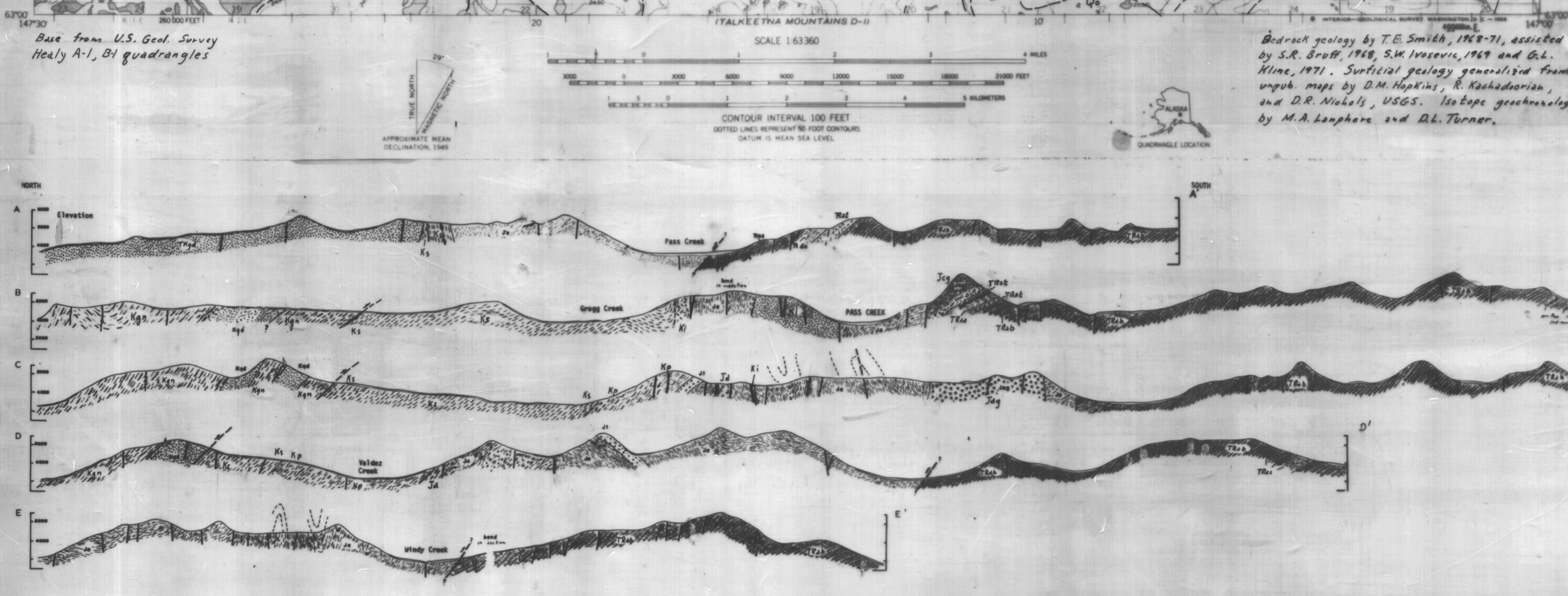


EXPLANATION



Base from U.S. Geol. Surv. Neely A-1, B1 quadrangles

- Qaf
- Qas
- Qs

**Surficial Deposits**

**Qaf, Alluvial fans:** Poorly consolidated gravels and sands ranging from coarse bouldery gravel at apex of fans to sand and silt at toes of larger fans. Some have varying amounts of intermixed wood and peaty material.

**Qas, Alluvial plains:** Bedded and sorted stream deposits varying from clean medium-grained near glaciers or in high valleys to silt in large river drainages.

**Qs, Swamp deposits:** Accumulations of silt and sand in areas of poor drainage with large amounts of intermixed vegetative matter. Broadly covered by standing water. Away from rivers, swamps are probably drained lake basins.

- Kgn
- Ks
- Kp

**Metamorphic Rocks**

**Kgn, Gneiss and high grade schist:** Layered pelitic gneisses and schists with abundant kyanite, staurolite, and sillimanite. Subordinate magnetite and zircon gneiss near larger intrusives. Includes local mafic and calc-magnesian horizons. K-Ar age of amphibolite at locality 2 is 66.2 my. (hornblende). Unit is generally less gneissic in northernmost exposures. Retrograde microtextures widely developed.

**Ks, Schist:** Pelitic semischist and schist of brownish hue forming gradational unit in biotite and staurolite zones of regional metamorphic succession. Local calc-magnesian interlaminae. Helicitic and spiral microtextures present in amphiboles and garnets. K-Ar age of schist at locality 3 is 57.2 my. (biotite).

**Kp, Spotted phyllite:** Medium to dark gray foliated rocks with plane compositional laminations. Spottling due to porphyroblastic biotite in random orientations, or less commonly to horsts of amphibole or garnet. Numerous rotational microtextures. K-Ar age of actinolitic hornblende from amphibolite horizon at locality 1 is 64.1 my.

- Ja
- Jb
- Jt

**Argillite**

**Ja, Blue to olive gray argillite, siltstone, and graywacke** comprising present sediments from which pelitic metamorphites were developed. Mainly massive though commonly laminated, showing cyclic grading, flattened cross bedding, and lead casts. Thin slates of intraserial conglomerate and dark carbonaceous laminae or calcareous siltstone. Northern part of unit grades into slates and phyllites. Heavily stippled zones are marker beds of massive graywacke.

**Jb, Predominantly metabasalt with associated volcaniclastic sediments and argillite.**

**Jt, Grayish-green volcanoclastic sediments and metamorphosed equivalents with interbeds of black carbonaceous argillite. Includes subordinate flow rocks.**

- Jag
- Tral
- Trad
- Trab
- Traa
- Tras

**Conglomerate**

**Jag, Wedge-like unit of cobble and boulder conglomerate with polymictic matrix.** Well rounded, hematite coated clasts include basalt, diorite, and graywacke. Matrix now largely recrystallized to chlorite, epidote, and prismatic bearing aggregate.

**Amphitheatre Group**

**Trab, Grayish-green and grayish-red basalts and basaltic andesites.** Weakly metamorphosed. Flow thick most varies from inches to about 100 feet. Chemically similar to island arc tholeiites. Mainly subaerial. Northern part of unit abundantly amygdaloidal. Amygdalic minerals are quartz, chlorite, calcite, epidote, pyroxene and pumpellyite. Unit locally includes dikes and sills of similar composition, e.g. in Red Creek drainage. Area of fractured overprint includes thickly bedded greenish flows with numerous exposures of columnar jointing. Dotted line within unit indicates traces of bedded flows.

**Tral, Clayey and silty lenses and interbeds of microparticulate** that are locally carbonaceous, laminated, or fossiliferous. In areas of greater deformation they have been transformed to calcphyllites or calc-schists. Locality 4 contains the marine fossil *Balanus* sp. *Hydractinia* and *Zonitidae* sp. *Meridia* from locality 5 contain structures suggestive of *Stromatolites* colonial corals such as *Thamnostrophia* (?)

**Trad, Thinly bedded, greenish volcanoclastic sediments, shales, and green schists** interbedded with basalts and argillites.

**Traa, Dark carbonaceous argillite with frequent graded laminae, siltstone cross bedding, and other depositional textures.** Thicker bedded of undifferentiated pelitic and volcanoclastic sediments in lower part of volcanic section. These subunits. Especially show lateral change from argillite outward into thin calcareous interbeds.

- Qr
- Qm
- Qg
- Qo
- Qc

**Glacial Deposits and Rock Glaciers**

**Qr, Rock glaciers:** Lobate, tongue-shaped, and spatulate accumulations of shattered bedrock rubble with varying amounts of interstitial silt and ice. Restricted to cirques and protected mountain valleys. A few are presently active.

**Qm, Marginal deposits:** Lateral, medial, and end moraines with generally sharp topographic forms along valley sides or bottoms. Mostly composed of coarse rubby till except in larger valleys where till has sandy or silty matrix.

**Qg, Ground moraine complex:** Till and subordinate water laid material. Irregular to subdued topography. Locally channelled or pitted. Includes some kames and sharply crested eskers.

**Qo, Outwash deposits:** Sorted and bedded sands and gravels lying generally in front of coeval moraines. Some were deposited on ice, since melted, destroying or deforming bedding or forming pitted deposits.

**Qc, Ice contact deposits:** Half-channels in marginal material, formed against receding ice sheet in lowlands south of Clearwater Mountains.

- Kgn
- Ks
- Kp

**Calc-alkaline Granitoid Rocks**

**TKgd, Granodiorite:** Moderately foliated pluton showing both concordant and discordant relations with enclosing metamorphites. Border zones are generally porphyroblastic with many rounded and stretched out xenoliths of country rock. Includes local phases of diorite, quartz diorite, and trondhjemite. K-Ar age dates at locality 4 are 61.2 my. (biotite), 66.3 my. (hornblende).

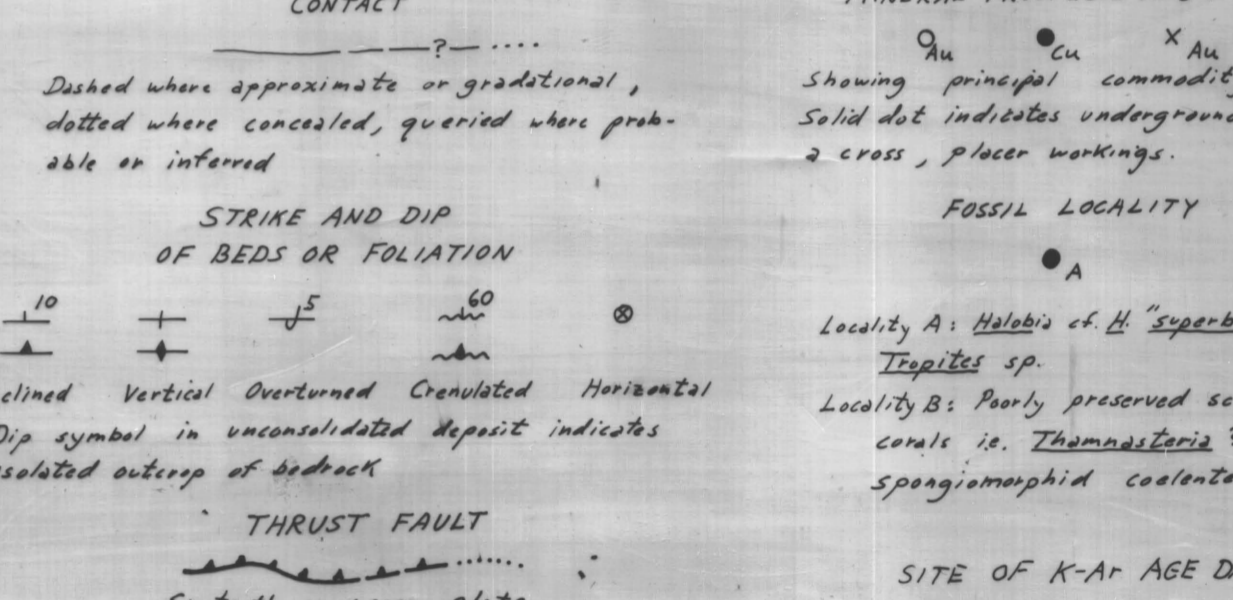
**Kgd, Quartz diorite:** Medium to coarse grained, foliated sill-like intrusive on ridge north of Valdez Creek. Grades into local felsic and mafic varieties and includes numerous xenoliths of schist and gneiss. Foliation due to cataclasis and recrystallization during late dynamothermal episode of metamorphic event.

**Ki, Small stocks, dikes and sills:** Medium-grained equigranular and porphyritic stocks and hypabyssal bodies. Mainly of intermediate composition with subordinate gabbro or monzonite. Most are metamorphosed to some degree, showing secondary textures or minerals characteristic of the metamorphic zone in which they are found.

- Ja
- Jb
- Jt

**Alkali Gabbro**

Strongly fractionated stock in headwaters of Eldorado Creek with compositional and temporal range from theralite to monzonite. Mainly hornblende monzogabbro. K-Ar age of biotite from theralite at locality 5 is 130 my., and of hornblende from monzonite is 143 my.



**CONTACT**  
Dashed when approximate or gradational, dotted when concealed, queried when probable or inferred.

**MINERAL PROSPECTS AND MINES**  
Showing principal commodity sought. Solid dot indicates underground working, a cross, placer workings.

**STRIKE AND DIP OF BEDS OR FOLIATION**  
Vertical Overturned Overturned Horizontal  
Dip symbol in unconformable deposit indicates isolated outcrop of bedrock.

**THRUST FAULT**  
Sawtooth on upper plate

**HIGH ANGLE FAULT**  
U, upthrown side, D, down-thrown side. Arrows indicate relative lateral movement.

**FOLDS**  
Anticline Syncline Overturned  
Showing crestline or troughline and direction of plunge.

ANALYTICAL DATA FOR K-Ar AGE DETERMINATIONS

LW No.	Field Number	Mineral	Unit	K <sub>2</sub> O (%)	A <sub>40</sub> <sup>40</sup> (%)	A <sub>37</sub> <sup>40</sup> / ΣA <sub>n</sub> <sup>40</sup>	Age (my.)
1	69AS6 638	Hornblende	Kp	0.310 0.304 Σ 0.307	2.958 × 10 <sup>-11</sup>	0.85	64.1 ± 1.9
2	69AS6 199	Hornblende	Kgn	0.102 0.104 Σ 0.108	1.872 × 10 <sup>-11</sup>	0.93	66.2 ± 2.4
3	69AS6 1536	Biotite	Ks	8.93	7.659 × 10 <sup>-10</sup>	0.73	57.2 ± 2
4	69AS6 137	Biotite	TKgd	9.20	8.463 × 10 <sup>-10</sup>	0.36	61.2 ± 2
	"	"	"	0.835	8.332 × 10 <sup>-10</sup>	0.54	66.3 ± 2
5	69AS6 252A	Biotite	Jag	8.62	1.767 × 10 <sup>-9</sup>	0.93	130 ± 4
	" 252	Hornblende	"	1.065	2.313 × 10 <sup>-10</sup>	0.88	143 ± 4