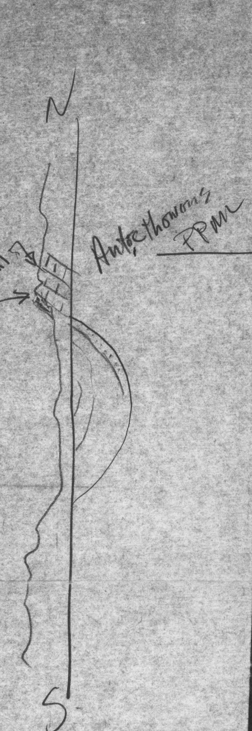
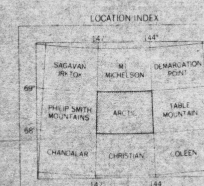


Base by Topographic Division
U.S. Geological Survey, 1956

SCALE 1:250 000
5 0 5 10 15 20 25 MILES
5 0 5 10 15 20 25 KILOMETERS
CONTOUR INTERVAL 200 FEET
DATUM IS MEAN SEA LEVEL

1959 MAGNETIC DECLINATION AT SOUTH EDGE OF SHEET VARIES FROM 31°30' TO 33°30' EAST



Field geology by J. B. Mertie Jr., 1927; W. P. Brosgé, J. T. Dutro Jr., M. D. Mangus, H. N. Reiser, 1952; W. P. Brosgé, H. N. Reiser, J. O. Berkland, N. K. Hagen, 1960; W. P. Brosgé, H. N. Reiser, 1963.

OPEN FILE MAP
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PRELIMINARY GEOLOGIC MAP OF THE ARCTIC QUADRANGLE, ALASKA
by
W. P. Brosgé and H. N. Reiser

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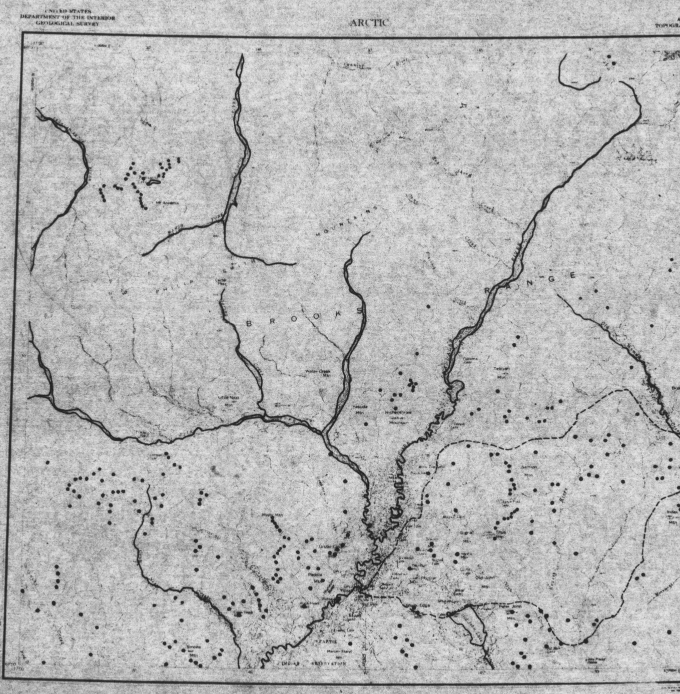
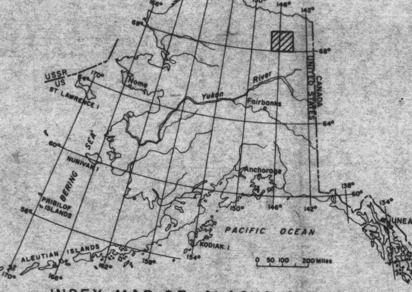
This map is prelimary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.



Index map of Arctic quadrangle showing location of field observation stations made in 1952, 1960 and 1963 (dots) and of traverse by Mertie in 1927 (broken line)

Note: Geology extended between field stations in the southern part of qradrangle by aerial observation from helicopter and by interpretation of aerial photos. Geology extended beyond field stations in the northern part of the quadrangle by interpretation of aerial photographs. Surficial deposits have been mapped entirely from aerial photographs.



INDEX MAP OF ALASKA SHOWING LOCATION OF ARCTIC QUADRANGLE

EXPLANATION

QUATERNARY — Pleistocene and Recent

Qs

Surficial deposits
Alluvium, glacial deposits and colluvium.
Hachured line indicates prominent moraine

UNCONFORMITY

TRIASSIC — Lower, Middle and Upper Triassic

℞s

Shublik Formation
Black, partly calcareous, papery shale interbedded with silty shale, siltstone and thin beds of dark gray limestone; calcareous concretions and ironstone nodules
Estimated thickness more than 300 feet
Includes beds of Early Triassic age in part correlative with shale member of Patton and Tailleur (1964)

Rocks of undifferentiated units

℞Ps — Shublik and Sadlerochit Formations

Lower Triassic; Lower and (or) Upper Permian

℞Ps

Sadlerochit Formation *
Gray to black, partly brown-weathering shale, silty shale and siltstone. Some chert, fine-grained sandstone, conglomerate and limestone in lower part. Pyritic.
Estimated thickness 1000 feet at Porcupine Lake
Rests on Lisburne Group.
Stratigraphic relationship to Siksikpuk Formation unknown

PERMIAN — Lower(?) Permian

Ps / Psc (chert beds)

Siksikpuk Formation *
Dark gray, greenish gray, brown and red silty micaceous shale and slate, locally silicified. Pyritic, manganiferous. Some calcareous shale and limestone
Psc, chert beds mapped locally
Formation rests on Lisburne Group
May include some younger rocks. At one locality north of Nichenthraw Mtn. (Table 1, No. 6) also includes some fossiliferous Upper Mississippian black shale whose structural relation to the Siksikpuk Formation is unknown.

℞Msl — Sadlerochit Formation and Lisburne Group

PENNSYLVANIAN(?) — Lower and (or) Upper Pennsylvanian(?); MISSISSIPPIAN — Lower and Upper Mississippian

PPMl

Lisburne Group
Light- to dark-gray, fine- to coarse-grained limestone and dolomite with light- and dark-gray nodular to bedded chert. Locally, in southernmost exposures, almost completely replaced by chert.
Thickness in northern part of quadrangle 2000 to 3000 feet
Includes Wachsmuth Limestone (Lower Mississippian), Alapah Limestone (Upper Mississippian) and, at least in northern part of quadrangle, Wahoo Limestone (Pennsylvanian? and Permian)

Mlk — Lisburne Group** and Kayak Shale
** Probably includes only the lower (Mississippian) formations of the Lisburne Group

Lower Mississippian

Mk

Kayak Shale *
Black shale; interbedded limestone in upper part; sandstone in lower part. Includes some black and green chert in southern exposures
Thickness about 400 to 1000 feet.
In northern part of quadrangle may include Upper Mississippian Kayak(?) Shale of Brosgé, Dutro, Mangus and Reiser (1962)

UNCONFORMITY

MDkk — Kayak Shale and Kanayut Conglomerate

DEVONIAN — Upper Devonian

Dk

Kanayut Conglomerate
Chert- and quartz-pebble conglomerate, quartzitic sandstone and shale. Rare thin beds of calcareous sandstone and limestone. Northeast of Old Woman Creek basal conglomerate beds contain green shale chips and are interbedded with red and green shale.
Estimated thickness about 2000 feet.
Pinches out in southwest part of quadrangle

Dsq / Ds — Dgw / Ds

Slate and sandstone
Dsg, interbedded quartzitic sandstone, slate and shale. About 1500 to 2000 feet thick
Dgw, gray green lithic graywacke interbedded with quartzitic sandstone and slate. About 1500 to 2000 feet thick
Ds, black slate and shale and minor sandstone. Red and green shale and partly calcareous sandstone in upper part northeast of Old Woman Creek. Sheared conglomerate locally at base. As much as 2500 feet thick

Dsc / Dlf

Slate, conglomerate and limestone
Dsc, gray, green and purple slate; conglomerate of gray and red slate pebbles, varicolored chert pebbles, minor quartz pebbles and locally abundant limestone pebbles; graywacke grit with some volcanic rock fragments; calcareous chloritic sandstone. Estimated thickness from a few hundred feet to 1000 feet or more. Absent locally west of Arctic quadrangle. Probably equivalent to units Dsp and Dsg of Chandalar quadrangle (Brosgé and Reiser 1964)
Dlf, dark gray fossiliferous limestone

LOCAL UNCONFORMITY

Dsl

Calcareous shale and limestone
Calcareous and noncalcareous shale and phyllite; interbedded thin beds of gray- and orange-weathering limestone and partly calcareous conglomerate.
Unit locally absent

LOCAL UNCONFORMITY

Middle(?) and Upper Devonian

Dsk

Skajit Limestone
Massive, light- to dark-gray limestone and marble.
Lower contact not recognized

* Distinction between shales of the Sadlerochit Formation, Siksikpuk Formation and Kayak Shale is doubtful where mapped by photointerpretation

Rocks of uncertain age

DEVONIAN(?) TO JURASSIC(?)

mi

Mafic igneous rocks
Greenstone and purple altered spilitic flows associated with the Neruokpuk Formation
Basalt sills in the Kayak Shale and chert and slate unit
Andesitic flows(?) and dikes associated with Skajit Limestone and unit Dsc
May be in part flows of Devonian and Devonian(?) age; in part intrusive rocks of Jurassic age equivalent to intrusive rocks in Christian quadrangle (Reiser and others in press)

DEVONIAN(?) TO TRIASSIC(?)

℞Dcs

Chert and slate
Black, red and green radiolarian chert; black, red and green slate and argillite.
Age and thickness undetermined

DEVONIAN OR OLDER

Dn

Neruokpuk Formation
Phyllite and chert unit. Black, and gray slate; black, red and purple chert and siliceous slate.
Underlies Kanayut Conglomerate

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OPEN FILE MAP

Table 1. Fossil Collections and their ages

Map No.	Field Collection number and U.S.G.S. Mesozoic locality number	Latitude and longitude	Predominant fossil group	Age	Unit
1	52ABe32 (24063)	68°47'N, 146°33'W	ammonites, pelecypods	middle Early Triassic	℞s
1	52ADu52 (24062)		pelecypods	middle Early Triassic	
2	52ADu47 (24061)	68°46.5'N, 146°37'W	pelecypods	middle Early Triassic	
3	52ABe43 (24064)	68°45.5'N, 146°31'W	pelecypods	middle Early Triassic	
4	52ADu48	68°48.5'N, 146°25'W	ammonites	early Early Triassic	℞Ps
5	60ABe728	68°31'N, 145°16'W	brachiopods, gastropods	Early(?) Permian	Ps
6	63ABe153	68°28'N, 145°18'W	goniatite, brachiopods	Late Mississippian	? (Mapped with Ps)
7	60ABe724	68°28'N, 145°16'W	coral	Devonian to Mississippian	
8	60ABe722	68°27'N, 145°23'W	coral	Silurian to Permian	
9	60ARR754	68°26'N, 144°06'W	brachiopods, gastropods	Early Mississippian	
10	60ARR611	68°17.5'N, 144°52'W	corals, brachiopods, gastropods	Early Mississippian	PPMl
11	60ABe748	68°18.5'N, 146°41'W	crinoid columnals and brachiopods	Early Mississippian	
12	60ABe733	68°36.5'N, 144°28'W	brachiopods, bryozoans	Early Mississippian	
13	60ABe729	68°35.5'N, 145°13'W	corals	Early Mississippian	
14	60ABe761	68°15.5'N, 146°41'W	bryozoans, brachiopods	Early Mississippian	
15	60ARR611A	68°17.5'N, 144°52'W	brachiopods, crinoid columnals	Early Mississippian	
16	60ARR613	68°17'N, 144°53'W	brachiopods, gastropods, trilobites, crinoid columnals	Early Mississippian	Mk
17	60ARR697	68°14.5'N, 144°46'W	bryozoans, coral	Early Mississippian	
18	60ARR712	68°33'N, 144°04'W	brachiopods	Early Mississippian	
19	60ABe620	68°15'N, 144°52'W	brachiopods	late(?) Late Devonian	
20	60ABe688	68°19.5'N, 146°54'W	brachiopods, plants	Late Devonian	Dk
21	60ABe619	68°14.5'N, 144°54'W	corals, brachiopods	early(?) Late Devonian	
22	60ABe546	68°11'N, 145°54'W	brachiopods	Late Devonian	
23	60ABe547	68°11.5'N, 145°53'W	brachiopods	Late Devonian	
24	60ABe548	68°11.5'N, 145°53'W	brachiopods	Late Devonian	
25	60ABe549A	68°12'N, 145°52'W	brachiopods	early Late Devonian	
26	60ARR649	68°05'N, 144°37'W	brachiopods	Late Devonian	
27	60ABe672	68°20'N, 146°19'W	plants	indeterminate	Dgw
28	60ABe745	68°08.5'N, 145°41'W	brachiopods	Devonian(?)	
29	60ARR784	68°09.5'N, 146°13'W	brachiopods	early Late Devonian	
30	60ARR741	68°24.5'N, 144°54'W	corals, brachiopods	Middle or early Late Devonian	
31	60ABk201	68°09.5'N, 145°53'W	crinoid columnals and bivalve shells	indeterminate	
32	60ABk202	68°08.5'N, 145°52'W	corals, brachiopods	early Late Devonian	
33	60ARR635	68°15.5'N, 144°08'W	plants	Devonian	
34	60ABe735	68°33'N, 144°14'W	brachiopods	Late Devonian(?)	
35	60ARR642Z	68°05'N, 144°47'W	brachiopods	Late Devonian	Ds
35	60ARR642		brachiopods	Late Devonian(?)	
36	60ARR618	68°11'N, 145°13'W	brachiopods, gastropods	early(?) Late Devonian	
37	60ABe580	68°39.5'N, 144°08'W	pelecypods	Devonian(?)	
38	63ARR210	68°00.25'N, 146°14'W	corals	Silurian or Devonian	
39	60ABk203	68°09'N, 145°55'W	corals	Middle or early Late Devonian	
40	60ABe549f	68°12'N, 145°52'W	corals	Middle or early Late Devonian	
41	60ABe555A		corals	Silurian or Devonian	
41	60ABe555B	68°13'N, 145°50'W	corals	early Late Devonian	
41	60ABe555C		corals	early Late Devonian	
41	60ABe555D		corals	Middle(?) or early Late(?) Devonian	Dlf
42	60ARR584	68°14'N, 145°53'W	corals	Middle or early Late Devonian	
43	60ABe557	68°12.5'N, 145°46'W	corals	Silurian or Devonian	
44	60ARR659	68°08.5'N, 144°19'W	corals, brachiopods, gastropods, trilobite	Devonian(?)	
45	60ARR660	68°09'N, 144°18'W	corals	Middle(?) or early Late(?) Devonian	
46	60ARR769	68°06'N, 145°46'W	brachiopods	Middle(?) to early Late(?) Devonian	
47	60ARR786	68°11.5'N, 146°14'W	gastropods	Devonian(?)	Dsc
48	60ARR719	68°00.5'N, 146°15'W	corals	Ordovician to Devonian or later	
49	60ARR785	68°11.5'N, 146°15'W	corals	Middle or early Late Devonian	Dsk
50	60ARR787	68°10.5'N, 146°08'W	corals, pelecypods from float	early Late Devonian	
51	60ARR782	68°04.5'N, 146°18'W	gastropods, coral	Devonian(?)	Dsk(?) in mi

Age assignments of Triassic fossils by Bernhard Kummel, 1954 and N. J. Silberling, 1964; Mississippian goniatites by MacKenzie Gordon, Jr., 1963; Permian, Mississippian and Devonian brachiopods, crinoids, gastropods and corals by J. T. Dutro, Jr., 1961, E. L. Yochelson, 1961, W. A. Oliver, Jr., 1961 and 1963 and Helen Duncan, 1964; Devonian plants by S. H. Mamay, 1960.

EXPLANATION (CONT.)

Contact
Dashed where approximately located; dotted where concealed

Morainal ridge
Hachures face away from ice contact

Fault
Dashed where approximately located; queried where doubtful; dotted where concealed. U, upthrown side; D, downthrown side

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

Anticline
Showing trace of axial plane and plunge of axis

Overturned anticline
Showing trace of axial plane, direction of dip of limbs and plunge of axis

Syncline
Showing trace of axial plane

Overturned syncline
Showing trace of axial plane and direction of dip of limbs

Strike and dip of beds

Horizontal beds

Strike and direction of dip of beds
From distant views and photointerpretation

Strike and direction of dip of overturned beds
From distant views and photointerpretation

Fossil locality
Number refers to list of fossil collections, Table 1

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