OPEN FILE REPORT

83-294

PLATE 1

Base from USGS 1:250,000:
MEADE RIVER, 1955,100 ft.

SCALE 1:250 000

Geology mapped in 1977-78.

DESCRIPTION OF MAP UNITS

	Description of materials	Distribution and thickness	Topography and drainage	Permafrost	Susceptibility to frost action	Suitability for construction	Special problems
Qt Thaw-lake deposits	Consist of sediment eroded from lake banks and redistributed by currents and wave action; chiefly fine to medium sand in areas of eolian sand and alluvial deposits, silty sand in marine deposits, and silt to fine sand in upland silt. May include pebble beds and lenses or discrete pebbles where derived from alluvium and marine sand and beach deposits. In areas of thin upland silt may be largely sand from underlying alluvial deposits. Contains retransported pieces of peat, sticks, as well as in situ peat beds and lenses. Commonly silty and organic rich.	Coalesced and individual thaw-lake basins, commonly elongated in N. 10° W. direction occupy 50 to 80 percent of area. Basins generally less than 5 m deep in outer coastal plain, less than 13 m deep in dunes, and less than 21 m deep in upland silt below adjoining residual surfaces not subjected to thaw-lake process. Depth depends on thickness of permafrost that has an ice content greater than voids of materials. Basin deposits generally less than 3 m thick in outer coastal plain, and as thick as 11 m in upland silt of inner coastal plain, east of Meade River, but considerably less than 11 m west of Meade River.	Form interlocking and overlapping basins with local relief of less than 3 m, set in broad basins incised less than 5 m below residual surfaces in outer coastal plain and less than 21 m in upland silt unit east of Meade River. Depressions either undrained or connected by small, meandering creeks; drainage generally poorly integrated.	Permafrost generally present beneath a thin active layer under lakes less than 2 m deep and beneath adjacent marshes and meadows. Lakes deeper than 2 m may have a small thaw bulb between the bottom of active layer and permafrost table. Settlement calculations for thaw-lake basins and residual surfaces of coastal plain at Barrow (Hussey and Michelson, 1966; Sellmann and others, 1975, p. 14-19) may apply to outer coastal plain of Meade River quadrangle; ice-rich zone and wedges create surface zone 6 to 8 m deep in which ice content exceeds voids of material. Deeper thaw-lake basins of inner coastal plain suggest that ice-rich zone extends to as deep as 21 m.	Thaw-lake deposits in silty sand with admixed organic material frost susceptible; silt deposits highly frost susceptible.	Note: Assumption is made in this column that buildings are to be constructed and roads and airfields built with state-of-the-art arctic construction techniques--piles and air space for buildings, pads of gravel/insulation for roads and airfields, to prevent thaw of permafrost Silty and sandy foundations contain relatively low excess ice (7 to 19 percent at Barrow, exclusive of wedge ice, according to Hussey and Michelson, 1966). Poor source of granular materials. In part seasonally flooded during snow melt period.	Although used as sites for construction of large projects such as Pump Station 1 of TAPS, thaw-lake basins have potential for differential settlement upon thaw of permafrost that may require refrigerated foundations. A common site for formation of pingos.
Qal Alluvial deposits	Stratified to lenticular deposits of gravel, sand, and silt, generally becoming finer downstream. Gravel is subrounded to angular, depending on source in marine deposits, fluvial gravel, or in broken and weathered bedrock. Erratic boulders (fig. 1, table 2) as tag from marine deposits of rock types listed in table 2. Also include slabs of local bedrock (fig. 2). Silt and organic beds and lenses common in all types of alluvium, particularly as overbank deposits on floodplain and terraces.	Includes flood plain and low terraces that are less than 10 m above river. Locally less than 1 m thick on streams cutting bedrock, but several meters thick elsewhere; deposits of Meade River delta are of unknown thickness.	Forms terraced plain, part of which is occupied by stream channel and bars, the rest by terraces. Old stream meander scrolls on lower terraces have been widened by thaw-lake processes and on higher terraces the meander scroll pattern has been nearly or completely obliterated by thaw-lake activity. Terrace drainage generally poor; subject to seasonal flooding to 6 m or 8 m above low water on some rivers and to 3 m above sea level by coastal storm surges at mouths of rivers.	Perennially frozen except for a 2 to 6 m thick unfrozen layer beneath occasional deep channels and pools. Away from rivers and lakes active layer is about 0.5 m thick on permafrost. Ice content of permafrost in granular deposits not known, but possibly is lower than that in fine-grained materials. Ice wedges are well developed on terraces.	Granular alluvium having less than 6 percent silt generally not frost susceptible; fine-grained material such as silty sand, silt, and organic soils of overbank deposits and more silty alluvial gravel and sand are frost susceptible.	Gravel and fine- to coarse-sand bed materials provide good foundations, except where underlain by clay, but are subject to flooding. Granular borrow quantities very limited, but local annual thaw beneath streams generally 2 m, perhaps as much as 6 m beneath pools. Sandy terrace deposits, frozen at shallow depth, offer no granular borrow and are, at lower levels, subject to flooding.	Subject to bank erosion and channel scour and flooding during spring thaw. Icings (aufeis) not reported, perhaps because ground-water discharge and winter stream-flow do not occur.
Qe Eolian sand	Fine to medium sand containing abundant quartz with minor dark minerals; chert common. Well sorted, stratified to massive with large-scale cross bedding in some exposures. Non-calcareous.	Widespread distribution as a mantle of dune sand overlying older marine and other unconsolidated deposits in an area bordering Topagoruk, Usukluk, Meade, and Kiligavik Rivers. Thickness as much as 15 m. Active dunes common on river bars and in lee (east) of flood plains on Meade and some smaller streams.	Generally well-drained dune ridges as much as 15 m high interspersed with thaw-lake basins and poorly-drained interdune depressions that are not part of an integrated drainage system; few meandering brooks drain area.	Permafrost underlies entire unit; active layer less than 1.5 m thick in well-drained summits and less than 0.5 m thick in poorly-drained interdune areas. Ice content unknown, but probably high in dune sand or in underlying deposits to account for thaw-lake basins as deep as 13 m. Pingos are more common in thaw-lake basins on eolian sand than elsewhere.	Dune sand generally not frost susceptible, except where silt content exceeds 6 percent.	Adequate for natural foundations, although in part ice-rich. Requires stabilization or addition of binder for use as surfacing material or fill. Relatively easy to work and excavate with ripper in well-drained ridges. Subject to deflation by wind wherever vegetation mat is broken.	Very sensitive to wind erosion when surface vegetation is disturbed.
Qus Upland silt	Silt, silty sand, and fine sand; locally scattered pebbles and granules dominantly of quartz and chert. Stratification indistinct; well-sorted and calcareous. Deposits are large wind-blown silt or silt retransported by running water. East of Meade River, silt mantles alluvial deposits; to west, silt mantles sand and pebbly sand.	Extends from 38 and 68 m above sea level in an east-west trending belt at southern boundary of quadrangle. A few cm to more than 10 m thick; covers fluvial silt, sand, and fine gravel east of Meade River and sand and pebbly sand west of Meade River.	Flat to gently rolling terrain broken by stream valleys, thaw-lake basins, and by ravines along escarpments and major streams. Drainage generally poor except on steep slopes and hill crests.	Entirely underlain by permafrost with active layer 0.5 to 1 m thick. Contains ice wedges and very high volume of ice as small interstitial grains, masses, and lenses, in some areas approaching 80 percent of volume of the subsurface materials. In thick silt deposits, the high excess ice content may extend to a depth of 21 m as shown by deep thaw-lake basins in upland silt unit.	Silt and silty sand are frost susceptible.	Excess ice results in extreme sensitivity to disturbance during construction; least suitable for foundations of all than 10 m thick. Material is generally too fine-grained for most uses; possible source of binder material.	Easily gullied by running water on slopes if vegetation is disturbed or if sheet flow is concentrated by culverts in road or airfield fill. Concentrated flow may lead to thermal erosion in combination with the gullying.
Qb Marine beach, bar and spit deposits	Chiefly coarse to fine sand and granule and pebble gravel. Cobbles and boulders as large as 12 cm occur locally as a surface layer and as beds and lenses in finer gravel deposits. Include some silt and organic layers and lenses, driftwood, and occasional erratic boulders (fig. 1, table 2) to 1 m in diameter, and slabs of local bedrock. Gravel well rounded, locally polished chert, quartzite, quartz and other rock types. Generally contain less than 6 percent silt. Contain marine shells.	Largely forms modern offshore bars, spits, and beaches within 3 m of sea level, but also includes occasional elevated beach deposits of higher stands of the sea which are now largely obscured by thaw-lake activity. Probable thickness is 2 to 7 m; deposits generally thin and narrow.	Form subparallel ridges in beaches, offshore bars, and spits. Drainage good on ridges, but poor in swales between ridges. Inundated during major storm surges (to 3 m) and subject to ice push of pack along shore. Inland beach ridges well drained and not subject to flooding.	Modern beaches and spits have active layer as much as 2 m thick, but inland beach deposits related to higher sea levels perennially frozen to within 1 to 1.5 m of surface. Many modern beach deposits have thin ice wedges along contraction cracks formed by winter freezing; older beaches probably have larger wedges, though total ice content is probably less than that in sandy and silty deposits of other map units.	Granular materials not subject to frost action.	Granular materials suitable for fill and aggregate (except for chert and coal content that may be deleterious for use as concrete aggregate). Require stabilization for use as surfacing. Subject to storm surges below 3 m above sea level and are poor location for structures; also subject to ice shove.	Materials of limited volume at inland sites. Shore materials have rapid textural changes with depth and may lie above ice-rich, fine-grained deposits. Excavation of modern beaches, bars, and spits requires determination of impact of effect of borrow on coastal erosional and depositional processes.
Qs Marine sand	Fine to medium sand containing scattered pebbles and granules of chert; also contains silty or clayey sand, sandy silt, and minor beds and lenses of organic material, especially where covered by thin eolian sand or within local fluvial deposits mapped within unit. Commonly covered by thin, discontinuous layer of lag pebbles and thin eolian sand.	Forms the relatively flat part of the outer coastal plain formerly occupied by shallow seas; deposits of multiple marine transgressions exposed in coastal bluffs along Chukchi Sea shore where as much as 15 m thick; elsewhere normally 3 to 6 m thick. Upper part of deposit reworked extensively by thaw-lake process.	Forms residual surfaces that stand above numerous thaw-lake basins; drainage is generally good, and not subject to snow-melt flooding.	Contains ice wedges and very high volume of ice as interstitial grains, small masses, and lenses. Volumetric thaw settlements of upper 6 m of marine sand at Barrow (Hussey and Michelson, 1966) would be 35 percent (or 3.4 m) in undisturbed residual surface; ice content is greater than volume of natural voids (supersaturated with ice) down to about 6 m. Sellmann and others (1975) found that the depth of supersaturation with ice extended to about 8 m, with ice content of 75 percent of volume at depth of 1 m, not including wedge ice. Active layer generally less than 0.5 m thick.	Sand, generally having silt content greater than 6 percent, is frost susceptible.	Generally contains excess ice in uppermost 6 to 8 m that causes large differential settlement on thawing. Sandy materials may be suitable for fill, base course, and surfacing with proper stabilization and measures to prevent deflation by wind.	Easily eroded by running water and by wind once vegetation is removed.
Bedrock	Hard to friable sandstone, shale, clay, siltstone, ironstone, and coal of Nanushuk Group exposed in vertical river banks and in stream beds. Location of outcrops and lithology shown in figure 2.	Distributed throughout map area beneath cover of unconsolidated deposits; exposed only in river and lake banks and in coastal bluffs. Thickness of Nanushuk Group, the uppermost rock unit, increases southward from 300 m at Kuyanak Test Well No. 1 to 1,050 m at Meade Test Well No. 1. In small area along northern border of quadrangle Nanushuk Group is missing and Torok shale is believed to lie beneath unconsolidated deposits.	Bedrock forms surface of low relief and gradient of 3 to 4 m/km northeastward in outer coastal plain and a surface of less than 30 m relief beneath upland silt of inner coastal plain. Bedrock surface in coastal bluffs gullied by streams.	Permafrost extends through unconsolidated deposits into bedrock throughout the area of the quadrangle. Base of permafrost in bedrock estimated at 200 to 300 m (Osterkamp and Payne, 1981). Ice content not known.	Sandstone subject to shattering by frost action along joints and bedding planes; siltstone, coal, and clay subject to frost heaving.	Quarry sites limited to river banks beneath frozen overburden. Best of rock is sandstone which is generally slabby and jointed so that large pieces for rip rap are difficult to obtain; weathering properties of sandstone marginal at best for use as rip rap. Other rock types too weak for rip rap and other uses, but may be suitable for fill. Coal is subbituminous rank and can be used as fuel.	

MAP SYMBOLS

Contact plotted from aerial photographs; queried where gradational and indefinite

Escarpment dashed and queried where indistinct and based on topographic map elevations; hachures downslope

Pingo plotted from aerial photographs

CORRELATION OF MAP UNITS

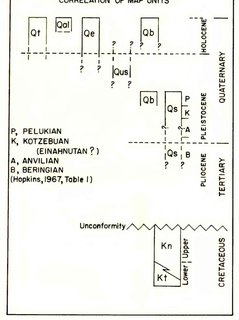


Table 1

Description of fossil collection sites and check list of marine fossils collected 1977-78

Location number (figs. 1 and 3)	Description and location of fossil collection sites, coastal bluffs
M-7168	Bank of Kunaran Creek, 2.2 km from coast; sample from 0.6 to 2.1 m below top of 5.2 m-thick basal block of dark gray silt and peat beneath 0.6 m of black gravel and 3 m of surficial brown sand (not plotted fig. 3).
M-7169	Sealiff; samples from basal contact between Gubik Formation and underlying sandstone of Cretaceous age.
M-7170	Sealiff; sampled from a depth of 6.1 m in 7.6 m-thick surficial sand, which is underlain by 8.6 m of black to dark gray silt and clay that is separated from Cretaceous sandstone by less than 2.5 cm of shell-bearing sand (M-7170A).
M7170A	Same as M-7170; sample from 2.5 cm shell-bearing sand on sandstone.
M-7312	Sampled from near base of 1.8 m-thick bed of black silty sand overlain by 1.8 m of contorted lenticular sand and 1 m of surface peat.
M-7313	Sampled from lower 5 cm of rounded gravel at base of Gubik Formation on Cretaceous sandstone. Sample horizon overlain by 1.8 m black silt, 5 cm shell-rich gravelly sand, 1.2 m shell-rich dark gray silty sand and brown sand, and 4.6 m of cover.
M-7314	Sampled 15 cm shell-rich gravel that overlies 15 cm sand and silt and 3 m of Cretaceous clay shale and underlies 4.6 m brown and gray sand, silty sand, and shell beds to top of exposure (upper unit sampled M-7315).
M-7315	Sampled upper unit of exposure (above, M-7314) about 3 m above Cretaceous clay shale and 1.7 m below top of exposure.

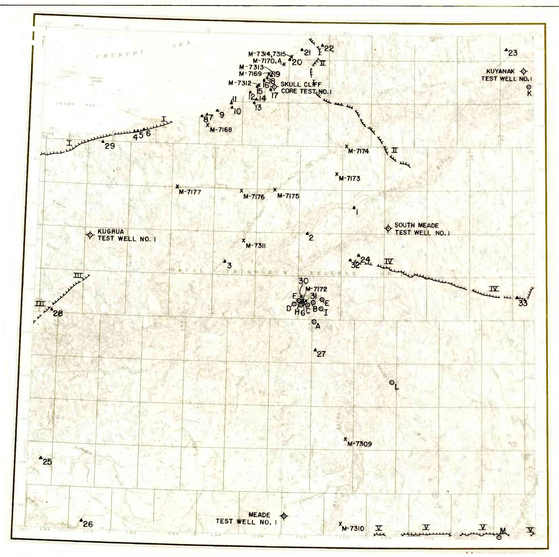
Location number (figure 1)	Description and location of fossil collection sites, Meade River
M-7172	Marine gravel above Cretaceous bedrock and below eolian deposits, west bank of Meade River at Atkasook airfield; probably same as fossil collection 15029 of MacNeil (1957, p. 110).
M-7173	Sample collected from base of sand bank of lake between Meade and Inaru Rivers.
M-7309	Sampled from outcrop of stony brown sand of fluvial or marine origin that is overlain by 3.7 m of eolian sand and underlain by Cretaceous(?) clay.
M-7310	Shells at base of bank of brown sand containing thin beds of detrital coal and overlain by 1.4 m of silt; source of shells probably in sand.

Location number (figure 1)	Description and location of fossil collection sites, Inaru River and Kucheak Creek
M-7174	Marine shells picked from bar; source evidently from thin gravel above Cretaceous bedrock in nearby bank of Inaru River.
M-7175	Marine shells picked from bar; source evidently from thin gravel above Cretaceous bedrock in nearby bank of Inaru River.
M-7176	Samples picked from bar, but also occur in sandy gravel beneath surficial brown sand and above Cretaceous bedrock in slumped bank of Inaru River.
M-7177	Shells taken from base of sand bank of lake through which Inaru River flows. Source was either from basal sand and gravel beds, now concealed, or transported into lake by river from similar deposits upstream.
M-7311	Shells from river bed, but similar to those exposed (but broken) in sand and clay in lower 1 m of east bank of Kucheak Creek.

Table 1 (cont.)

Check list of marine macrofossils collected in Meade River quadrangle, 1977-78, identified by L. N. Marincovich, Jr., U.S. Geological Survey, Menlo Park, Calif.

	Collection Number (location, fig. 1)											
	Coastal bluffs (see fig. 3)						Meade River		Inaru River Kucheak Cr.			
	M-7168	M-7170	M-7172	M-7173	M-7174	M-7175	M-7172	M-7173	M-7174	M-7175	M-7177	M-7311
GASTROPODA												
Admete sp.	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Admete couthouyi Jay	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Admete, cf. A. regina Dall	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Boreotrophon sp.	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Boreotrophon cf. B. truncatus (Strøem)	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Buccinum sp.	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Buccinum glaciale Linnaeus	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Buccinum cf. B. tenellum Dall	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Colus sp.	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Colus spitzbergensis (Reeve)	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Epitonium groenlandicum Perry	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Margarites sp.	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Natica (Cryptonatica) clausa Broderip and Sowerby	x x - - - -	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Natica (Tectonatica) janthostoma Deshayes	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Neptunea sp.	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Neptunea (Neptunea) heros heros Gray	- - - - - -	- - - - - -	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Neptunea (Neptunea) heros sp.	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	x - - - - -
Neptunea (Neptunea) lyrata (Gmelin) ssp.	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Obesotoma cf. O. tenuilerata Dall	- - - - - -	- - - - - -	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Oenopota sp.	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Plicifucus sp.	- - - - - -	- - - - - -	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Plicifucus kroyeri (Moeller)	- - - - - -	- - - - - -	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Polinices (Euspira) pallidus (Broderip and Sowerby	x - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
Tachyrhynchus erosus (Couthouy)	- - - - - -	- - - - - -	- - - - - -	x - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -	- - - - - -
PELECYPODA												
Astarte sp.	x - - - - -	x x - -	x - - -	x - - -	x - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Astarte borealis Schumacher	- - - - - -	- - - - - -	x - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Astarte cf. A. Jeffingwelli Dall	x - - - - -	- - - - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Cyclocardia crassidens (Broderip & Sowerby)	x - - - - -	- - - - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Cyclocardia crebricostata (Krause)	x - x x - -	x x x -	x x x -	- - - -	x x x -	x - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Hiatella arctica Linnaeus	- - - - - -	- - - - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Macoma sp.	- - - - - -	- - - - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Macoma balthica Linnaeus	- - - - - -	- - - - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Macoma (Macoma) cf. M. (M.) brota Dall	x - - - - -	- - - - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Macoma cf. M. calcarea (Gmelin)	x - - - - -	- - - - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Mya sp.	- - - - - -	x - - - -	x - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Serripes groenlandicus (Bruguiere)	x x - - - -	x - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Serripes laperousii (Deshayes)	- - - -	x x x x	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Spisula sp.	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Spisula voyi (Gabb)	x - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
BARNACLE												
Barnacle	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	x - - -



EXPLANATION

× M-7312
Location and U.S. Geological Survey identification number of fossil collection described in table 1.

▲ 23
Location and number of ice-rafted erratic boulders in marine sediments of Quaternary age described in table 2.

⊕ 8
Location of and letter identifying radiocarbon-dated organic material in deposits of Quaternary age described in table 3.

✦
Abandoned and plugged test well or core test hole

III
Prominent escarpments, including former marine shorelines; queried where indefinite or indistinct. Roman numeral denotes escarpments, as referred to in text and listed below:

I Marine wave-cut cliff indicating sea level about 20 m above present

II Indistinct marine shoreline highly modified by thaw-lake activity; indicates approximate 20 m sea level, similar to I

III Prominent wave-cut cliff indicating sea level about 20 m above present; correlated with pre-Illinoian shorelines of McCulloch (1967, fig. 2)

IV Escarpment bounding northern limit of dune field, probably not of marine origin

V Escarpment between 38 and 68 m above sea level separating dune fields on north from upland silt and underlying fluvial deposits; probably cut by streams

5 0 5 10 15 20 25 MILES
5 0 5 10 15 20 25 KILOMETERS

Fig. 1 LOCATION OF ESCARPMENTS, TEST WELLS AND CORE TEST, FOSSIL COLLECTIONS, RADIOCARBON SAMPLES, AND ERRATIC BOULDERS

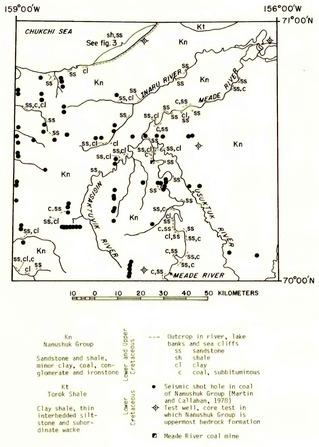


Fig. 2 BEDROCK MAP OF THE MEADE RIVER QUADRANGLE

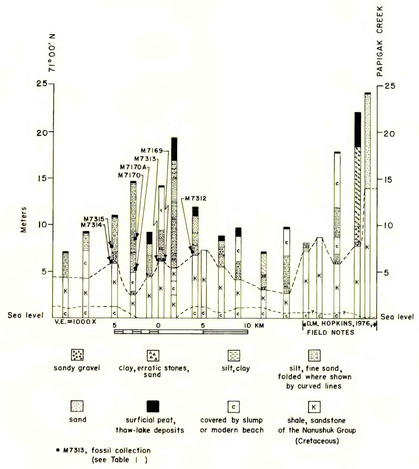


Fig. 3 DIAGRAMMATIC CROSS SECTION OF CHUKCHI SEA COASTAL BLUFFS BETWEEN 71°00'N LATITUDE AND PAPIGAK CREEK

Table 2

Description of erratic boulders

Map location (fig. 1)	Description	Source of information: unpub. field notes
1	Granitic rock, vein quartz, gabbro	Author
2	Granitic boulder, maximum dimension 76 cm	Author
3	Granitic rock, to 18 cm; local sandstone	Author
4	Erratic boulders (type unspecified) on beach	D. M. Hopkins, 1976
5	Norite, red granite, carbonate, on beach	D. M. Hopkins, 1976
6	Erratic boulders (type unspecified) on beach	D. M. Hopkins, 1976
7	Erratic boulders on floor of gully	D. M. Hopkins, 1976
8	Red granite, folded biotite schist, norite to 30 cm at top Cretaceous bedrock	D. M. Hopkins, 1976
9	Porphyroblastic granite gneiss with dark inclusions; 1.2 m maximum dimension	D. M. Hopkins, 1976
10	Vesicular basalt	D. M. Hopkins, 1976
11	Conglomerate and igneous rocks on beach	D. M. Hopkins, 1976
12	Red quartzite, dolomite, chert, diabase, etc.	D. M. Hopkins, 1976
13-14	Cretaceous sandstone, vesicular volcanics, numerous well polished erratics between 13 and 14; pavement of erratics on valley floor	D. M. Hopkins, 1976
15	Orthogneiss, porvoirite, to 61 cm	D. M. Hopkins, 1976
16	Red quartzite, chert, graywacke, diabase, dolomite, and local rocks	D. M. Hopkins, 1976
17	Numerous erratic boulders	D. M. Hopkins, 1976
18	Metabasalt, pyroxenite, chert to 1 m	D. M. Hopkins, 1976
19	Granitic rock, concretionary sandstone to 30 cm	Author
20	Coarse granite and others, to 61 x 76 cm	Author
21	Granite, limestone, chert conglomerate, graywacke	Author
22	Chert conglomerate and others to 61 cm, well polished and rounded	Author
23	Angular chert block 89x61x46 cm; dense volcanic rock 20x20x25 cm	Author
24	Lenses of Cretaceous sandstone fragments in marine sand	Author
25	Rounded quartz pebbles less than 5 cm diameter	Author
26	Scattered erratic cobbles less than 5 cm diameter	Author
27	Polished granite boulder 46 cm diameter on rock outcrop in Meade River	Author
28	Porphyritic granite to 30 cm on tundra surface	Author
29	Coarse granite (to 61 cm), pyroxenite, quartzite, vein quartz, polished	D. M. Hopkins, 1976
30, 31	Chert pebble conglomerate, granite, gneiss, quartzite, and porphyry, dark igneous rocks to near 1 m diameter	O'Sullivan (1961) and Hamilton, 1962 notes
32	Erratic boulders and local broken bedrock	L. D. Carter, 1982
33	Red quartzite, ultramafic rocks to 5 cm in sand	L. D. Carter, 1982

Table 3

Radiocarbon dates

Location (fig. 1)	Date, years	Laboratory number	Material, depth and map unit, where applicable	Source of data or collector
A	930 ± 70	--	Floodplain alluvium or low terrace, 300-305 cm	K. R. Everett, written commun., Jan. 1978
B	2,560 ± 75	DIC-695	Terrace alluvium, 48 cm, fine fibrous material	Everett (1979, p. 220)
	3,740 ± 110	DIC-694	Sedge peat at 64 cm	Everett (1979, p. 220)
C	9,470 ± 145	DIC-464	Base organic sand 112 cm on dune sand	Everett (1979, p. 220)
D	200	--	Soil on dune sand, 25-26 cm	Everett, written commun. Jan. 1978
	5,985 ± 165	--	Soil on dune sand, 35-58 cm	Everett, written commun. Jan. 1978
E	3,610 ± 90 11,200 ± 220	I-11,124 I-10,785	Basal surface peat, 1 m Interdune pond deposits, 1.3 m above river	Author, 1978 Author, 1978
F	5,590 ± 250	DIC-697	Near-surface soil	Everett (1979)
G	4,750 ± 70	DIC-465	Near-surface soil	Everett (1979)
H	4,100 ± 65	--	Near-surface soil	Everett, written commun. Jan. 1978
I	2,180 ± 65	--	Near-surface soil	Everett, written commun. Jan. 1978
J	4,080 ± 135	DIC-696	Near-surface soil	Everett (1979)
K	6,990 ± 125	I-11,123	Willow log, 1.6 m in dune	Author, 1978
L	11,460 ± 200	I-11,496	Peat within dune sand	Author, 1978
M	2,640 ± 85 8,980 ± 140	I-10,273 I-10,787	In situ fibrous peat Retransported twigs	Author, 1977 Author, 1978

Explanatory text accompanies map

ENGINEERING - GEOLOGIC MAPS OF NORTHERN ALASKA, MEADE RIVER QUADRANGLE

By

John R. Williams

1983

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.