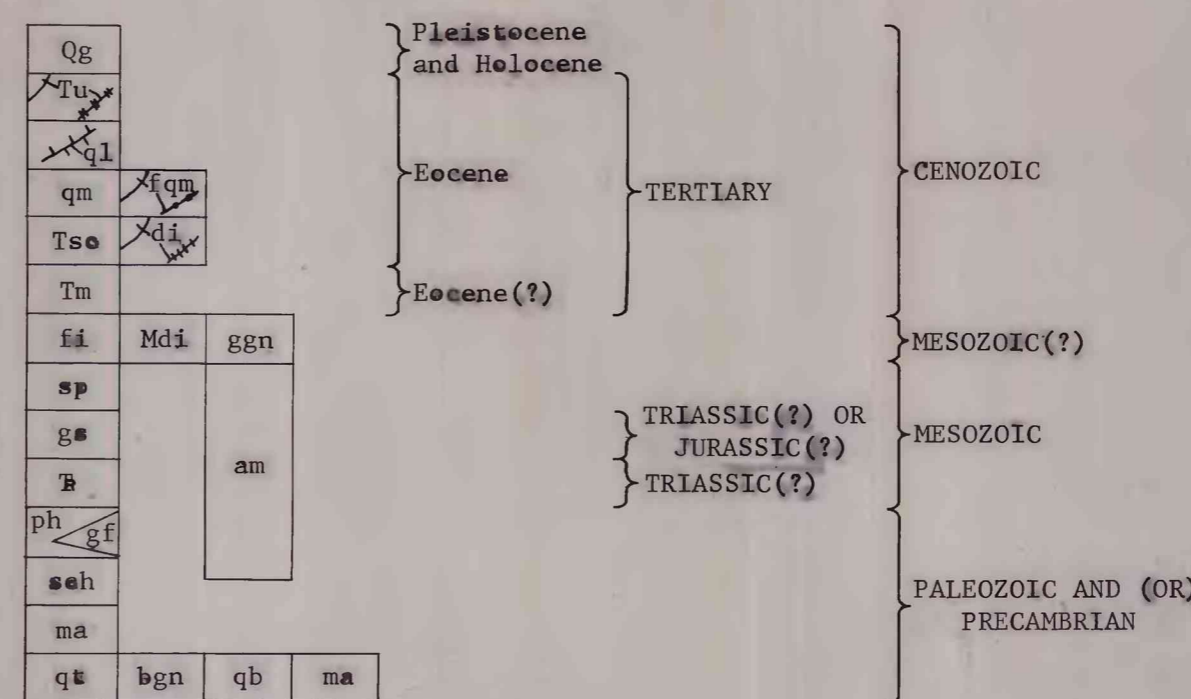




CORRELATION OF MAP UNITS



Equivalence of units in Togo Mountain quadrangle with units in adjacent Curlew quadrangle. Units in Curlew quadrangle described by Parker and Calkins (1964).

Togo Mountain quadrangle	Curlew quadrangle
ql	Tql
qm, fqm	Tqm and most of Kg
Tse	Ts
di	Tsq
Tm	Km
ggm	ggm
sp	fs
fi	mapped with ph
ph	ph
seh	sch and part sq

DESCRIPTION OF MAP UNITS

- Qg** GLACIAL DEPOSITS (PLEISTOCENE AND HOLOCENE)--Mainly till and glaciofluvial sand and gravel. Minor alluvium along streams
- Tu** DIKES AND PLUGS UNDIVIDED (TERTIARY)--Several varieties of silicic to intermediate, fine-grained to aphanitic dike rocks
- ql** QUARTZ MONZONITE OF LONG ALEC CREEK (EOCENE)<sup>1</sup> Quartz latite dikes--Pinkish- to brownish-gray porphyritic rocks; contain prominent feldspar phenocrysts to more than 10 mm long and small biotite and pyroxene phenocrysts; cut Triassic rocks in northwest part of quadrangle
- qm** Medium-grained, gray to pinkish-gray, locally porphyritic, biotite-hornblende quartz monzonite and granodiorite--Present in Long Alec Creek pluton; not delimited from fqm
- fqm** Fine-grained, equigranular to locally weakly porphyritic. Forms part of Long Alec Creek pluton and large numbers of dikes
- Tse** SANPOIL VOLCANICS (EOCENE)<sup>1</sup> Rhyodacite porphyry--Consists of abundant phenocrysts 2-4 mm long of hornblende, biotite, and plagioclase in a fine-grained, gray groundmass. Hypabyssal intrusive phase of Sanpoil Volcanics. Present only west of Granby fault
- di** Fine-grained gray to greenish-gray granodiorite to quartz diorite--Present only east of Granby fault. Could be considered an early mafic phase of quartz monzonite of Long Alec Creek
- Tm** MONZONITE (EOCENE?)--Fine-grained gray hornblende monzonite
- fi** METAMORPHOSED PORPHYRY (MESOZOIC?)--Consists of prismatic to augen-shaped oligoclase phenocrysts 5-10 mm long in fine-grained gray groundmass that ranges from massive to phyllitic. Intrudes only the phyllite unit. Phenocrysts are relic, but groundmass is completely reconstituted to quartz, feldspar, biotite, hornblende, and clinopyroxene
- Mdi** DIORITE, MONZONITE, GRANODIORITE, AND HORNBLENDITE (MESOZOIC?)--Thick dikes, sheets and plugs. Locally foliated and lineated suggesting a pre-Tertiary age. Differences among the several bodies indicate they may not be related
- ggm** CASCADE GRANODIORITE OF PRETO (1970) (MESOZOIC?)--Light-gray foliated biotite granodiorite; commonly contains megacrysts of orthoclase 1-5 cm long and small red garnet crystals. Cut by pegmatite and aplite bodies mostly less than a few meters across

- sp** SERPENTINITE (MESOZOIC)--Dark green to black where massive and light green where sheared; includes brown-weathering silica-carbonate rock. Intrudes Granby fault and Triassic rocks west of fault
- gs** GREENSTONE (TRIASSIC? OR JURASSIC?)--Massive, porphyritic, green metabasalt; may be intrusive or extrusive
- am** AMPHIBOLITE (MESOZOIC AND (OR) PALEOZOIC AND (OR) PRECAMBRIAN)--Massive to weakly layered, well-foliated rock consisting mainly of hornblende and plagioclase. Forms concordant and discordant sheets in metasedimentary rocks in north-east quarter of quadrangle
- tr** TRIASSIC(?) ROCKS--Chert, argillite, greenstone, limestone, and conglomerate. Triassic(?) age based on presence of Late Triassic fossils in similar rocks 2 and 4.5 km west of Togo Mountain quadrangle
- ph** PHYLITE (PALEOZOIC AND (OR) PRECAMBRIAN)--Dominantly gray to black, laminated to thin bedded phyllite that commonly is spotted with cordierite poikiloblasts and locally with andalusite; minor light-gray quartzitic beds 0.5 mm to 25 cm thick. Lower part is more quartzose and less micaceous. Metamorphic grain size increases downward as well. Includes interlayers of massive, light-gray to brown cummingtonitic hornfels, gf
- sch** SCHIST (PALEOZOIC AND (OR) PRECAMBRIAN)--Upper part mainly fine-grained hornblende schist, mica schist, and quartz-feldspar granofels; lower part more calcareous containing diopside schist, calcitic schist, and marble. Garnet and (or) staurolite present locally in upper part, fibrolite in lower part
- ma** MARBLE (PALEOZOIC AND (OR) PRECAMBRIAN)--Medium- to coarse-grained, thick-bedded, white to gray dolomite and calcite marble. Most contains small amounts of silicates, but locally forsterite and spinel are common. One prominent marble unit lies apparently conformably beneath schist unit, and other marble units are inter-layered with quartzite and pelitic schist
- qt** QUARTZITE (PALEOZOIC AND (OR) PRECAMBRIAN)--White, pink or buff, medium- to coarse-grained, thickly layered to massive metaquartzite. Locally quartzite layers are thin and separated by biotitic laminae. Interlayers of bgn as much as few tens of meters thick also present. Contains disseminated feldspar and locally black tourmaline, particularly near bodies of pegmatite and ggm

- bgn** PELTIC SCHIST AND GNEISS (PALEOZOIC AND (OR) PRECAMBRIAN)--Characteristic assemblage is sillimanite-cordierite-biotite-orthoclase-oligoclase. Also includes biotite-quartz gneiss, quartzite, and minor calc-silicate gneiss. Pegmatite, aplite, and many small bodies of other igneous-appearing rocks are common to abundant
- qb** QUARTZITE AND PELTIC SCHIST AND GNEISS UNDIVIDED (PALEOZOIC AND (OR) PRECAMBRIAN)--This unit not delimited from the quartzite or pelitic rocks; shown only by presence of symbol qb in the Mt. Leona-Tenasket Mountain area and the Togo Mountain area

- CONTACT--Long dashed where approximately located, short dashed where gradational or very poorly exposed
- FAULT--Dashed where approximately located, dotted where concealed, queried where doubtful
- STRIKE AND DIP OF BEDS
  - Inclined
  - Vertical
- STRIKE AND DIP OF FOLIATION
  - Inclined
  - Vertical
- BEARING AND PLUNGE OF LINEATION--May be combined with foliation symbol
- PROSPECT PIT
- ADIT

References cited

Parker, R. L., and Calkins, J. A., 1964, Geology of the Curlew Quadrangle, Ferry County, Washington: U.S. Geol. Survey Bull. 1169, 95 p.  
 Preto, V. A., 1970, Structure and petrology of the Grand Forks Group, British Columbia: Canada Geol. Survey Paper 69-22, 80 p.

<sup>1</sup>Quartz monzonite of Long Alec Creek and Sanpoil Volcanics are closely related genetically and temporally. Rocks of both units have chemical and petrographic features in common, and K-Ar ages indicate that both are about 50 m.y. old. In the adjacent Curlew quadrangle the quartz monzonite intrudes the hypabyssal phase of the Sanpoil Volcanics, Ts, which in turn intrudes the lava flows and breccias of the Sanpoil. Thus, the quartz monzonite of Long Alec Creek represents an example of a pluton intruding its own volcanic cover.

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This map is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.

PRELIMINARY GEOLOGIC MAP OF THE TOGO MOUNTAIN QUADRANGLE, FERRY COUNTY, WASHINGTON

By  
Robert C. Pearson  
1977