DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

GEOLOGIC QUADRANGLE MAP
HEALY D-3 QUADRANGLE, ALASKA
GQ-805

Base by U.S. Geological Survey, 1965
10,000-foot grid based on Alaska coordinate system, zone 4

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1970

SCALE 1:63 360

1 ½ 0 1 2 3 4 MILES

1 .5 0 1 2 3 4 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL

ALASKA
QUADRANGLE LOCATION

Geology by Clyde Wahrhaftig, 1947, 1949, 1950, 1954, 1957, and 1958, R. A. Eckhart, 1950, and Allan Cox, 1954; assisted by G. C. Turner and Harrel C. Stacy, 1947, J. P. Johnson and Kirk Bryan, Jr., 1949, Waiton Bakke, Kirk Bryan, Jr., and Allan Cox, 1950, Joel Swanson, 1954, and R. E. Zartman, 1957

EXPLANATION

QUATERNARY

Holocene

Qa — Alluvium
Includes stream and fan deposits

Qo — Outwash gravel on the Wood River

Qg — Rock glaciers

Qls — Landslide deposits

Qm — Morainal deposits

Pleistocene

Riley Creek Glaciation — *Carlo Stade*

Qoa — Older alluvium of Cody Creek

Qtg — Terrace gravel

Qca — Alluvium

Healy Glaciation

Qra — Alluvium and pediment gravel

Qrm — Morainal deposits

Qha — Alluvium and pediment gravel

Qtp — Terrace and pediment gravel
Age relationships uncertain

Dry Creek Glaciation

Qda — Alluvium and pediment gravel

Qdm — Morainal deposits

Browne Glaciation

Qba — Alluvium and pediment gravel

UNCONFORMITY

TERTIARY

Miocene

Coal-bearing group

Tsn — Suntrana Formation
Interbedded, poorly consolidated, white-weathering, crossbedded, pebbly quartz sandstone ("salt-and-pepper sandstone"), silty claystone and blocky-fracturing subbituminous coal in thick, laterally persistent beds. Pebble population in sandstone more than 65 percent and usually more than 80 percent quartz, quartzite, chert, and argillite

Tcu — Coal-bearing group, undivided

Tsc — Sanctuary Formation
Poorly consolidated, brown-weathering, gray, varved or banded shale. Breaks down readily to form landslides

Oligocene and Miocene

Thc — Healy Creek Formation
Interbedded poorly consolidated clay-rich quartz and quartz-and-mica sandstone, quartz-and-chert conglomerate, claystone, and subbituminous coal in lenticular beds. Characterized by abrupt lateral facies change

MAJOR UNCONFORMITY

Paleocene to Oligocene

Tf — Felsic dikes and porphyritic intrusive rocks

Tdi — Fine-grained diorite

Ti — Andesite plugs, hypabyssal intrusions, plug-domes, and associated flows and breccia

Tb — Basalt dikes

Tdb — Diabase
Intrusive into the Cantwell Formation

Paleocene

Tc — Cantwell Formation
Interbedded, moderately well consolidated to well-cemented, cliff-forming sandstone and conglomerate, siltstone, and shale, in beds a few feet to a few hundred feet thick, sandstone and conglomerate predominating. Sandstone and conglomerate are alternately white to buff and dark gray to dark brown, in units several hundred feet thick, and light colors predominating at base of section. Pebbles in light-colored rocks are quartz and schist from sources to north, in dark-colored rocks are quartz, black chert, and volcanic rocks from sources to south. Lenticular beds of bony bituminous coal 1-3½ feet thick locally present in shale sections, especially near base; abundant float from probably much thicker coal beds at base in N½ sec. 27, T. 13 S., R. 4 W. Redbeds present at base of formation south of Dean Creek. Of continental origin

MAJOR UNCONFORMITY

MESOZOIC

Mgd — Hornblende-biotite granodiorite

NORTH OF CODY AND HEALY CREEKS

MISSISSIPPIAN(?)

Totatlanika Schist

Mtc — California Creek Member
Gray quartz-orthoclase-sericite schist and augen gneiss
Mtcb, *black carbonaceous schist*

Mtm — Moose Creek Member
Mtm, *yellow quartz-orthoclase gneiss and schist*
Mtmg, *green basic metavolcanic schist*
Mtmb, *black carbonaceous schist*

METAVOLCANIC AND ASSOCIATED ROCKS SOUTH OF CODY AND HEALY CREEKS

PALEOZOIC

Pr — Rhyolite schist

Pmg — Metagabbro and intrusive greenstone

Pgb — Green metavolcanic schist and black carbonaceous schist

Pm — Marble

Ps — Schist of clastic sedimentary origin
Includes quartz-sericite schist, sericite schist, and chert

Pss — Schist of sedimentary origin
Mainly black carbonaceous schist

SEDIMENTARY ROCKS AT SOUTH EDGE OF QUADRANGLE

Pq — Quartzite

PRECAMBRIAN OR PALEOZOIC

kpb, kp, kpc — Keevy Peak Formation
Quartz-sericite schist, quartzite, purple and green schist and slate, arkosic grit-like schist, marble, and limy schist
kpb, *black schist*
kpc, *lenses of stretched-pebble conglomerate*

bc, bcb, bcm — Birch Creek Schist
Quartz-sericite schist, sericite schist, quartzite, quartz-sericite-carbonate schist, locally green chloritic and epidotic schist. Locally contains disseminated pyrite
bcb, *black carbonaceous schist*
bcm, *marble*

60 — Contact, showing dip
Dashed where approximately located; short dashed where indefinite, gradational, or inferred from aerial photographs; dotted where concealed; queried where doubtful

Fault
Dashed where approximately located; short dashed where indefinite; dotted where concealed; queried where doubtful

Thrust fault
Dashed where approximately located; queried where doubtful. Sawteeth on upper plate

Anticline
Showing trace of axial surface and plunge. Shown only for the Cantwell Formation

Syncline
Showing trace of axial surface and plunge. Queried where position doubtful; dotted if covered by younger deposits. Shown only for the Cantwell Formation

10 — Inclined (shown with symbol for fracture cleavage)

Horizontal

Bearing and plunge of minor fold axis

25 — Inclined

Vertical

70 — Overturned

Horizontal

Strike and dip of beds
Includes lithologic layering, presumably bedding, in metamorphic rocks

60 — Inclined

50 — Inclined and parallel to bedding

Vertical

Horizontal

40 — Gently folded

Strike and dip of foliation

50 — Inclined

Vertical

Horizontal

Strike and dip of fracture cleavage or axial plane of minor fold

25 — Inclined

Horizontal

Bearing and plunge of lineation
In metaconglomerate, direction of long axis of stretched pebbles; in other metamorphic rocks, elongation of mineral grains and streaks on cleavage or foliation surfaces; in igneous rocks, parallelism of hornblende needles

60 — Inclined

Horizontal

Strike and dip of joints

SELECTED BIBLIOGRAPHY

Mackin, J. H., 1950, The down-structure method of viewing geologic maps: Jour. Geology, vol. 58, no. 1, p. 55-72.

Wahrhaftig, Clyde, 1958, Quaternary geology of the Nenana River valley and adjacent parts of the Alaska Range: U.S. Geol. Survey Prof. Paper 293-A, p. 1-68

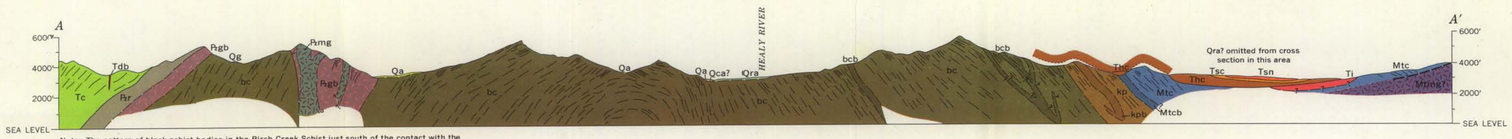
Wahrhaftig, Clyde, 1968, Schists of the central Alaska Range: U.S. Geol. Survey Bull. 1254-E, p. E1-E22.

Wahrhaftig, Clyde, and Cox, Allan, 1959, Rock glaciers in the Alaska Range: Geol. Soc. America Bull., v. 70, no. 4, p. 383-436

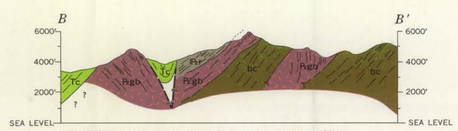
Wahrhaftig, Clyde, Wolfe, Jack A., Leopold, Estella B., and Lanphere, Marvin A., 1969, The coal-bearing group in the Nenana coal field, Alaska: U.S. Geol. Survey Bull. 1274-D, p. D1-D30.

Wolfe, Jack A., and Wahrhaftig, Clyde, 1969, The Cantwell Formation of the central Alaska Range: U.S. Geol. Survey Bull. 1294-A, (In press)

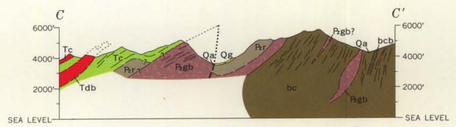
Note: Contacts between metamorphic units may be intrusive, sedimentary, or tectonic. If the tectonic nature of the contact is known, the contact is shown as a fault

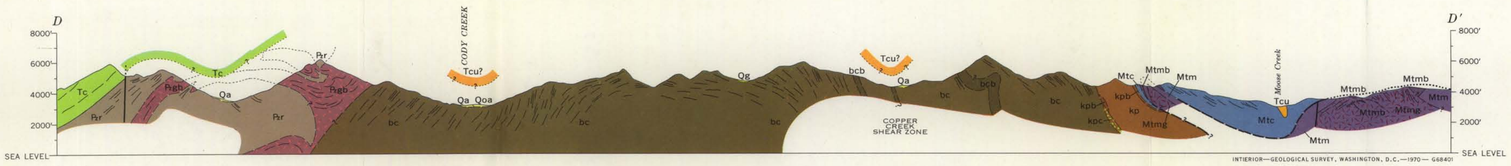


Note: The pattern of black schist bodies in the Birch Creek Schist just south of the contact with the Keevy Peak Formation results from applying the method of Mackin (1950) in preparing the cross section. It suggests undetected thrust faults in this part of the quadrangle.



Inferred faults are not shown on map because they pass upward into bedding-plane slip along the unconformity at the base of the Cantwell Formation.





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GEOLOGIC MAP OF THE HEALY D-3 QUADRANGLE, ALASKA

By

Clyde Wahrhaftig

1970

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