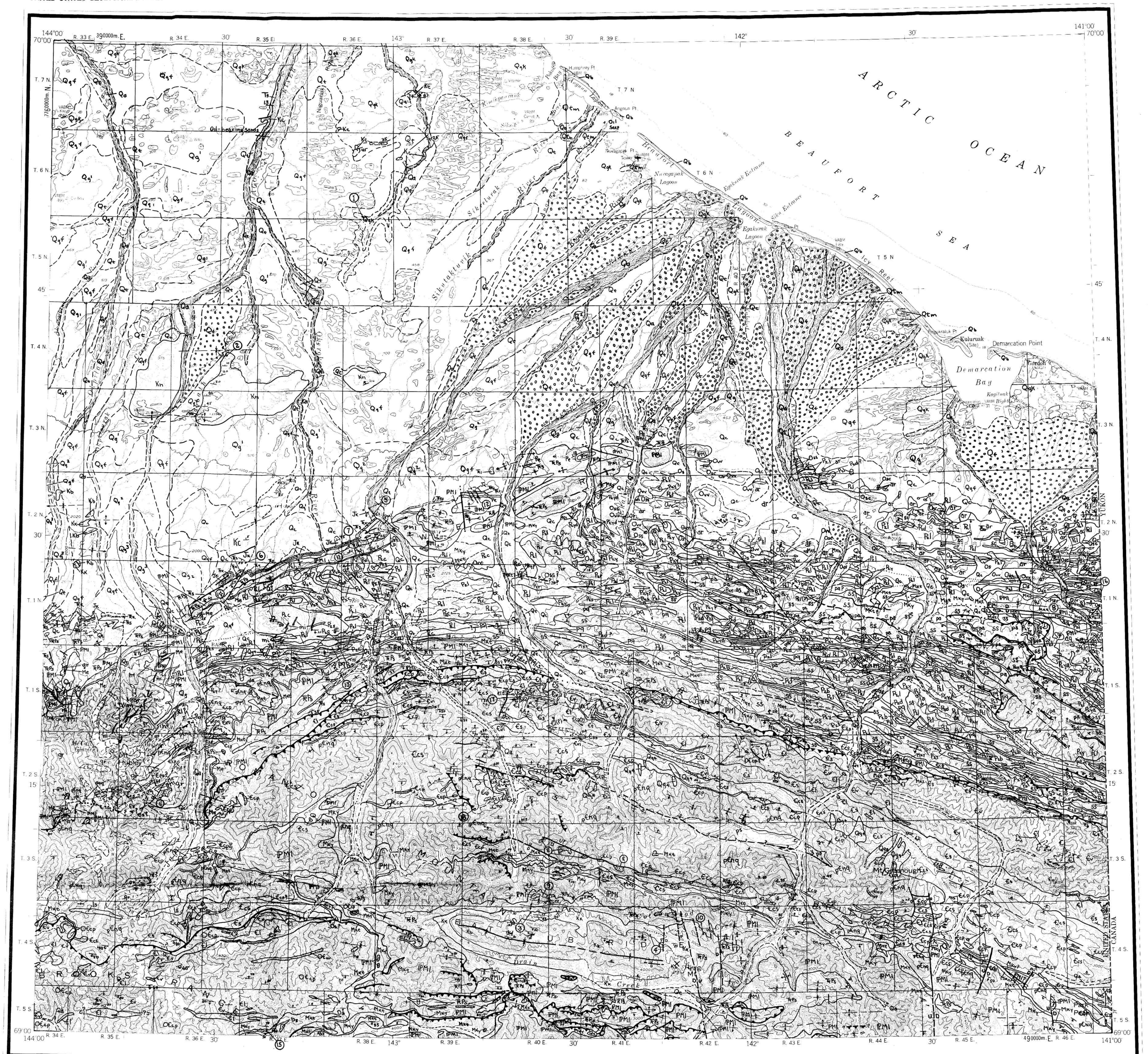


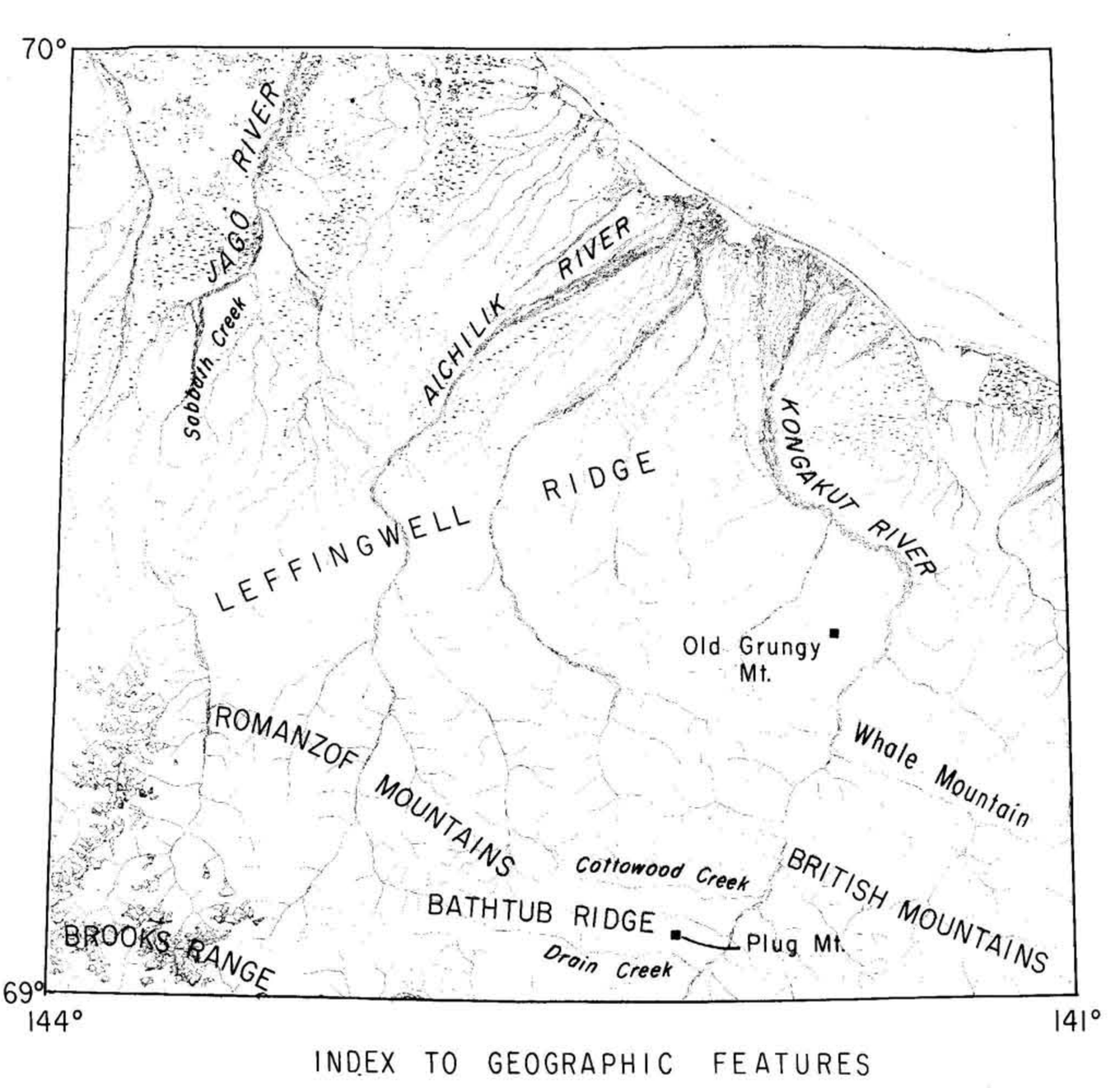
Base from U.S. Geological Survey 1:250,000, 1955

SCALE 1:200000

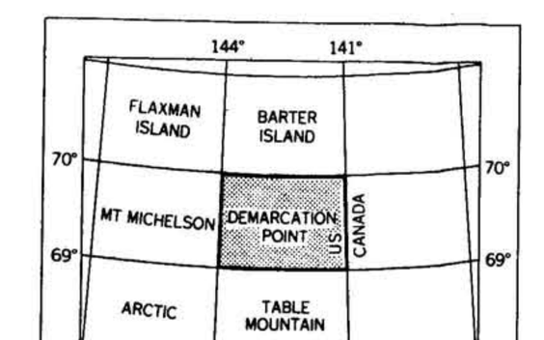
5 0 5 10 15 20 25 MILES

0 5 10 15 20 25 KILOMETRES

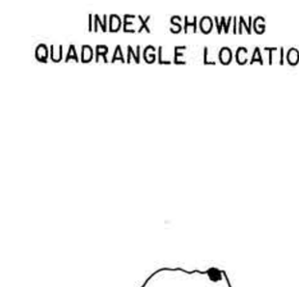
CONTOUR INTERVAL 200 FEET
DOTTED LINES REPRESENT 100- CONTOURS
DATUM IS MEAN SEA LEVEL
DEPTH CURVES IN FEET-DATUM IS MEAN LOWER LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER



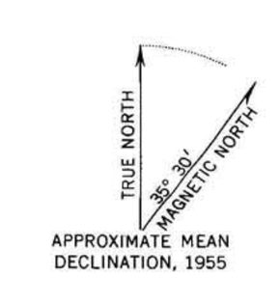
INDEX TO GEOGRAPHIC FEATURES



INDEX SHOWING QUADRANGLE LOCATION

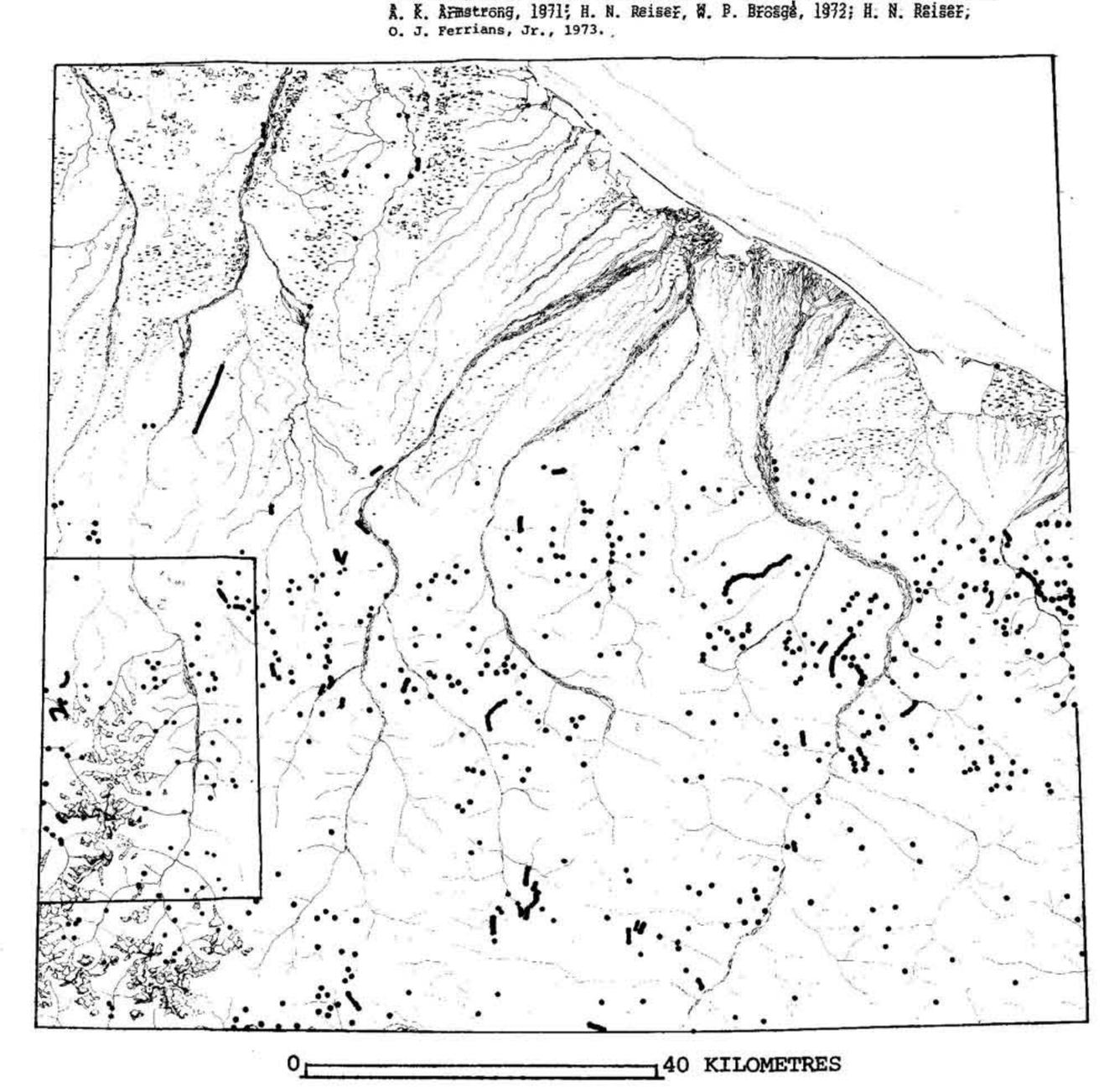


QUADRANGLE LOCATION



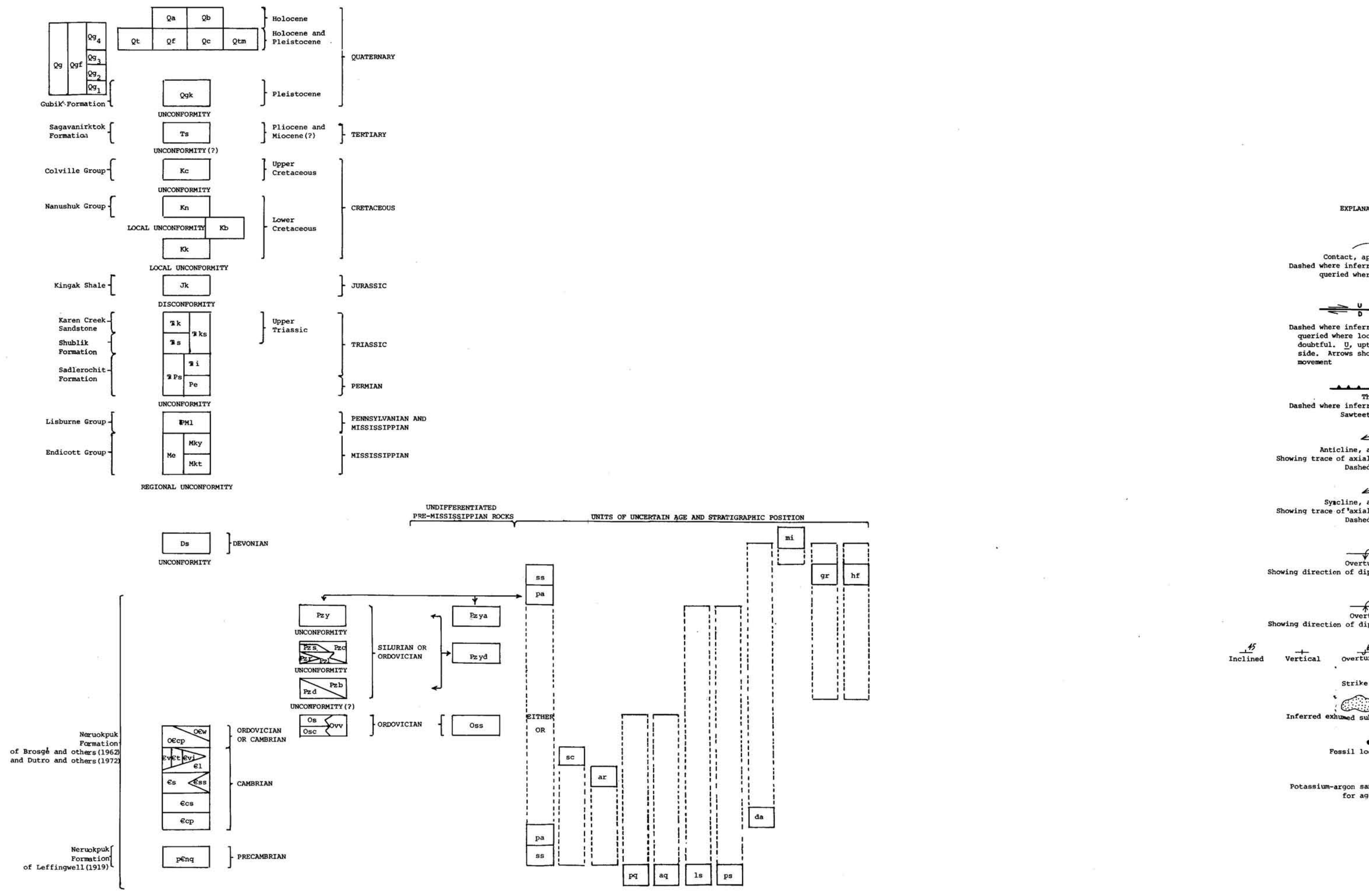
APPROXIMATE MEAN DECLINATION, 1955

Geology by E. de K. Leffingwell, 1907; A. G. Maddren, G. L. Harrington, 1912; M. D. Mangus, 1953; E. G. Sable, G. R. Kunkle, 1957; E. G. Sable, R. S. Bunnell, 1958; W. P. Brosgé, H. N. Reiser, 1960; I. L. Tailleur, A. K. Armstrong, H. N. Reiser, H. A. Tourtelot, 1968; H. N. Reiser, W. P. Brosgé, J. T. Dutro, Jr., R. L. Detterman, E. G. Sable, A. K. Armstrong, 1969–1970; H. N. Reiser, W. P. Brosgé, J. T. Dutro, Jr., R. L. Detterman, A. K. Armstrong, 1971; H. N. Reiser, W. P. Brosgé, 1972; H. N. Reiser, O. J. Ferrians, Jr., 1973.

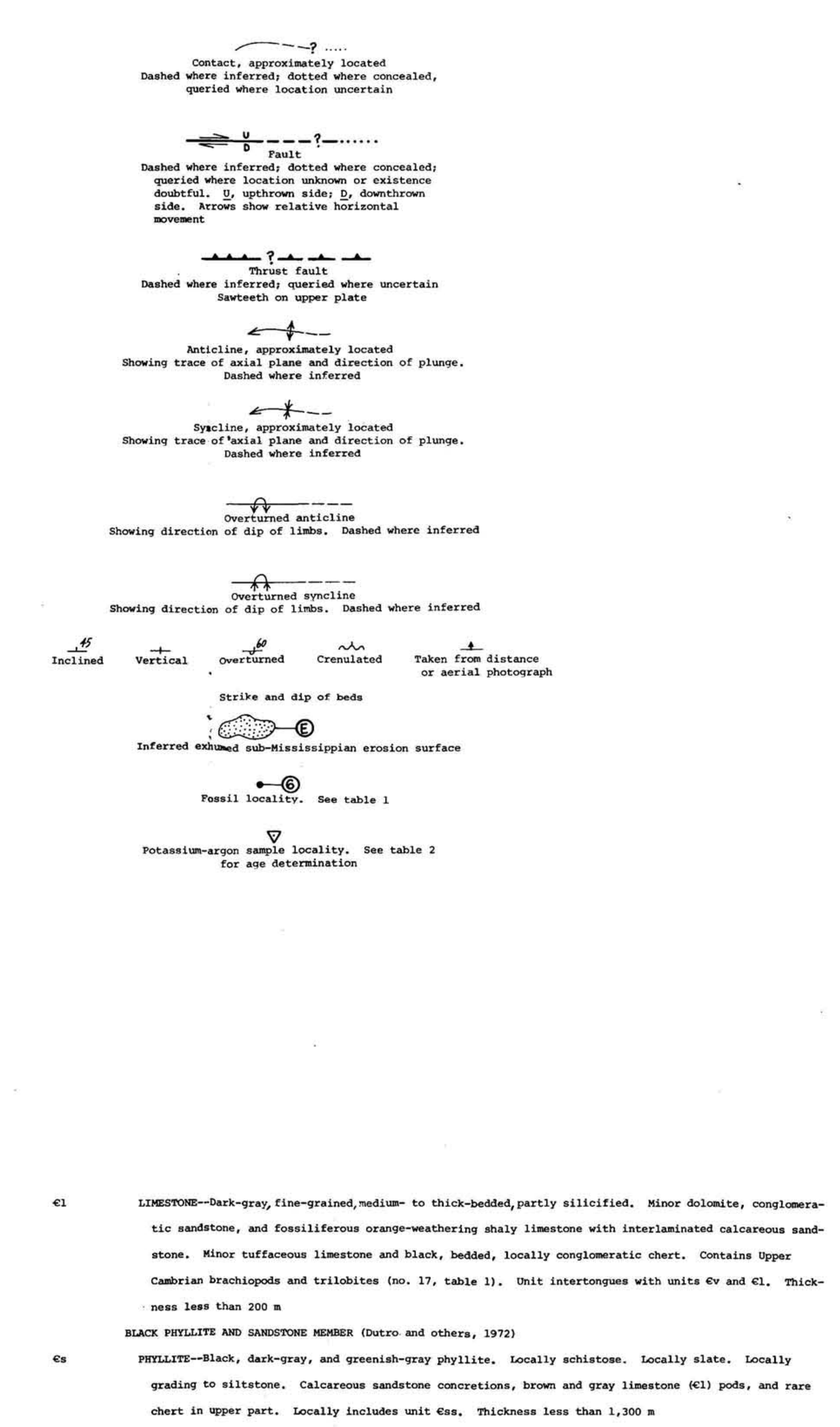


Location of field observation points (dots) and continuous foot traverses (lines) in the Demarcation Point quadrangle, 1968–73. Rectangular box, area mapped 1957–58 (Sable, 1965).

CORRELATION OF MAP UNITS



EXPLANATION OF SYMBOLS



DESCRIPTION OF MAP UNITS

Qa ALLUVIUM--Unconsolidated flood-plain deposits of poorly to well sorted silt, sand, pebbles, and cobbles. Restricted to narrow flood plains and low terraces. Locally includes colluvium (Qc) in narrow valleys

Qb BEACH DEPOSITS--Modern unconsolidated sand and gravel deposited on shore and in bars paralleling present coast line

Qt TERRACE DEPOSITS--Moderately to well sorted gravel, sand, and silt. Several levels. Locally paired

Qf ALLUVIAL FANS--Poorly sorted silt and gravel deposited by rivers debouching on coastal plain

Qc COLLUVIUM--Poorly sorted rock debris, sand, silt, and clay resulting from gravity, frost, and sheet-surface runoff processes

Qtm MARINE TERRACE DEPOSITS--Unconsolidated gravel, sand, and silt

Qg GLACIAL DEPOSITS--Undifferentiated glacial drift

Qgf GLACIAL FLUVIAL DEPOSITS--Poorly sorted and poorly stratified clay, silt, sand, gravel, and boulders

Qg_4 GLACIAL AND GLACIAL FLUVIAL DEPOSITS--Clay, silt, sand, gravel, and boulders of present or recent mountain glaciations. Includes rock glacier in SE1/4 of T. 1 S., R. 36 E.

Qg_3 Qg_2 Qg_1 GLACIAL DEPOSITS--Include glacial fluvial deposits, clay, silt, sand, pebbles, cobbles, and boulders. Subscripts 1 to 3, respectively, represent deposits of oldest to youngest recognized advances

Qgk GUBIK FORMATION (Pleistocene)--Marine deposits of well to poorly sorted and well to poorly stratified silt, sand, and gravel. Locally includes wood and woody material. Carbon 14 date of greater than 34,000 years from sample at Niguanak River (no. 1, table 1). Thickness more than 10.5, probably less than 60 m.

Ts SAGAVANIRKTOK FORMATION (Miocene? and Pliocene)--Grayish-brown to olive-brown laminated to thin-bedded micaceous poorly indurated claystone, siltstone, and shale. Weathers to grayish-brown adhesive clay. Correlated with Tertiary (Miocene? and Pliocene) sediments (Detterman and others, in press) west of map area. Thickness more than 300 m

Kc COLVILLE GROUP (Upper Cretaceous)--Brown fine- to medium-grained sandstone and siltstone. Locally carbonaceous. Locally pebble. Locally oil bearing on lower Jago River. Gray rusty-weathering locally limy siltstone and sandstone. Gray shale and black organic shale with interbedded tuffs and tuffaceous sediments including bentonites. Weather bright yellow, orange, red, green, and gray. Lithologically correlated with Upper Cretaceous (Turonian to Maestrichian) rocks to west (Detterman and others, in press). Thickness more than 450 m

Kn NANUSHUK GROUP (Lower Cretaceous)--Includes marine and nonmarine strata. Marine strata of interbedded greenish-yellow fine-grained calcareous sandstone, dark-colored siltstone, and shale. Crossbedding and conglomeratic lenses common in sandstone. Nonmarine strata of dark-brownish gray polymictic conglomerate, salt and pepper sandstone, gray fine-grained sandstone, and dark-gray to black micaceous and carbonaceous siltstone and shale. No definitive fossil control (no. 2, table 1). Lithologically correlated with Tuktu Formation and lower part of Chandler Formation of Early Cretaceous (Albian) age (Detterman and others, in press). As mapped includes Kb in NW1/4 of T. 3 N., R. 35 E. Thickness 1,000 to 2,000 m

Kb GRAYWACKE OF BATHTUB RIDGE--Dark-gray to green fine- to coarse-grained graywacke, predominantly thin to medium bedded but some massive, cyclically interbedded with dark-gray shale, siltstone, and conglomerate. Plant detritus abundant. Crossbedding and graded bedding common. Early Cretaceous (Albian) age based on stratigraphic relations. Well exposed at Bathtub Ridge (T. 4 S., R. 39 E.). Thickness between 800 to 1,200 m

Kk SILTSTONE, SANDSTONE, AND SHALE OF KONGAKUT RIVER--Upper part mostly dark-gray locally manganiferous pebble shale and dark-olive-gray brownish-gray-weathering siltstone. Minor interbedded sandstone. Lower part mostly dark-gray fissile shale overlain by thin interval of quartz arenite. Clay ironstone beds locally common. Rare arenaceous limestone beds near base contain fossils of Early Cretaceous (Valanginian to Aptian?) age (no. 3, 4, table 1). Well exposed in vicinity of headwaters of Kongakut River (T. 4 S., R. 39 E.). Thickness more than 700 m, probably less than 800 m

Jk KINGAK SHALE (Jurassic)--Upper part clay shale, silty shale, and siltstone with red rusty-weathering ironstone beds. Middle and Upper Jurassic ammonites and pelecypods collected from similar rocks west and south of map area (Detterman and others, in press). Lower part dark-gray to black fissile paper shale, dark-gray clay shale, minor claystone, and beds and nodules of red-weathering ironstone. Unit contains Middle Jurassic ammonites and Lower Jurassic pelecypods, crinoids, and ammonites (nos. 5, 6, table 1). Thickness 0 to 500 m

TRk KAREN CREEK SANDSTONE (Upper Triassic)--Dark-gray fine-grained quartzitic sandstone and siltstone. Locally calcareous or dolomitic. Phosphatic nodules common. Upper Triassic (Norian) fossils collected from type section west of map area (Detterman and others, in press). Unit absent in southern part of quadrangle. Thickness 0 to approximately 30 m

TRs SHUBLIK FORMATION (Triassic)--Interbedded black shale, black calcareous siltstone, and black limestone. Abundantly fossiliferous. Contains Late Triassic (Karnian) fossils (no. 7, table 1). Collections from reference section at Fire Creek, 58 km (35 miles) west of map area, establish Middle and Late Triassic (Anisian to Norian) age (Detterman and others, in press). Unit absent in southern part of quadrangle. Thickness 0 to approximately 100 m

TRks KAREN CREEK SANDSTONE AND SHUBLIK FORMATION, UNDIVIDED

TRPs SADLEROCHIT FORMATION (Permian and Triassic)

TRi IVISHAK MEMBER (Lower Triassic)--Comprised of three lithologic units. Upper unit medium-dark-gray thin-bedded to massive commonly laminated siliceous siltstone, minor silty shale, and argillaceous sandstone. Contains middle Early Triassic (Smithian) fossils (no. 8, table 1). Thickness 0 to more than 30 m. Middle unit clean light-gray massive sandstone. Weathers red to reddish brown. Locally conglomeratic. Correlated with similar rocks of middle Early Triassic age just west of map area (Detterman and others, in press). Thickness variable; 15 m just south of map area, about 120 m in vicinity of Canada-Alaska boundary monument no. 5. Lower unit dark-colored laminated to thin-bedded silty shale and siltstone with minor argillaceous sandstone beds. Fossils of Early Triassic (Griesbachian) age collected from this unit west of map area (Detterman and others, in press). Thickness 35 to probably less than 150 m

Pe ECHOOKA MEMBER (Lower and Upper Permian)--Comprised of two lithologic units. Upper unit red-weathering resistant ferruginous orthoquartzite, quartzitic sandstone, and siltstone. Contains Permian (Guadalupian) fossils (nos. 11–14, table 1) at base of upper unit, probably equivalent in age to top of lower unit to south. Thickness of upper unit 50 to 110 m; thins to north. Lower unit almost entirely restricted to extreme southern part of map. Best exposed in ridge north of Joe Creek south of map area. Top of lower unit thin- to medium-bedded quartzose calcarenite and biogenetic limestone which includes brachiopod coquinas. Thickness approximately 20 m. Top of lower unit underlain by about 25 m of medium- to thick-bedded chert and siliceous siltstone. Base of lower unit dusky-yellow thin-bedded limy mudstone and calcareous siltstone. Thickness approximately 50 m. Lower unit yields Permian (Wolfcampian to Guadalupian) fossils (nos. 9 and 10, table 1). Total thickness for lower unit about 100 m; thins rapidly to northwest (Detterman and others, in press).

PMl LISBURNE GROUP, UNDIVIDED (Mississippian and Pennsylvanian)--Upper unit (Wahoo Limestone) fine-grained limestone and oolitic limestone, some glauconite and minor dolomite. Weathers characteristic light gray to yellowish cream. Contains megafauna and microfauna of Morrowan and Atokan (Early and Middle Pennsylvanian) age; microfaunal zones 20 and 21 (Mamet and Armstrong, 1972; Armstrong and Mamet, 1974). Thickness of upper unit variable due to erosion, 0 to about 375 m. Lower unit (Alapah Limestone) gray bioclastic limestone, dolomite, and black chert. Weathers gray to dark gray. Contains megafauna and microfauna of Meramecian and Chesterian (Late Mississippian) age; microfaunal zones 15 to 19 (Mamet and Armstrong, 1972; Armstrong and Mamet, 1974). Thickness of lower unit 275 to 655 m. As mapped in extreme south-central part of quadrangle unit may include lower unit of Echooka Member (Lower Permian)

Me ENDICOTT GROUP, UNDIVIDED (Mississippian)

Mky KAYAK (?) SHALE--Dark-gray to black shale. Locally interbedded with gray- to red-weathering limestone. Locally contains anthracite at base. Thickness as much as 50 m

Mkt KEKIKTUK CONGLOMERATE--Resistant massive quartzite and granule to cobble conglomerate. Quartzite is generally light gray, clean, well indurated, and light gray weathering; locally iron stained. Conglomerate predominantly of quartz and chert clasts, interbedded, and lenticular. Locally contains anthracite. Thickness less than 75 m; locally absent

Regional, sharp angular unconformity

The exhumed, folded sub-Mississippian erosion surface (E) is mapped locally

Ds SANDSTONE AND CALCAREOUS SANDSTONE--Gray fine-grained thin-bedded locally manganiferous carbonaceous sandstone interbedded with rusty-black slaty shale and ferruginous, calcareous, fossiliferous sandstone with abundant brachiopods. Unit includes hematitic brick-red-weathering sandstone, chert arenite, silicified chert pebble to boulder conglomerate, and platy to thin-bedded gray- to brownish-red-weathering limestone. Contains Middle (?) Devonian brahciopods (no. 15, table 1). Thickness probably more than 100 m. Rests with angular unconformity on chert and phyllite member (OꞒcp)

NERUOKPUK FORMATION (Brosgé and others, 1962)

Units mapped may contain rocks of other units, particularly where exposure is limited

Pzy ARGILLITE AND LIMESTONE MEMBER (Dutro and others, 1972)--Gray, green, and red argillite and phyllite interbedded with orange-weathering thin-bedded limestone, white, gray, and green chert, white and gray quartzite and sandstone, minor calcareous grit, calcareous sandstone, pale-orange very fine grained thin- to thick-bedded sandy limestone and dolomite, and dolomitic quartzose siltstone. Unit weathers distinctive yellow orange. Unit may include unrecognized rocks of unit Pzd. Thickness about 300 to 650 m

LIMESTONE MEMBER (Dutro and others, 1972)

Pzc LIMESTONE AND CALCAREOUS SANDSTONE--Predominantly dark-gray platy to thin-bedded silty limestone. Weathers distinctive pink orange and yellowish orange. Locally crossbedded. Locally contains abundant quartz grains. Intervals with black phyllite laminae. Includes medium- to dark-gray and dark-greenish-gray fine-grained thin- to medium-bedded calcareous sandstone grading to siltstone. Weathers orange, dark orange, and olive. Locally massive. Locally laminated. Locally crossbedded. Locally interbedded with black shaly limestone and black phyllite. Rare dark-gray more resistant calcareous reddish-brown-weathering quartz wacke. Thickness of unit less than 300 m

Pzs SHALE--Gray and black slaty shale and gray micaceous shale. Light-gray-green, dark-gray, and greenish-black banded slate; weathers dark reddish brown. Intervals with beds of red-weathering ironstone and bedded large ellipsoidal ironstone concretions. Thickness less than 30 m

Pzl LIMESTONE--Dark-gray to grayish-black thick- to medium-bedded limestone. Weathers medium to light gray. In part pelletoidal, pistolitic, and recrystallized. Commonly with floating rounded quartz grains. Locally grades to coarse-grained calcareous sandstone and calcareous grit conglomerate. Distinctive intricate net of white calcite veins. Thickness less than 150 m. Rests unconformably on sandstone and dolomite (Pzd), brown-weathering limestone and shale (Pzb), black slate (Os), gray phyllite and chert member (Osc), volcanic and volcaniclastic rocks (Ovv), red and green phyllite member (ar), and argillite, quartzite, and limestone member (aq)

Pzr RED-WEATHERING LIMESTONE--Probably equivalent to unit Pzl. Differs from unit Pzl in weathering red, having well-defined crossbedding, and in being more ferruginous and generally coarser grained. Recognized only in area between Egaksarak and Ekaluakat Rivers. Thickness less than 150 m

Pzb BROWN-WEATHERING LIMESTONE AND SHALE--Interbedded brown shale, gray phyllite, pink to medium-gray fine-grained calcareous and dolomitic quartzite, and laminated to thin-bedded brown-weathering limestone. Locally contains greenish-gray slate and white chert. Thickness less than 150 m. Rests on phyllite and quartzite (pq)

Pzd SANDSTONE AND DOLOMITE--Fine-grained lamellar to thin-bedded calcareous and dolomitic sandstone, siltstone, and silty dolomite. Weather light brown orange to yellow orange. Prominent crossbedding. Interbedded with thin beds of black slate or phyllite, and occasional pink fine-grained clean hard quartzite. Thickness probably less than 50 m. Rests on phyllite and quartzite (pq)

Os BLACK SLATE--Locally phyllitic slate and black slaty shale interbedded with dark-colored thin-bedded locally laminated micaceous limonitic locally pyritic siltstone and quartzite. Weathers brown to rusty red. Worm trace fossils locally abundant. Contains one graptolite of Ordovician age (no. 16, table 1). Thickness less than 20 m

Osc GRAY PHYLLITE AND CHERT MEMBER (Dutro and others, 1972)--Light- to dark-greenish-gray and white to grayish-black vitreous to dull chert, grayish-black to greenish-gray phyllite, silicified phyllite, and silicified to nonsilicified finely banded mudstone. Commonly intensely contorted, crenulated, and brecciated (conglomeratic?). Overlain by and locally gradational (?) with unit Os. May include rocks of unit Ovv. Thickness at least 70 m. Rests on red and green phyllite member (ar)

Ovv VOLCANIC AND VOLCANICLASTIC ROCKS--Basaltic volcanic wacke, tuff, agglomerate, tuffaceous sandstone, volcanic conglomerate, flow breccia, calcareous volcanic wacke, tuffaceous limestone, and tuffaceous dolomite. Mostly dark greenish gray, weathering mottled greenish gray. Dolomitic facies weathers yellowish brown. Very fine grained, finely banded volcanic wacke weathers distinctive deep-hued brownish red in SE1/4 of T. 2 N., R. 39 E. Dark-greenish-gray phaneritic chloritized intrusive rocks weather reddish gray in sec. 17, T. 2 N., R. 40 E., secs. 7 and 17, T. 1 N., R. 44 E., and secs. 1 and 2, T. 2 N., R. 41 E. Thickness 10 to 250 m. Intertongues with black slate (Os) and gray phyllite and chert member (Osc). Sedimentary portion rests on slate, argillite, quartzite, and chert (sc) and red and green phyllite member (ar)

CHERT AND PHYLLITE MEMBER (Dutro and others, 1972)

OꞒw VOLCANIC WACKE AND TUFFACEOUS SANDSTONE--Gray to dark-green fine to very coarse grained volcanic wacke and tuffaceous sandstone. Weather yellowish orange and brownish orange. Clasts mostly fragments of acidic and basic (?) volcanic rocks. Chert clasts common. Thickness more than 50 m

OꞒcp CHERT AND PHYLLITE--Black, gray, white, and green chert with interbedded dark-gray, brown, green, and red phyllite, slate, and rare thin-bedded limestone and mafic intrusive rocks. Thickness 300 to 1,000 m

VOLCANIC AND CARBONATE MEMBER (Dutro and others, 1972)

Ꞓv VOLCANIC AND VOLCANICLASTIC ROCKS--Dark-grayish-green to greenish-black and brown mafic vesicular flows, basaltic tuffs, agglomerate(?), and pebble- to cobble-size volcanic conglomerate. Weather dark olive brown and dark gray. Minor gray dark-gray-weathering chert grit conglomerate. Locally includes units Ꞓt and Ꞓvi. Intertongues with limestone (Ꞓl). Thickness probably between 700 and 1,300 m

Ꞓt BASALTIC TUFF--Dark-brown to greenish-brown basaltic tuff. Weathers dark brown. Mapped only locally. Thickness less than 70 m

Ꞓvi MAFIC INTRUSIVE ROCKS--Small dikes and sills (?)

Ꞓl LIMESTONE--Dark-gray, fine-grained, medium- to thick-bedded, partly silicified. Minor dolomite, conglomeratic sandstone, and fossiliferous orange-weathering shaly limestone with interlaminated calcareous sandstone. Minor tuffaceous limestone and black, bedded, locally conglomeratic chert. Contains Upper Cambrian brachiopods and trilobites (no. 17, table 1). Unit intertongues with units Ꞓv and Ꞓl. Thickness less than 200 m

BLACK PHYLLITE AND SANDSTONE MEMBER (Dutro and others, 1972)

Ꞓs PHYLLITE--Black, dark-gray, and greenish-gray phyllite. Locally schistose. Locally slate. Locally grading to siltstone. Calcareous sandstone concretions, brown and gray limestone (Ꞓl) pods, and rare chert in upper part. Locally includes unit Ꞓss. Thickness less than 1,300 m

Ꞓss SANDSTONE--Grayish-black to gray fine-grained sandstone grading to siltstone. Locally includes beds of gritty lithic wacke. Intertongues with unit Ꞓs. Thickness less than 50 m

CALCAREOUS SILTSTONE AND SANDSTONE MEMBER (Dutro and others, 1972)

Ꞓcs CALCAREOUS SILTSTONE AND SANDSTONE--Predominantly gray to olive brownish-weathering micaceous partly calcareous phyllitic siltstone and brown-weathering very thin-bedded finely crossbedded partly calcareous micaceous sandstone. Locally includes orange-weathering limestone and calcareous graywacke. Contains rare echinoderm columnals (no. 18, table 1). Thickness about 700 to 1,300 m

Ꞓcp CHERT AND PHYLLITE--Black, white, gray, and variegated green and red bedded chert and local red-brown-weathering poorly to completely silicified siltstone and slate. Includes maroon-red, green, and black phyllite, locally grading to slate and argillite. Locally includes manganiferous siltstone and slate. Thickness probably less than 100 m

pꞒnq QUARTZITE AND SEMISCHIST MEMBER--Interbedded thin- to thick-bedded resistant massive quartz wacke, subordinate phyllite and argillite, and rare calcareous sandstone. Generally weathers greenish to brownish gray. Thickness more than 1,700 m

Undifferentiated pre-Mississippian rocks

Pzya PHYLLITE AND ARGILLITE (pa) AND (OR) ARGILLITE AND LIMESTONE MEMBER (Pzy), UNDIFFERENTIATED

Pzyd ARGILLITE AND LIMESTONE MEMBER (Pzy) (OR) SANDSTONE AND DOLOMITE (Pzd)

Oss BLACK SLATE (Os) AND GRAY PHYLLITE AND CHERT MEMBER (Osc), UNDIFFERENTIATED

Units of uncertain age and stratigraphic position

ss FERRUGINOUS SANDSTONE MEMBER (Dutro and others, 1972)--Fine- to coarse-grained quartz wacke locally grading to sublitharenite and lithic graywacke (Pettijohn and others, 1972). Mostly greenish to brownish gray and grayish black. Weathers distinctive reddish orange. Locally granular conglomeratic. Rounded quartz grains common. Unit includes siltstones of similar composition, red, green, and black phyllitic slate, and rare limy beds. Physically overlies unit Pzy but resembles and may be equivalent to units pꞒnq and Ꞓcp. If so, unit is allochthonous. Thickness about 700 m

pa PHYLLITE AND ARGILLITE--Gray, green, red, and maroon phyllite and argillite. Locally includes gray to green chert. These rocks resemble and may be equivalent to unit Ꞓcp. Physically underlain and overlain by unit ss. Thickness less than 100 m

sc SLATE, ARGILLITE, QUARTZITE, AND CHERT--Gray-green laminated brownish-weathering locally manganiferous slate with interbedded clean hard quartzite and light-gray laminated chert. Slate grades to argillite. Quartzite predominantly white to gray; weathers gray. Rare thin hematitic quartzite weathers red brown. Locally intensely crenulated and broken. Occurrence restricted to Clarence River. Unit may in part be equivalent to unit pq. Thickness probably less than 100 m

ar RED AND GREEN PHYLLITE MEMBER--Red and green phyllite, gray phyllite, and minor chert and quartzite. Thickness more than 300 m

pq PHYLLITE AND QUARTZITE--Grayish-green to gray phyllite interbedded with thin beds of white to pinkish-gray fine-grained dense quartzite. Commonly intensely crenulated and crumpled. May in part be equivalent to unit Oss. Total thickness unknown but more than 75 m

aq ARGILLITE, QUARTZITE, AND LIMESTONE--Upper (?) part interbedded grayish-black laminated banded orange-brown-weathering argillaceous slate, brown-weathering thin-bedded partly platy limestone, and dark-gray fine-grained thin-bedded limonitic sandstone. Lower (?) part interbedded argillaceous siltstone and slate, grayish-brown-green graywacke, and quartzite and sandstone. Weather dark brown to orange. Occurrence restricted to Clarence River area. Total thickness unknown, but more than 150 m

ls LIMESTONE--Gray to grayish-black platy to thin-bedded limestone. Weathers light gray to reddish orange, reddish brown, yellow, and ochre. Locally pyritic. Locally silty and sandy. Locally includes black limestone with phyllitic partings, black phyllitic slate, siltstone, and sandstone. Locally includes black chert. Thickness less than 125 m. Physically underlain and overlain by unit pꞒnq

ps PHYLLITE, QUARTZITE, AND SILTSTONE--Thin-bedded to laminated phyllite, quartzite, and siltstone. Weather black and gray green. Quartzite pale pink to medium gray; very fine grained. Phyllite locally crossbedded. Minor black recrystallized limestone. Very fine-grained tabular bedded calcareous limonitic quartzite grading to calcareous arenite. Incompletely examined. Thickness unknown, but more than 70 m. Physically underlies unit pꞒnq

da DACITIC ROCKS--Light-gray-green aphanitic flow and pyroclastic (?) rocks. Weather distinctive grayish yellow green and greenish yellow. Locally foliated and sheared. Outcrop restricted to area within T. 1 and 2 S., R. 36 E.

mi MAFIC ROCKS--Medium- to dark-grayish-green dense massive diabasic and dioritic dikes and sills (?). Weather brownish orange and olive gray. Original minerals chloritized and generally altered. Schistose, and locally garnet bearing within granitic rocks (gr)

gr GRANITIC ROCKS--Predominantly quartz monzonite. Muscovite and biotite common accessory minerals within main pluton (Okpilak batholith) and in stock (Jago stock) breached by Jago River in T. 2 S., R. 35 E. Hornblende abundant but restricted to small stock at head of Jago River in T. 2 and 3 S., R. 35 E. Potassium-argon age of 431 ± 13 m.y. on hornblende (table 2) from small stock at head of Jago River. Lead-alpha ages of 310 ± 25 and 405 ± 45 m.y. on zircon and potassium-argon ages of 125 and 128 m.y. on biotite from Okpilak batholith (Sable, 1965). Alteration of Mississippian rocks in contact with granitic rocks indicate post-Mississippian, Cretaceous (?), remobilization.

hf ALTERED ROCKS--Include schistose rocks, locally iron stained, derived from units pꞒnq, Mkt (?), tactites from unit Pzl (?), and hornfels from unit Ꞓcs. Hornfels mostly gray and green, laminated and greenish gray and tan weathering. Occurs at contact with granitic rocks (gr)

TABLE 1. SELECTED FOSSIL COLLECTIONS

Map No.	Field collection No. and meters above base of section	USGS locality No.	Lithologic unit, fossils, and age		Latitude, longitude, township, and range
			Gubik Formation (Qgk)		
1	70ADt275		Populus (Salicaceae) sp. C-14 dating >34,000 yrs. B.P.	1/	69°49'30" N.; 143°05' W. T. 6 N., R. 36 E.
			Nanushuk Group (Kn)		
2	71ADt300-P-1		Tythodiscus ("...a marine algal form that ranges from Jurassic to Recent and is common in the Late Jurassic-Early Cretaceous...shales of North Slope..."). Collection also included reworked Devonian spores.	2/	69°49'30" N.; 143°05' W. T. 4 N., R. 35 E.
			Siltstone, sandstone, and shale (Kk)		
3	70ADt214		Buchia sublaevis	3/	69°07'45" N.; 142°37' W. T. 4 S., R. 39 E.
4	71ADt313	M5815	Aucellina(?) sp. (Aptian?)	3/	69°06'10" N.; 142°17' W. T. 4 S., R. 41 E.
		M5817	Simbirskites sp.; Lytoceras sp.; belemnites, and brachiopods (Hauterivian)		
		M5818	Buchia sublaevis (Valanginian)		
			Kingak Shale (Jk)		
5	71ADt330	30074	Amaltheus cf. A. stokesi and Ostrea sp. (Pliensbachian)	3/	69°33' N.; 143°05' W. T. 2 N., R. 37 E.
		30075	Arctioceras kochi, A. kochi var. pseudolamberti and Choffatia cf. C. subbakeri (Bathonian)		
		30073	Pentacrinus sp. and pelecypod fragments (Early Jurassic)		
		30136	Cadoceras sp. (Callovian)		
6	71ADt368	30135	Pseudolioceras maclintocki (basal Bajocian)	3/	69°28'45" N.; 143°26' W. T. 1 N., R. 35 E.
			Shublik Formation (TRs)		
7	71ADt283 +50 m		Halobia of the H. zitteli ornatissima group and rhynchonellid brachiopods (Karnian)	4/	69°30' N.; 143°07' W. T. 2 N., R. 37 E.
			Ivishak Member (TRi) of Sadlerochit Formation		
8	71ADt326	M6076	Euflemingites romunderi (Smithian)	4/	69°25' N.; 141°00'10" W. T. 1 N., R. 45 E.
			Echooka Member (Pe) of Sadlerochit Formation		
9	70ADt204 +58 m	24387-PC	Stenoporoid and fenestrate bryozoans, undet.; Derbyia(?) sp.; Chonetina cf. C. superba; Lissochonetes spitsbergianus; Anemonaria pseudohorrida; Waagenoconcha sp.; Cancrinella sp.; Megousia harlandi; Yakovlevia duplex; Stenocisma sp.; Neophricodothyris asiatica; Spiriferella saranae and Punctospirifer(?) sp. ("...Characteristic lower part of Echooka Member...")	5/	69°08'30" N.; 142°03'45" W. T. 3 S., R. 39 E.
	70ADt204 +12 m	24386-PC	Yakovlevia(?) sp.; Attenuatella sp.		
10	71ADt303 +117 m	23459-PC	Septospirifer(?) sp. and straparollid snails	6/	69°06'20" N.; 142°08' W. T. 4 S., R. 41 E.
	+88 m	23458-PC	Anidanthus(?) sp.; Waagenoconcha sp.; Spiriferella sp. and Septospirifer sp. 23458- & 9-PC "...possibly some part of Zone F" (Leonardian to Guadalupian) (Bamber and Waterhouse, 1971)		
	+22 m	23457-PC	Chonetina sp. and Attenuatella sp. (Wolfcampian) ("...may be correlated with Zone Ea (Bamber and Waterhouse, 1971)...")		
11	71ADt283	23452-PC	Chonetina(?) sp.; Anemonaria(?) sp., productoid, indet., stenocismid, indet., and Spiriferella sp. ("...possibly Zone G (Bamber and Waterhouse, 1971)...previously called the "lower Echooka fauna"...")	6/	69°20'20" N.; 143°07' W. T. 2 N., R. 37 E.
12	71ADt284 +50 m	23453-PC	"A coquina of Megousia-like shells...probably the species Kuvelousia sphiva of Waterhouse" ("...Zone G (Bamber and Waterhouse, 1971...")	6/	69°32'30" N.; 142°46' W. T. 2 N., R. 38 E.
13	71ADt290 +8–18 m	23454-PC	Spiriferella(?) sp.	6/	69°22'15" N.; 143°09'20" W. T. 1 S., R. 37 E.
	+52–56 m	23455-PC	Spiriferella sp.; undetermined horn coral ("...possibly Zone G...")		
14	71ADt296 +12 m	23456-PC	Stenoporoid bryozoans; indet., Chonetina(?) sp.; Anidanthus(?) sp. productoid fragments, indet. ("...possibly Zone G...")	6/	69°27' N.; 143°28'30" W. T. 1 N., R. 35 E.
			Sandstone and calcareous sandstone (Ds)		
15	71ABe459E 71ABe463A, B,C,D,E	8900-SD 8898-SD 8899-SD	Warrenella? sp.; Goniophora sp.; Deceptrix sp. (or Nuculoidea sp.); ?Schizodus sp.; Actinopteria sp.; Dechenella sp. (Middle(?) Devonian)	7/	69°00'15" N.; 143°21'30" W. T. 5 S., R. 37 E.
			Black slate (Os) in Neruokpuk Formation		
16	71ABe430D		Orthograptus of the O. quadrimucronatus type	8/	69°26'30" N.; 141°00' W. T. 1 N., R. 45 E.
	71ABe431E		Nereites, Paleodictyon? Zoophycos? Dictyodora	9/	
			Limestone (Ꞓl) of volcanic and carbonate member in Neruokpuk Formation		
17	70ABe173C	6983-CO	Geragnostus sp.; Saratogia sp.; ptychoparioid trilobite; Billingsella sp. (Lower Cambrian)	10/	69°20'45" N.; 142°39' W. T. 1 S., R. 39 E.
			Calcareous siltstone and sandstone member (Ꞓcs) of Neruokpuk Formation		
18	70ARr316		Echinoderm debris	11/	69°13'45" N.; 142°46'30" W. T. 2 S., R. 39 E.

1/ Plant fossil identified by Richard A. Scott, U. S. Geol. Survey. Radiocarbon age determination by Meyer Rubin, U. S. Geol. Survey.

2/ Identified by Richard A. Scott, U. S. Geol. Survey.

3/ Identified by R. W. Imlay and D. L. Jones, U. S. Geol. Survey.

4/ Identified by N. J. Silberling, U. S. Geol. Survey and Dept. of Geology, Stanford University.

5/ Identified by J. T. Dutro, Jr., and D. Bieler, U. S. Geol. Survey.

6/ Identified by J. T. Dutro, Jr., U. S. Geol. Survey.

7/ Identified by J. T. Dutro, Jr., and John Pojeta, Jr., U. S. Geol. Survey.

8/ Identified by W. B. N. Berry, Univ. of California, Berkeley.

9/ Trace fossils identified by J. T. Dutro, Jr., U. S. Geol. Survey.

10/ Identified by J. T. Dutro, Jr., and A. R. Palmer, U. S. Geol. Survey.

TABLE 2. RADIOGENIC AGE DETERMINATION

Field No.	Location	Mineral	Map Unit	K_2O percent	Ar^{40}_{rad} (moles/gm)	$Ar^{40}_{rad}/Ar^{40}_{total}$	Apparent Age (millions of years)
69ARr131	lat 69°09' N. long 143°43' W. Sec. 32, T. 3 S., R. 35 E.	Hornblende	gr	0.593 0.594	4.246×10^{-10}	0.87	431±13

Potassium analyses: Lois Schlocker

Argon analysis and age calculation: J. C. Von Essen

[K^{40} decay constants: $\lambda_e = 0.585 \times 10^{-10} year^{-1}$; $\lambda_\beta = 4.72 \times 10^{-10} year^{-1}$. Abundance ratio: $K^{40}/K = 1.19 \times 10^{-4}$ atom percent]

(Compare apparent ages for lead-alpha 310–450 m.y.; potassium argon 125–128 m.y. (Sable, 1965, p. 168, 169))

REFERENCES

Armstrong, A. K., and Mamet, B. L., 1974, Carboniferous biostratigraphy, northeastern Brooks Range, Arctic Alaska: Am. Assoc. Petroleum Geologists Bull., v. 58, no. 4 (in press).

Bamber, E. W., and Waterhouse, J. B., 1971, Carboniferous and Permian stratigraphy and paleontology, northern Yukon Territory, Canada: Alberta Society of Petroleum Geologists Bull., v. 19, no. 1, p. 29–250.

Brosgé, W. P., Dutro, J. T., Jr., Mangus, M. D., and Reiser, H. N., 1962, Paleozoic sequence in eastern Brooks Range, Alaska: Am. Assoc. Petroleum Geologists Bull., v. 46, no. 12, p. 2174–2198.

Detterman, R. L., Reiser, H. N., Brosgé, W. P., and Dutro, J. T., Jr., 197_, Post-Carboniferous stratigraphy, northeastern Alaska: U.S. Geol. Survey Prof. Paper 886 (in press).

Dutro, J. T., Jr., Brosgé, W. P., and Reiser, H. N., 1972, Significance of recently discovered Cambrian fossils and reinterpretation of Neruokpuk Formation, northeastern Alaska: Am. Assoc. Petroleum Geologists Bull., v. 56, no. 4, p. 808–815.

Leffingwell, E. de K., 1919, The Canning River region, northern Alaska: U.S. Geol. Survey Prof. Paper 109, p. 103–105.

Maddren, A. G., 1912, Geologic investigations along the Canada-Alaska Boundary, in A. H. Brooks, Mineral resources of Alaska, 1911: U.S. Geol. Survey Bull. 520, p. 297–314.

Mamet, B. L., and Armstrong, A. K., 1972, Lisburne Group, Franklin and Romanzof Mountains, northeastern Alaska, in Geological Survey research 1972: U.S. Geol. Survey Prof. Paper 800-C, p. C127–C144, 10 figs.

Pettijohn, F. J., Potter, P. E., and Siever, Raymond, 1972, Sand and sandstone: Springer-Verlag, 618 p.

Sable, E. G., 1965, Geology of the Romanzof Mountains, Brooks Range, northeastern Alaska: U.S. Geol. Survey open-file report, 218 p.

____, 1967, Geology of the Romanzof Mountains, Brooks Range, northeastern Alaska: Dissertation Abstracts, Sec. B, v. 27, no. 7, p. 2417.

____, 197_, Geology of western Romanzof Mountains, Brooks Range, northeastern Alaska: U.S. Geol. Survey Prof. Paper (in press).

PRELIMINARY GEOLOGIC MAP OF THE DEMARCATION POINT QUADRANGLE, ALASKA

BY
H.N. Reiser, W.P. Brosgé, J.T. Dutro Jr., and R.L. Detterman

1974

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