continued													
Mafic dike	79A	49.9	1.27	19.4	10.6	0.14	4.20	7.88	4.40	1.63	0.38	----	99.80
Mafic dike	107	56.0	0.88	17.6	8.37	0.14	3.64	6.58	3.70	1.87	0.30	----	99.08
WALL ROCKS AND METASEDIMENTARY INCLUSIONS													
Calc-silicate wall rock													
	54C	62.9	0.36	7.83	5.41	0.27	5.50	13.2	2.40	0.33	0.30	0.56	99.06
Calc-silicate inclusion													
	74A	63.7	0.48	11.4	4.12	0.15	1.40	16.4	0.71	0.03	0.31	1.24	99.94
Bishop Creek Gneiss													
	30A	62.6	0.55	17.3	4.10	0.13	1.20	3.90	3.20	6.15	0.25	0.46	99.84
	BP-1a	58.4	1.02	17.5	5.40	0.14	2.30	5.50	3.00	5.10	0.30	----	98.66
Inconsolable Granodiorite													
	BP-3	57.2	1.00	16.4	7.28	0.11	3.84	6.35	3.74	2.83	0.27	----	99.02
	BP-5	58.3	0.97	17.0	6.53	0.10	2.98	5.44	3.89	3.63	0.29	----	99.13
Biotite schist													
	UB-1E	52.1	1.85	17.9	12.6	0.11	2.89	2.32	3.00	3.90	0.34	----	97.01
Alaskite of Evolution Basin													
	UB-8	73.4	0.11	13.2	0.82	0.05	0.22	0.96	3.60	4.61	0.04	----	97.01

Table 2. Major-element determinations, Lamarck Granodiorite and associated rocks, continued.

TYPE	SAMPLE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	LOI	Total
Alaskite of Evolution Basin, continued													
	PC-X	76.9	0.12	12.6	0.92	0.08	0.10	0.31	4.30	4.50	0.04	----	99.87
	DB-5	75.1	0.17	12.6	1.17	0.04	0.35	0.97	3.51	4.88	0.04	----	99.83
Cartridge Pass Pluton													
	UB-3C	53.2	0.95	19.3	7.91	0.11	3.00	7.34	3.87	1.97	0.42	----	98.07

Reported values are averages of two determinations made on replicate fused discs by wavelength-dispersive XRF. LOI, loss on ignition, 925°C. Branch of Geochemistry, U.S. Geological Survey, Menlo Park, California. T. Frost, analyst.

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
PIUTE PASS - LAKE SABRINA AREA												
Lamarck	4A	990	<20	50	185	370	12	88	15	<5	50	<5
Lamarck	4B	710	<20	66	160	330	28	145	24	11	100	9
Lamarck	6A	980	22	55	125	370	14	110	13	7	62	6
Inclusion	6C	910	<20	55	110	720	22	175	13	30	145	60
Lamarck	10B	890	23	62	185	245	10	105	14	<5	24	<5
Lamarck	10C	700	<20	70	150	390	23	135	22	9	120	7
Hybrid Inc.	11A	850	<20	60	110	445	16	105	11	16	165	96
Hybrid	11C	900	<20	55	110	470	16	100	11	17	165	100
Lamarck	12	1400	<20	44	155	460	12	125	15	7	65	5
Lamarck	15A	1150	<20	55	140	450	13	125	15	8	70	5
Lamarck	15C	950	<20	65	105	675	19	160	12	17	110	35
Inclusion	16A	300	28	64	125	475	18	120	11	37	160	85
Hybrid	16B	790	23	60	130	590	16	150	13	12	100	20
Inclusion	16C	480	20	50	115	510	21	125	10	32	155	75
Hybrid Inc.	16D	375	23	55	105	440	16	85	11	75	135	280
Lamarck	16E	610	33	72	130	520	14	150	13	12	100	20
Intrusion	87A	590	<20	55	100	560	18	155	10	30	105	110

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
PIUTE PASS - LAKE SABRINA AREA, continued												
Inclusion	87B	770	23	82	70	670	27	140	18	12	115	30
Hybrid	87C	785	24	65	100	690	20	160	13	22	115	55
Inclusion	87D	230	21	48	195	280	22	140	16	36	200	110
Lamarck	87E	950	<20	36	150	380	15	110	14	9	64	6
Schleieren	87F	490	27	74	125	390	17	125	16	10	92	13
Hybrid	87G	640	21	62	91	670	15	150	12	20	100	50
Lamarck	87H	1200	38	85	160	500	17	120	16	9	78	7
Hybrid	87I	625	30	65	120	525	16	130	17	13	100	26
Hybrid	87J	600	27	64	100	540	17	150	16	14	105	25
Lamarck	87K	1000	<20	55	120	590	16	140	14	11	90	12
Inclusion	88	250	22	68	115	345	32	130	15	44	160	180
Lamarck	88C	970	27	68	125	420	15	125	14	<5	65	6
Lamarck	91	1050	<20	46	115	480	17	115	14	9	72	15
Lamarck	92	1300	<20	60	115	540	20	145	13	12	105	13
Lamarck	LL-1a	1000	27	55	145	400	14	115	11	5	60	6
Inclusion	LL-4a	610	30	73	130	570	21	160	15	25	160	44
Hybrid	LL-4b	530	42	88	105	610	23	160	17	14	120	15

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
PIUTE PASS - LAKE SABRINA AREA, continued												
Inclusion	LL-5b	300	20	53	120	300	25	110	13	75	200	260
Inclusion	PP-6a	325	22	50	220	400	26	130	16	37	175	110
Intrusion	LL-5a	900	25	73	110	730	25	210	15	10	150	16
Intrusion	LL-3	600	36	100	155	700	22	210	16	16	130	40
Intrusion	LL-2c	1100	26	90	80	580	20	190	13	13	108	28
Lamarck	PP-2L	1400	<20	43	92	590	12	90	10	7	52	7
Hybrid	PP-2M	1200	<20	55	120	600	20	150	13	10	92	14
Hybrid	PP-3	660	27	68	145	675	21	170	12	20	150	58
Lamarck	PP-7	900	24	78	120	675	21	170	15	11	100	13
SOUTH LAKE - ECHO PASS												
Lamarck	20A	950	21	63	130	445	18	115	15	8	75	9
Inclusion	20B	240	35	77	190	400	27	140	16	17	160	22
Lamarck	21A	930	24	64	130	450	15	115	13	10	75	14
Inclusion	21B	450	34	67	105	490	21	160	13	14	125	10
Lamarck	23A	1100	<20	40	115	500	16	140	13	9	85	10
Inclusion	23B	200	40	85	48	455	27	105	11	52	150	230
Lamarck	24A	1500	<20	43	92	570	15	130	12	9	81	9

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
SOUTH LAKE - ECHO PASS AREA, continued												
Inclusion	24B	665	<20	46	75	670	20	145	13	13	120	9
Hybrid	24C	750	<20	64	93	570	24	150	14	13	125	20
Inclusion	25	590	34	85	75	830	17	190	14	6	140	<5
Lamarck	31A	1050	<20	46	92	610	15	120	14	10	88	10
Inclusion	31B	340	40	74	96	580	18	150	15	14	150	12
Inclusion	44C	580	22	61	100	670	21	145	12	23	145	37
Intrusion	45	930	<20	55	92	700	21	155	15	14	110	18
Lamarck	SL-1a	940	24	50	130	450	16	130	12	8	65	11
Hybrid	SL-3	1000	<20	54	90	700	18	150	11	10	110	15
Lamarck	SL-4	830	36	78	135	400	18	140	14	7	55	6
Intrusion	SAB-1b	440	40	92	105	890	24	105	13	30	140	65
Hybrid	SAB-2	910	30	70	110	620	18	125	14	15	90	18
Hybrid	SAB-4	1000	<20	30	112	560	18	140	16	9	80	11
Hybrid	SAB-5	810	23	53	130	550	17	120	12	10	105	14
Lamarck	SAB-9	1000	<20	45	120	505	15	105	11	8	72	12
Hybrid	EC-1H	500	35	70	40	690	18	140	15	9	80	15
Hybrid	EC-1b	870	20	60	70	750	18	145	11	16	100	23

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
SOUTH LAKE - ECHO PASS AREA, continued												
Lamarck	EC-1a	980	27	66	115	460	20	110	14	9	75	13
Inclusion	EC-1c	500	25	54	65	580	17	105	12	65	140	225
Inclusion	EC-1d	850	23	50	72	720	14	105	10	11	110	18
MT. GILBERT AREA												
Lamarck	76A	830	20	53	125	450	17	135	12	9	73	12
Schleiren	76B	260	42	76	100	450	22	170	15	11	95	18
Schleiren	76C	210	78	155	105	250	54	290	29	36	195	63
Intrusion	80C	700	22	53	48	850	13	105	12	33	120	80
Intrusion	80E	820	<20	53	70	870	17	130	10	28	130	54
Lamarck	80FL	680	40	80	65	660	16	155	16	12	110	18
Intrusion	80FI	550	22	53	67	690	16	125	10	35	150	60
Intrusion	81A	590	<20	48	73	840	18	85	11	51	135	100
Intrusion	81B	610	<20	43	45	890	14	92	11	32	115	53
Gabbro Inc.	83	900	<20	37	105	570	15	75	10	155	105	340
Inclusion	83B	780	20	58	60	880	20	200	11	22	145	36
Intrusion	83C	760	28	90	80	780	23	190	16	15	110	25
Lamarck	84A	680	26	67	68	690	16	165	13	13	96	10

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
MT. GILBERT AREA, continued												
Intrusion	84B	525	27	58	82	620	16	27	14	28	150	51
Inclusion	84C	340	42	71	135	455	19	130	18	67	190	230
Intrusion	84D	765	<20	52	52	900	17	110	<10	28	120	60
Lamarck	84E	1000	24	75	105	545	15	125	15	10	86	11
Inclusion	84F	210	50	92	115	455	21	160	15	42	170	105
Lamarck	85A	1150	15	57	95	600	16	130	13	11	90	12
Inclusion	85B	400	40	74	105	620	19	200	12	30	150	50
Lamarck	86A	1300	<20	55	93	590	16	130	13	8	86	10
Inclusion	86B	330	32	60	110	580	17	210	13	17	155	20
Lamarck	GB-1a	1300	34	64	97	600	12	120	13	9	65	12
Lamarck	GB-1b	1400	24	67	90	650	15	200	11	11	115	8
Intrusion	GB-2	610	20	58	58	840	16	100	11	36	125	88
Intrusion	GB-8	720	25	60	65	870	19	120	12	38	24	80
Intrusion	GB-9	780	25	55	55	930	15	100	12	40	110	75
Intrusion	GB-10	630	25	62	45	850	17	96	11	33	130	80
Gabbro Inc	GB-5a	570	33	64	40	930	20	92	12	25	120	40
Gabbro Inc	GB-5b	620	22	52	67	620	16	75	11	78	92	140

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
MT. GILBERT AREA, continued												
Gabbro Inc	GB-5c	740	<20	43	92	490	17	75	10	150	110	380
Gabbro Inc	GB-6	780	<20	40	130	510	14	70	10	150	110	410
DUSY BASIN - PALISADE BASIN												
Lamarck	93	1150	<20	67	95	450	17	130	15	7	62	<5
Inclusion	95A	320	36	66	125	550	16	170	12	20	150	25
Inclusion	95B	260	28	60	100	610	20	140	13	20	150	30
Lamarck	96A	1050	<20	55	100	600	14	125	13	10	88	8
Inclusion	96B	300	32	64	125	600	18	150	14	20	160	35
Lamarck	102	1150	<20	50	92	450	15	125	15	6	58	<5
Lamarck	103	1400	<20	46	100	390	14	130	13	<5	52	<5
Giant Incl.	106A	890	23	74	86	820	21	220	17	39	125	56
Giant Incl.	106B	900	28	80	85	870	20	200	15	35	125	60
Lamarck	106C	1150	<20	56	95	580	16	130	15	11	86	9
Lamarck	110	1180	<20	66	115	400	20	150	18	<5	74	<5
Lamarck	112	1100	20	58	120	360	14	130	15	<5	60	<5
Lamarck	113A	940	<20	52	100	540	16	125	13	12	90	8
Inclusion	113B	350	38	54	160	590	19	190	15	29	160	20

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
DUSY BASIN - PALISADE BASIN, continued												
Lamarck	114A	980	13	54	105	550	14	120	13	9	75	7
Inclusion	114B	230	33	55	180	460	20	160	14	30	160	42
Inclusion	114C	660	24	45	170	570	13	220	8	11	170	14
Lamarck	115A	1080	21	66	105	530	14	120	13	8	71	13
Hybrid Lam.	115B	1000	30	69	92	620	16	150	12	14	94	30
Inclusion	115C	680	26	56	84	720	16	140	13	21	120	57
Hybrid Lam.	115D	1000	22	56	85	620	14	140	12	16	90	24
Lamarck	116	1000	<20	65	100	550	17	130	15	9	90	11
Lamarck	117A	1050	<20	61	100	560	17	120	14	10	88	12
Inclusion	117B	470	25	52	140	510	14	115	13	50	180	100
Lamarck	118	1100	<20	57	105	560	16	120	12	9	87	12
Hybrid Inc.	119A	1000	<20	82	95	830	18	200	14	33	115	66
Lamarck	123A	1180	23	58	97	615	14	135	13	11	76	10
Lamarck	123B	1050	20	68	105	720	18	200	15	28	110	58
Lamarck	PC-1a	850	22	57	105	525	13	130	13	9	71	14
Lamarck	PC-1b	790	20	50	115	550	10	68	12	7	75	<5
Hybrid	PC-1c	950	30	66	105	750	17	170	11	40	110	90

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
DUSY BASIN - PALISADE BASIN, continued												
Intrusion	PC-2	800	34	72	85	770	18	180	13	39	122	77
Hybrid	PC-4b	680	35	70	115	740	20	155	14	10	105	12
Hybrid	PC-4c	1150	28	70	135	610	22	120	14	25	100	53
Lamarck	DB-7b	1100	21	75	88	590	14	120	12	10	87	11
MATHER PASS - UPPER BASIN												
Lamarck	UB-1a	1300	<20	62	100	390	18	150	14	5	51	<5
Intrusion	UB-1b	540	<20	52	74	630	18	135	12	15	90	24
Intrusion	UB-1c	690	20	54	75	710	20	100	12	38	110	90
Lamarck	UB-2a	1120	<20	53	130	410	18	150	14	7	58	5
Hybrid	UB-2b	1050	25	60	90	800	16	150	13	17	100	12
Gabbro Inc	UB-1d	640	<20	45	75	490	22	55	11	60	110	160
Gabbro Inc	UB-3d	680	<20	33	75	510	18	75	10	100	116	310
Intrusion	UB-5	700	<20	61	61	840	15	90	11	34	110	70
Intrusion	UB-5b	740	26	65	60	820	18	108	12	40	115	72
Hybrid	UB-6	690	20	35	90	625	16	115	10	34	90	75
Hybrid	UB-7	600	29	64	65	830	20	130	11	22	99	43
Hybrid	UB-9	950	<20	48	75	710	16	80	11	40	105	100

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
MATHER PASS - UPPER BASIN, continued												
Gabbro Inc	PC-5a	510	<20	35	280	420	19	92	10	250	210	610
Hybrid	PC-7B	930	30	86	70	800	18	175	15	20	100	40
Gabbro Inc	PC-8	270	23	47	80	550	17	62	10	60	130	200
Intrusion	PC-9	1000	30	80	92	960	20	100	15	35	135	58
Intrusion	PC-10	950	28	60	62	590	19	110	15	10	110	12
APLITE, COMPOSITE, AND MAFIC DIKES												
Aplite dike	21C	40	22	36	160	47	11	37	19	<5	<10	<5
Aplite dike	29-0	1750	<20	72	275	130	20	115	16	<5	20	<5
Aplite dike	49C	30	23	44	200	35	<10	50	15	<5	10	<5
Aplite dike	81C	2250	<20	42	110	440	<10	140	10	<5	12	<5
Aplite dike	97A	60	29	40	190	60	<10	42	13	<5	<10	<5
Aplite dike	111	1200	<20	33	145	340	13	72	14	<5	<10	<5
Comp. dike	7A	240	<20	34	170	145	<10	29	10	<5	<10	<5
Comp. dike	7B	450	28	65	140	560	20	145	15	7	120	5
Comp. dike	27A	1650	<20	30	130	440	<10	90	9	<5	18	6
Comp. dike	27B	550	25	59	110	580	11	130	11	17	120	17
Comp. dike	46A	360	30	65	155	445	19	175	13	8	110	6

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
APLITE, COMPOSITE, AND MAFIC DIKES, continued												
Comp. dike	46B	140	22	36	125	110	<10	41	12	<5	11	<5
Comp. dike	104A	135	25	35	120	100	<10	35	10	<5	10	<5
Comp. dike	104B	820	20	64	94	920	17	180	13	31	130	40
Comp. dike	105A	1350	<20	62	100	440	12	110	14	<5	37	<5
Comp. dike	105B	1200	<20	47	105	520	11	140	13	8	60	8
Comp. dike	121A	1520	<20	24	110	325	<10	47	10	<5	<10	<5
Comp. dike	121B	2250	<20	23	90	455	<10	53	10	<5	11	<5
Comp. dike	121C	1030	<20	50	83	720	15	160	12	21	125	38
Comp. dike	121D	1030	<20	64	87	850	15	155	12	32	130	72
Comp. dike	122	710	<20	50	88	680	14	110	12	25	110	61
Comp. dike	DB7a-F	1600	<20	40	65	530	10	82	12	10	35	6
Comp. dike	DB7a-I	900	25	64	82	625	15	180	15	10	70	7
Comp. dike	DB7a-M	370	22	54	110	610	18	130	13	28	165	76
Mafic dike	29A	560	21	57	70	700	13	110	10	12	125	10
Mafic dike	29B-1	900	<20	66	95	660	24	180	11	11	160	6
Mafic dike	29B-2	1000	34	70	75	690	18	200	13	7	110	5
Mafic dike	29E	690	<20	40	74	600	13	105	10	45	135	56

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
APLITE, COMPOSITE, AND MAFIC DIKES, continued												
Mafic dike	79A	640	22	58	82	750	17	150	10	19	140	17
Mafic dike	107	760	23	74	84	720	19	115	11	11	115	7
WALL ROCKS AND METASEDIMENTARY INCLUSIONS												
Calc-silicate wall rock												
	54C	48	38	57	20	96	27	88	12	48	750	150
Calc-silicate inclusion												
	74A	45	62	90	<10	160	24	180	17	17	175	24
Bishop Creek Gneiss												
	30A	1770	20	76	200	270	25	175	16	7	83	6
	BP-1a	970	24	78	185	250	23	145	16	9	89	8
Inconsolable Granodiorite												
	BP-3	490	20	73	110	600	20	135	15	36	95	70
	BP-5	1000	30	80	150	620	22	250	15	12	85	40
Biotite schist												
	UB-1E	600	45	95	135	310	50	235	24	77	80	94
Alaskite of Evolution Basin												
	UB-8	345	25	45	160	95	7	75	13	<5	18	<5

Table 3. Minor- and trace-element determinations (ppm), Lamarck Granodiorite and associated rocks.

TYPE	SAMPLE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
WALL ROCKS AND METASEDIMENTARY INCLUSIONS, continued												
Alaskite of Evolution Basin, continued												
	PC-X	125	56	83	145	<10	27	120	21	--	--	--
	DB-5	500	28	62	155	125	13	100	16	--	--	--
Cartridge Pass Pluton												
	UB-3C	980	26	71	65	750	20	205	10	10	120	12

Determinations made by averaging results of three determinations (Compton peak ratio method, Johnson, 1984) each on replicate <200-mesh powders by secondary target energy-dispersive XRF.

Operating conditions as follows:

Elements	KV	mA	secondary target	live time, sec.
Ba, La, Ce	58	2.0	Gd	200
Rb, Sr, Y, Zr, Nb	35	1.4	Ag	100
Ni, Zn	20	1.2	Ge	100
Cr	20	2.0	Ti	100

T. Frost, analyst, Branch of Geochemistry, Menlo Park, California.

Table 4. Comparison of wavelength-dispersive XRF determinations made at Branch of Geochemistry with recommended values for selected geochemical reference standards.

STANDARD	TYPE	SiO_2	TiO_2	Al_2O_3	Fe_2O_3*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5
BR	basalt	38.6±0.3	2.58±0.04	10.27±0.11	12.92±0.04	0.20±0.004	13.6±0.2	13.85±0.08	3.1±0.3	1.43±0.05	1.07±0.02
		38.39	2.61	10.25	12.94	0.20	13.35	13.87	3.07	1.41	1.05
PCC-1	peridotite	42.4±0.3	0.01±0.01	0.84±0.11	8.30±0.04	0.13±0.009	43.2±0.4	0.62±0.05	0.0±0.2	-0.1±0.1	-0.0±0.01
		42.10	0.01	0.73	(8.29)	0.12	43.50	0.55	0.01	0.00	(0.00)
BIR-1	basalt	47.8±0.3	1.01±0.04	15.60±0.13	11.28±0.07	0.18±0.003	9.69±0.2	13.40±0.04	1.8±0.2	0.01±0.005	0.01±0.01
		48.00	0.96	15.54	(11.34)	0.18	9.71	13.33	1.82	0.03	(0.02)
BHVO-1	basalt	50.1±0.4	2.71±0.05	13.81±0.16	12.30±0.05	0.17±0.005	7.28±0.15	11.29±0.03	2.2±0.2	0.55±0.01	0.30±0.02
		49.90	2.69	13.85	(12.24)	0.17	7.31	11.33	2.29	0.54	0.28
JB-1	basalt	52.4±0.3	1.36±0.03	14.55±0.14	9.01±0.08	0.16±0.004	7.63±0.12	9.38±0.04	2.9±0.2	1.44±0.007	0.28±0.02
		(52.60)	1.34	14.62	9.05	0.15	7.76	9.35	2.79	1.42	0.26
W-2	diabase	52.7±0.4	1.03±0.008	15.51±0.13	11.01±0.07	0.17±0.002	6.33±0.2	10.90±0.03	2.3±0.2	0.58±0.009	0.15±0.02
		52.81	1.06	15.49	(10.94)	0.17	6.39	10.89	2.21	0.63	0.14
BCR-1	basalt	54.4±0.2	2.22±0.02	13.81±0.10	13.48±0.07	0.18±0.001	3.52±0.1	7.01±0.03	3.2±0.3	1.68±0.04	0.34±0.02
		54.53	2.26	13.72	13.44	0.18	3.48	6.97	3.30	1.70	0.36
AGV-1	andesite	59.9±0.4	1.03±0.03	17.30±0.13	6.63±0.10	0.11±0.005	1.48±0.07	4.90±0.02	4.2±0.2	2.93±0.02	0.50±0.03
		59.61	1.06	17.19	6.82	0.10	1.52	4.94	4.32	2.92	0.51
STM-1	syenite	60.1±0.5	0.16±0.01	18.61±0.17	5.10±0.08	0.21±0.01	0.11±0.08	1.03±0.03	8.6±0.4	4.30±0.02	0.17±0.02
		59.66	0.13	18.44	(5.22)	0.22	0.10	(1.09)	8.95	4.29	0.16
QLO-1	qtz latite	65.4±0.3	0.61±0.02	16.41±0.18	4.31±0.04	0.09±0.009	1.06±0.05	3.21±0.04	4.3±0.2	3.65±0.02	0.27±0.02
		65.93	0.62	16.37	(4.29)	0.09	1.04	3.24	4.23	3.63	0.26
GSP-1	granodiorite	67.5±0.2	0.64±0.02	15.11±0.13	4.28±0.05	0.04±0.003	0.94±0.03	1.99±0.03	2.7±0.5	5.48±0.04	0.25±0.02
		67.32	0.66	15.28	4.28	0.04	0.97	2.03	2.81	5.51	0.28
G-2	granite	69.4±0.2	0.49±0.02	15.51±0.15	2.71±0.03	0.03±0.005	0.68±0.06	1.98±0.02	4.0±0.2	4.48±0.03	0.11±0.02
		69.22	0.48	15.40	2.67	0.03	0.75	1.96	4.06	4.46	0.13
G-1	granite	71.9±0.4	0.26±0.01	14.00±0.11	1.96±0.02	0.02±0.01	0.41±0.07	1.40±0.04	3.3±0.2	5.51±0.03	0.10±0.01
		72.68	0.26	14.05	1.94	0.03	0.38	1.39	3.32	5.48	0.09
RGM-1	rhyolite	72.8±0.5	0.28±0.02	13.42±0.18	1.92±0.03	0.04±0.01	0.25±0.04	1.12±0.02	4.2±0.2	4.30±0.02	0.07±0.02
		73.47	0.27	13.80	(1.88)	0.04	0.28	1.15	4.12	4.35	(0.05)
NIM-G	granite	75.1±0.4	0.10±0.01	12.44±0.31	2.07±0.01	0.01±0.01	0.09±0.03	0.69±0.07	3.1±0.3	5.10±0.04	0.01±0.01
		75.70	0.09	12.08	(2.02)	0.02	(0.06)	0.78	3.36	4.99	(0.01)
GH	granite	76.1±0.3	0.07±0.01	12.60±0.18	1.30±0.02	0.04±0.01	0.04±0.02	0.72±0.03	3.9±0.4	4.79±0.05	0.02±0.01
		75.85	0.08	12.51	(1.34)	0.05	0.03	0.69	3.85	4.76	0.01

First line for each element shows mean and standard deviation of determinations made at U.S.G.S. Branch of Analytical Chemistry, Menlo Park. T. Frost, analyst. Number of determinations per standard is at least 10.
Second line shows recommended or (provisional) values from Abbey, 1983.

Table 5. Comparison of energy-dispersive XRF determinations made at Branch of Geochemistry with recommended values for geochemical reference standards.

STANDARD	TYPE	Ba	La	Ce	Rb	Sr	Y	Zr	Nb	Ni	Zn	Cr
BR	basalt	1040±10 1050	81±7 80	125±10 140	51±2 47	1310±10 1300	30.4±2.9 30	264±4 250	96.4±2.5 (100)	256±4 260	138±6 150	360±9 380
PCC-1	peridotite	12.3±4.5 (4)	<1 (0.15)	5.2±4.1 (0.09)	<1 (0.3)	<1 0.4	<1 --	<1 (7)	10.2±4.3 (43)	2402±5 2400	58.1±1.7 41	2820±40 2800
BIR-1	basalt	10.1±3.5 (6.1)	12.3±5.3 (0.65)	20.4±8.1 (1.6)	<1 --	1.3±2 (105)	10.5±1.2 (16)	19.6±1.7 918)	<1 (2.3)	159±5 (165)	67.5±2.41 (70)	390±12 (370)
BHVO-1	basalt	133±11 135	17.7±7.1 (17)	47.2±10.3 39	7.6±2.5 10	414±4 420	23.0±3.7 (27)	172±4 180	18.9±2.5 19	123±5 120	10.4±3 105	305±13 300
JB-1	basalt	495±5 490	46.3±6.1 (36)	69±8.1 (67)	38±2.1 41	438±4 440	20.1±1.7 (26)	143±3 155	32.9±1.5 --	126±4 135	89.2±2.7 84	403±8 400
W-2	diabase	170±7 175	15±4 10.5	31±6.4 23	18.4±2.4 21	191±4 (190)	18.3±1.4 (23)	91±2 (100)	10.9±2.0 (6.8)	72.5±3.1 70	78.8±4.1 80	100±9 92
BCR-1	basalt	670±4 680	21±5.1 27	52±9.1 53	44.3±2.7 47	331±4 330	37.5±1.9 40	181±4 185	14.1±1.9 (19)	10.8±1.9 10	124±4 125	20.6±3.6 15
AGV-1	andesite	1182±11 1200	27±6.5 36	53±10.1 71	69.3±2.4 67	656±7 660	22.3±1.4 19	230±4 230	15.6±1.3 (16)	14.0±1.5 15	92.8±2.3 86	9.4±2.8 10
STM-1	syenite	565±9 560	188±18 150	230±25 260	122±5.1 (120)	721±14 700	61.4±3.0 (46)	1305±17 1300	233±4 (270)	3.2±1.4 (3)	265±6 240	12.5±2.1 (4)
QLO-1	qtz latite	1410±17 1400	12±3.4 (27)	32±6 (59)	78±1.2 74	343±3 350	24.2±1.7 (24)	180±3 175	12.8±2.0 (10.5)	2.1±1.6 (5.5)	69.8±3 64	2.1±1.9 (4.2)
GSP-1	granodiorite	1290±10 1300	192±10 195	365±10 360	247±3 250	241±3 240	33.8±2.5 29	501±6 500	30.4±2.2 (23)	4.9±1.6 9	110±4 105	17.8±4.2 12
G-2	granite	1880±10 1900	81±6.5 92	122±8 160	167±3 170	480±2 480	16.3±1.2 11	305±4 300	15.4±1.4 (13)	<1 3.5	100±2 84	8.2±4.3 8
G-1	granite	1040±18 (1200)	8.9±7.5 (100)	142±12 (170)	212±4 220	252±4 250	16.6±2.1 13	194±3 210	22.7±1.6 24	<1 (1)	50.5±6.0 45	19.7±4.4 (20)
RGM-1	rhyolite	820±14 800	14±7.1 (23)	41±7.3 (48)	144±3 (155)	100±3 100	24.6±1.8 (25)	217±3 200	12.2±1.0 (9.4)	3.6±2.1 (6)	39.1±1.9 36	<1 (4)
NIM-G	granite	114±6 (120)	120±9 (105)	200±15 200	316±2 320	4.5±3.7 10	131±2 145	291±4 300	48.0±1.7 53	4.8±2.8 (8)	58.2±1.9 50	14.0±4.0 12
GH	granite	26.1±5.4 22	34±15.2 (25)	76±10.1 (50)	373±5 390	3.4±2.5 10	75.6±2 70	135±2 150	78.6±1.3 (85)	1.6±1.4 3	74.5±2.7 85	<1 6

First line shows mean and standard deviation of determinations made at Branch of Analytical Chemistry, Menlo Park, California. T. Frost, analyst. Number of determinations per standard is at least 15.
Second line shows recommended or (provisional) values from Abbey, 1983.