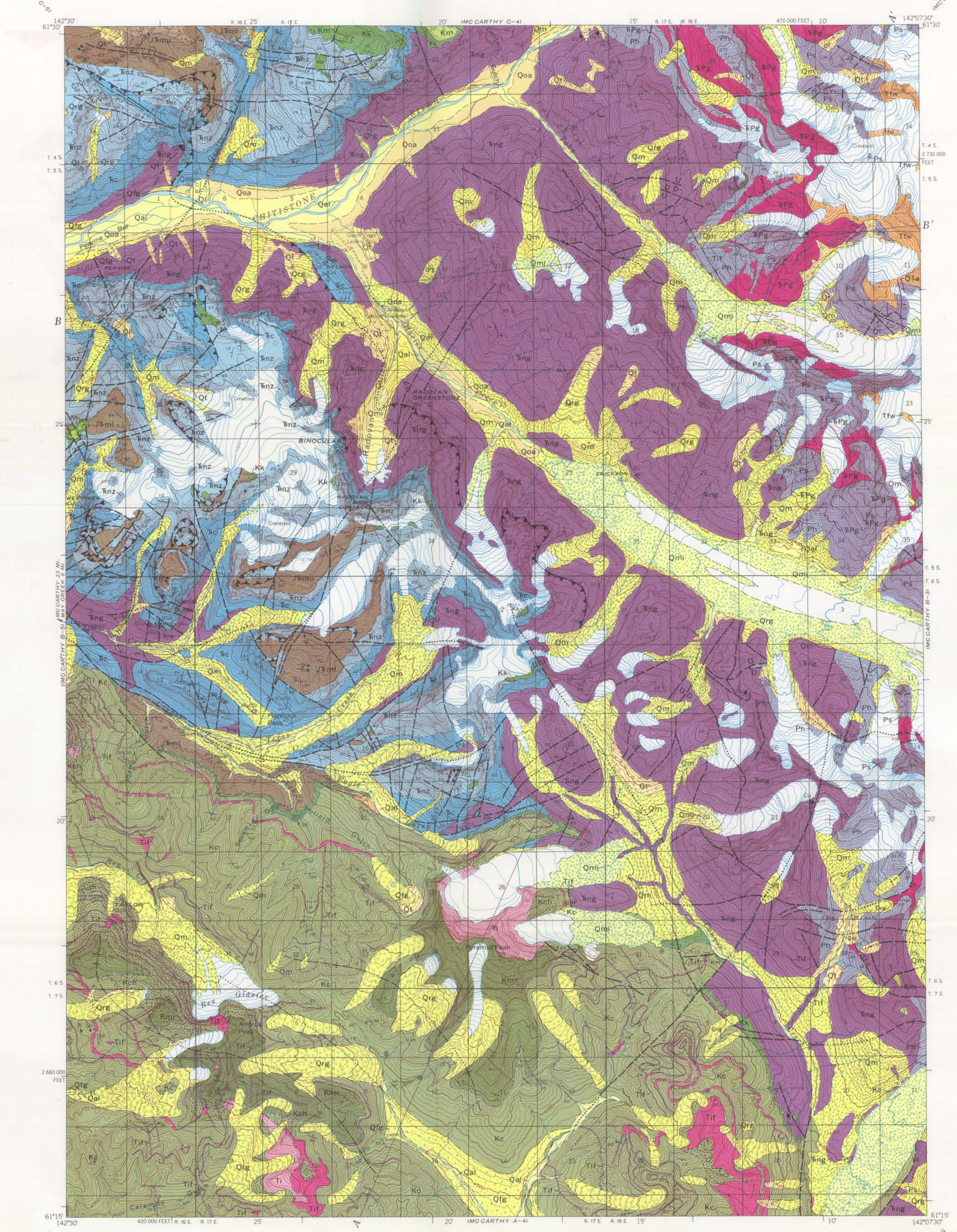
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

GEOLOGIC QUADRANGLE MAP
McCARTHY B-4 QUADRANGLE, ALASKA
GQ-943

COMPOSITE COLUMNAR SECTION

SYSTEM	SERIES	STAGE	DISTANCE FROM BASE OF SECTION IN FEET	LITHOLOGY	GROUP, FORMATION AND MEMBER	DESCRIPTION	CHARACTERISTIC FOSSILS
QUATERNARY					Surficial deposits	Includes alluvium, older alluvium, talus, moraines, landslides, rock glaciers, and fluvioglacial deposits	
					UNCONFORMITY		
TERTIARY			32,000 31,000		Top not exposed Andesitic flows and pyroclastic rocks Frederika Formation and Wrangell Lava Andesitic dike and sill Felsic hypabyssal rocks, chiefly porphyritic dacite Intermediate to mafic intrusive rocks, chiefly granodiorite	Diverse continental sedimentary rocks intercalated with andesitic flows and pyroclastic rocks of Wrangell Lava	Plant remnants
					UNCONFORMITY		
CRETACEOUS	Upper Cretaceous	Campanian or Maestrichtian	30,000 29,000		Top not exposed MacColl Ridge Formation	Coarse- or medium-grained sandstone; less abundant granule conglomerate and siltstone	
		Cenomanian to Campanian	28,000 27,000 26,000 25,000 24,000		Chititu Formation	Mudstone and shale with subordinate sandstone, impure limestone, and porcellanite; scattered limy concretions and local sandstone dikes; baked and welded near plutons	*Inoceramus*
	Lower and Upper Cretaceous	Albian and Cenomanian	Top not exposed in quadrangle		DISCONFORMITY(?) Moonshine Creek Formation	Mainly siltstone	*Desmoceras (Pseudouhligella)*
	Lower(?) and Upper Cretaceous	Albian(?) and Cenomanian			Schulze Formation	Porcellanite, siltstone, and sandstone	
					DISCONFORMITY		
	Lower Cretaceous	Albian	23,000		Kennicott Formation	Basal conglomerate overlain by sandstone, siltstone, and shale; local limy concretions	*Brewericeras hulenense*
					UNCONFORMITY		
TRIASSIC AND JURASSIC	Upper Triassic(?) and Lower Jurassic	Sinemurian			Top not exposed in B-4 quadrangle Upper member of McCarthy Formation	Impure limestone, locally spiculitic, and minor chert	*Arietites, Psiloceras*
	Upper Triassic and Lower Jurassic(?)	Rhaetian(?) and Hettangian ?	22,000 ?		Lower member of McCarthy Formation	Impure limestone and carbonaceous shale, subordinate chert	*Monotis*
TRIASSIC	Upper Triassic	Norian ?	21,000 ?		Nizina Limestone	Mainly thin bedded limestone, some chert lenses and nodules	*Halobia*
		Karnian	20,000 19,000		Chitistone Limestone	Mainly medium- or thick-bedded limestone; some dolomite and dolomitic limestone near base; subordinate crystalline carbonate; scattered chert nodules	*Tropites*
					DISCONFORMITY		

SYSTEM	SERIES	STAGE	DISTANCE FROM BASE OF SECTION IN FEET	LITHOLOGY	GROUP, FORMATION AND MEMBER	DESCRIPTION	CHARACTERISTIC FOSSILS
TRIASSIC	Middle and (or) Upper Triassic		18,000 17,000 16,000		DISCONFORMITY		
					Approximately 7,000 feet of Nikolai Greenstone has been eliminated from the section; the probable maximum thickness of the Nikolai in the quadrangle is about 13,000 feet		
			9000 8000 7000 6000		Nikolai Greenstone Basal conglomerate	Predominantly altered subaerial basaltic flows; generally amygdaloidal	
					DISCONFORMITY		
	Middle Triassic				Unnamed sedimentary rocks	Bedded chert, siltstone, and carbonaceous shale	Ammonites and traces of halobiid pelecypod ribbing
					UNCONFORMITY		
PERMIAN	Lower Permian		5000		SKOLAI GROUP Hasen Creek Formation	Sandstone, siltstone, shale, limestone, conglomerate, and bedded chert; generally thin bedded	Crinoids, brachiopods, bryozoans, corals, and gastropods
PERMIAN(?)	Lower Permian(?)		4000 3000 2000 1000		Gabbro Station Creek Formation	Upper part chiefly altered volcaniclastic rocks, mainly volcanic graywacke; lower part dominantly altered submarine basalt and basaltic andesite flows	
					Base not exposed		



Base by U.S. Geological Survey, 1964

APPROXIMATE MEAN DECLINATION, 1972

SCALE 1:63 360

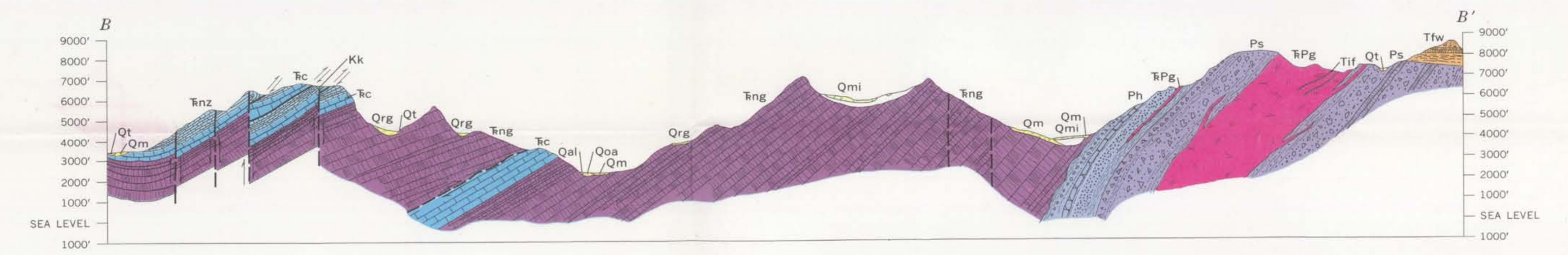
1 ½ 0 1 2 3 MILES

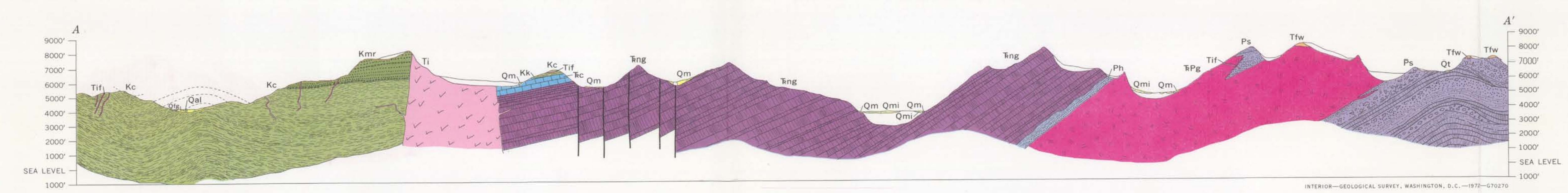
1 .5 0 1 2 3 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

Geology mapped by E. M. MacKevett, Jr. 1965, 1967; D. L. Jones, 1965, 1967; J. G. Smith 1967; and G. R. Winkler, 1967





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EXPLANATION

Qal | Qoa | Qt | Qm | Qmi | Ql | Qrg | Qfg

Surficial deposits

Also includes some unmapped soil, slope wash, and colluvium
- Qal, *alluvium*
- Qoa, *older alluvium*
- Qt, *talus*
- Qm, *morainal material*
- Qmi, *morainal material on ice*
- Ql, *landslide deposits*
- Qrg, *rock glacier*
- Qfg, *fluvioglacial deposits, mainly crudely stratified boulders, cobbles, pebbles, sand, and silt*

Age equivalence not implied — QUATERNARY

UNCONFORMITY

TERTIARY

Top not exposed in quadrangle

Tfw — Frederika Formation and Wrangell Lava
Continental sedimentary rocks of Frederika Formation; includes conglomerate, sandstone, siltstone, shale, and uncommon lignite. Intercalated with subordinate amount of Wrangell Lava

Ti — Intermediate to mafic intrusive rocks
Mainly form small stocks; includes granodiorite, quartz diorite, diorite, and gabbro; mainly medium grained and hypidiomorphic granular in texture

Tif — Felsic hypabyssal rocks, locally showing inclined or vertical dip
Mainly porphyritic dacite; typically light gray or light pinkish gray with plagioclase phenocrysts in very fine grained intersertal or felty groundmasses; generally strongly altered; forms small plutons, mainly dikes and sills

QTa — Andesitic dikes, showing dip
Probably related to Wrangell Lava volcanism; chiefly altered porphyritic andesite

UNCONFORMITY

CRETACEOUS

Top not exposed

Kmr — MacColl Ridge Formation (Upper Cretaceous)
Mainly coarse- or medium-grained sandstone; less abundant granule conglomerate and siltstone; the dominant sandstones are light or medium gray and weather light brown; they include arkosic, lithic, and feldspathic wacke (terminology of Williams, Turner, and Gilbert, 1954)

Kc, Kch — Chititu Formation (Lower and Upper Cretaceous)
Kc, mainly dark-gray or dark-greenish-gray mudstone and shale with subordinate sandstone, impure limestone, and porcellanite; contains scattered limy concretions and is cut by a few sandstone dikes
Kch, baked, welded, and locally silicified Chititu Formation rocks, chiefly brown-weathering hornfels

Km — Moonshine Creek Formation
Siltstone with some sandstone and conglomerate; mainly thin-bedded medium- or dark-gray rocks that weather light brown or orange brown

Top not exposed in quadrangle

Ks — Schulze Formation
Thin-bedded siliceous siltstone, fine-grained sandstone, and platy porcellanite; typically light gray where fresh and buff or yellowish brown where weathered

DISCONFORMITY

Kk — Kennicott Formation (Lower Cretaceous)
Basal conglomerate overlain by sandstone, siltstone, and shale locally abundant calcareous concretions; mainly light to dark greenish gray where fresh and various shades of brown where weathered. The conglomerates include granule or pebble conglomerate and less abundant cobble or boulder conglomerate; the sandstones comprise diverse wackes and arenites

UNCONFORMITY

TRIASSIC AND JURASSIC

Top not exposed in quadrangle

JTRmu, JTRml — McCarthy Formation (Upper Triassic(?) and Lower Jurassic; Upper Triassic and Lower Jurassic(?))
JTRmu, upper member, very fine grained to aphanitic rocks including impure limestone, locally spiculitic, and minor chert; dark gray, weather yellowish brown
JTRml, lower member, fine grained to aphanitic rocks including impure limestone and carbonaceous shale, subordinate chert; characteristically thin bedded; the limestones are mainly dark greenish gray and weather light or grayish brown; the shales and cherts are dark gray to grayish black, and the shales have dark-brown weathered surfaces

TRIASSIC

TRnz — Nizina Limestone (Upper Triassic)
Mainly thin-bedded dark-greenish-gray limestone with some chert lenses and nodules

TRc — Chitistone Limestone
Generally medium- or thick-bedded limestone with lesser amounts of dolomite and dolomitic limestone and widely scattered chert nodules; local crystalline limestone and dolomite. Most of the limestones are medium or dark greenish gray and weather light, yellowish, or grayish brown; the dolomites and crystalline carbonates are light or medium gray

DISCONFORMITY

TRng — Nikolai Greenstone (Middle and(or) Upper Triassic)
Altered subaerial lava flows of basaltic composition, commonly with chlorite-rich amygdules; basal conglomerate as much as 250 feet thick; generally dark greenish gray and weather to diverse shades of brown

DISCONFORMITY

TRs — Unnamed sedimentary rocks (Middle Triassic)
Bedded chert, siltstone, and carbonaceous shale; generally dark gray or grayish black

UNCONFORMITY

PERMIAN OR TRIASSIC

TRPg — Gabbro
Forms plutons, including dikes and sills. Medium- or coarse-grained rocks generally hypidiomorphic granular or subophitic in texture

Skolai Group

PERMIAN

Ph — Hasen Creek Formation (Lower Permian)
Sandstone, siltstone, shale, limestone, conglomerate, and bedded chert; characteristically thin bedded; fresh surfaces range from light gray to grayish black

PERMIAN(?)

Ps — Station Creek Formation (Lower Permian(?))
Volcaniclastic rocks, chiefly graywacke, derived from and broadly gradational with underlying submarine basalt and basaltic andesite flows; all slightly metamorphosed; generally dark greenish gray

Contact, showing dip
Long-dashed where approximately located; short-dashed where gradational; dotted where concealed

Fault, showing dip
Dashed where approximately located; dotted where concealed. U, *upthrown side;* D, *downthrown side*

Probable fault

Thrust fault, approximately located
Queried where probable; dotted where concealed. Sawteeth on upper plate

Fault intruded by dike, approximately located

Vertical fault, approximately located
Dotted where concealed

Anticline
Showing crestline and direction of plunge; dashed where approximately located; dotted where concealed

Trace of overturned anticline, approximately located
Showing direction of dip of limbs

Minor anticline
Showing direction of plunge

Syncline
Showing troughline; dashed where approximately located; dotted where concealed

Minor syncline
Showing direction of plunge

Monocline; approximately located

Inclined — Vertical — Horizontal — Overturned — Plicated
Strike and dip of beds

Strike and dip of lava flows

WESTOVER (Cu)
Mine or prospect
Showing name (if known) and symbol of main commodity

Ore-mineral occurrence
Showing symbol of main commodity

REFERENCE

Williams, Howel, Turner, F. J., and Gilbert, C. M., 1954, Petrography—an introduction to the study of rocks in thin sections: San Francisco, Calif., W. H. Freeman Co., 406 p.

GEOLOGIC MAP OF THE McCARTHY B-4 QUADRANGLE, ALASKA

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1972

For sale by the U.S. Geological Survey, price $1.00