

Mapping is based on both ground observations and aerial observations from a helicopter, August 11-19 and September 1-5, 1970, and supplemented by interpretation from aerial photographs. Bedrock geology chiefly by R. M. Chapman, and surficial geology chiefly by W. E. Yeend.

Base by U. S. Geological Survey, 1956.

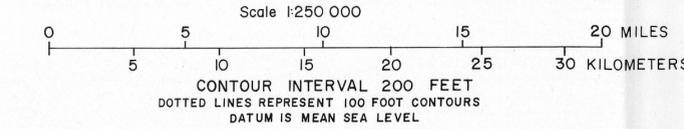
# PRELIMINARY GEOLOGIC MAP OF THE NORTHEASTERN PART OF THE TANANA QUADRANGLE, ALASKA

by  
**Robert M. Chapman and Warren E. Yeend**  
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DESCRIPTION OF MAP UNITS	UNCONSOLIDATED DEPOSITS	GLACIAL
Q4	Till, cirque glaciation.--Boulder- to clay-size particles, unsorted, coarse clasts subangular. Moraine forms occasionally present. Restricted to cirques in Ray Mountains.	
Q3	Till.--Boulder- to clay-size particles, unsorted, coarse clasts subangular. Exists in one locality as a long, low lateral moraine along lower part of Halu Creek.	
Q2	Till.--Boulder- to clay-size particles, unsorted, coarse clasts subangular. Present on lower Halu Creek as low lateral moraine.	
Q1	Till.--Boulder- to clay-size particles, unsorted, coarse clasts subangular. Present on lower Halu Creek as the farthest down-valley recognizable moraine.	
Qc	Till, undifferentiated.--Boulder- to clay-size fragments, unsorted, coarse clasts subangular. No good morainic forms.	
Qal	Recent alluvium.--Sandy gravel and sandy silt, coarse clasts subrounded to well rounded. Represents floodplain of modern rivers and streams.	
Qaf	Recent fan deposits.--Gravel, silt, and sand, coarse clasts subangular to subrounded; commonly occurs at the mouths of small side canyons.	
Qgs	Low-level bench gravel of Minook Creek.--Gravel and sand occurring on a topographic bench in lower parts of Minook Creek, generally less than 200 feet above modern stream bed.	
Q1,2,3	Terrace deposits of Freshlanna Creek.--Gravel, silt, and sand occurring at three levels near mouth of Freshlanna Creek; highest (oldest) surface (Qtr) about 400 feet above modern river bed.	
Qgs	Sand and gravel.--Coarse sand and fine gravel, clasts well rounded, moderately well sorted; characterized by abundance of grayish-white quartz and white feldspar clasts derived from granitic bedrock. Commonly mantled with 1 foot to 10 feet of silt. Present in the broad depression, south and west of the Ray River, in northeast corner of map.	
Qs	High-level white gravel.--Cobble gravel, river-deposited, clasts well rounded to subrounded; characterized by abundance of white quartz pebbles and cobbles. Occurs in one locality in northeast corner of map.	
Qrg	River gravel.--Gravel is well packed, chiefly pebble to small-cobble size with some sand and silt, clasts subrounded to well rounded. Cape hills in the vicinity of Rampart. North of the Yukon River, the rock types are predominantly fine- to very fine grained mafic rocks, with some red chert, argillite, and medium- to dark-gray chert; south of the Yukon River, the gravel includes many rock types and is in part surficial; the gravels are apparently of local origin. Thickness unknown but probably ranges from several tens of feet to about 100 feet.	
Qcal	Colluvium and alluvium, undifferentiated.--Silt and sand mantling the broad, flat valley bounded by the Kanuti Kilolitna River and Foran Creek in northeast corner of map. Ice-wedge polygons present.	

UNCONSOLIDATED DEPOSITS	COLLUVIAL
Qs	Solifluction mantle.--Silt, some sand, and a small amount of angular fragments of bedrock. Ubiquitous at higher elevations mantling all but the steepest slopes. Moves slowly downslope in summer when thawed, producing streamlines (ice cream-melasses) topography. Overlies parts of units sq, hsq, R P v, Kg, and Ts.
Qrs	Recent slide and slump deposits.--Very fresh, unmodified slumps and earthflows at one locality in older landslide deposit along north bank of Yukon River on extreme east edge of map; movement occurred about 1940.
Qls	Older landslide deposits.--Slumps and earth and rock slides showing irregular, hummocky topography and slide scar. Generally occur on steep slopes, particularly along Yukon River.
Qcf	Fan deposits.--Fan-shaped accumulation of unsorted detritus; predominantly gravel and silt. Mapped in single locality in northeast corner of map.
Qc	Colluvium, undifferentiated.--Predominantly silt, with some sand and gravel, often poorly sorted. Occurs along valley sides and valley flats, bordering the recent alluvium (unit Qal). Derived mainly from valley sides by slow downslope soil creep.
Qta	Talus.--Angular boulder rubble in cirque at head of Kanuti Kilolitna River.
Ql	Loess.--Silt, well-sorted, pale-brown, weathering to dark yellowish brown; at lower elevations mantles much of the topography; thickest near Yukon River.
Qat	Altiplanation terrace.--Flat, even surface, cut on bedrock in high areas; commonly possesses thin mantle of coarse, angular rock rubble. Individual terraces are generally less than 5 acres in area.
Qb	Rock-defended terraces on Minook Creek.--Erosional benches along east side of Minook Creek, 400 to 500 feet above the creek. May possess thin mantle of silt.
Qv	Vesicular lava.--Andesitic(?) lava is light to very light gray, weathers a medium yellowish brown to dark reddish brown, highly vesicular, scarce in part. Found at one locality near Ray River in suboutcrops as large rubble blocks and is tentatively correlated with similar rocks that crop out in bluffs several miles north along the Ray River in the Bettles quadrangle. Thickness unknown.
Qg	Granitic rocks.--Granite, quartz monzonite, and possibly some granodiorite are light to very light gray, chiefly coarse to very coarse grained and porphyritic, but with some fine- to medium-grained phases, blocky jointed; in parts sheared jointing gives a layered appearance. Age uncertain, but the entire unit is tentatively correlated with unit Kg (granitic rocks) of Paton and Miller (1970).

SEDIMENTARY, METAMORPHIC, AND IGNEOUS ROCKS	
sq	Schist, quartzite, phyllite, and slate.--Quartz-mica schist is commonly light to medium gray and silvery gray, and white quartz pods and irregular veinlets are abundant; quartzite is mostly light to medium gray, very fine grained, micaceous, schistose or chert-like in part; white quartz pods, lenses, and veinlets are common; beds range from thin to thick; slate and phyllite are light to dark gray, silvery, greenish gray, red, green, and rarely mottled red and green, interbedded in part with quartzite; minor amounts of gray chert, thin shaly medium- to dark-gray limestone, tuffaceous siltstone, and fine-grained and conglomeratic graywackes with some stretched or sheared pebbles and shale fragments are included. This unit is at least in part equivalent to unit sq of Paton and Miller (1970). Thickness unknown.
Rcl	Chert and limestone.--Chert and some chert-granule conglomerate, are light to medium dark gray and olive gray, and weather white to very light gray and less commonly to various shades of tan, yellow, green, and reddish orange; white quartz fragments are common. Limestone is light gray and weathers light tan to white with tuff-like coating, shaly to platy, conglomeratic with thin light gray phyllite fragments and white quartz pebbles. A minor amount of diabase, light to medium grayish green, medium grained, is included. Description is based on observations at only four stations. Thickness unknown.
R P v	Volcanic and intrusive mafic rocks, argillite, slate, and chert.--This unit includes the Permian(?) Rampart Group and the mafic rocks that intrude it. Lava flows, tuffs, and breccias, basaltic, diabasic, and in part andesitic, are dark green and grayish green to almost black, weather yellowish and reddish brown, generally aphanitic to very fine-grained; in part slightly metamorphosed; tuffaceous rocks are gradational into sedimentary tuffs and chert. The origins (volcanic or sedimentary, and extrusive or intrusive) of many of these rocks are difficult to determine; clearly extrusive features have not been identified possibly because they have been obliterated by structural deformation. Intrusive rocks include diorite, diabase, and some gabbro that are medium to dark green, grayish green, and greenish black and weather to various shades of yellow, brown, and reddish brown, fine to very coarse grained, hard, blocky and irregular fractures; commonly form prominent ridges, knobs, and bluffs. A hornblende(?) age date of 205 ± 6 m.y. (Triassic) has been obtained from a gabbro on the Yukon River near Point-Ne-Point (Brogsg and others, 1969, p. B16-B17). The sedimentary and metasedimentary rocks are chiefly argillite, chert, and slate, with some tuff, tuffaceous clastic rocks, and elastic limestone. The argillite and slate are commonly grayish red, maroon, and dark reddish brown, but include various shades of gray and green; the chert is generally light medium to dark gray but in part is greenish gray or reddish. Limestone is fine, medium gray, gritty to conglomeratic, locally contains pelecypod prisms and bryozoan fragments of probable Permian age. A more detailed description of one section is given by Brosgsg and others (1969, p. B8-B10). Thickness unknown but probably is at least several thousand feet.
QTV	Vesicular lava.--Andesitic(?) lava is light to very light gray, weathers a medium yellowish brown to dark reddish brown, highly vesicular, scarce in part. Found at one locality near Ray River in suboutcrops as large rubble blocks and is tentatively correlated with similar rocks that crop out in bluffs several miles north along the Ray River in the Bettles quadrangle. Thickness unknown.
Kg	Granitic rocks.--Granite, quartz monzonite, and possibly some granodiorite are light to very light gray, chiefly coarse to very coarse grained and porphyritic, but with some fine- to medium-grained phases, blocky jointed; in parts sheared jointing gives a layered appearance. Age uncertain, but the entire unit is tentatively correlated with unit Kg (granitic rocks) of Paton and Miller (1970).



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