DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Late Cenozoic radiometric dates, Seward and Baldwin Peninsulas, and adjacent continental shelf, Alaska

by

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

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INTRODUCTION

The Seward and Baldwin Peninsulas and adjacent continental shelf form the heart of Beringia, the vast arctic landmass that was exposed during Pleistocene glacial epochs (Hultén, 1937), and is an area of wide interdisciplinary interest. Quaternary deposits there preserve an especially rich record of the paleogeographic evolution of Beringia. Stratigraphic and geomorphic relationships between glacial drift and interglacial marine deposits and shorelines reflect the chronology of alternating seaways and land bridges. These relationships have attracted considerable research attention (Hopkins, 1967, 1972, 1973; Hopkins and others, 1960, 1974; McCulloch and others, 1965; Pawé and others, 1965). Less work has focused on the record of fluctuating late Pleistocene and Holocene glacial activity carried in four small mountain ranges on the Seward Peninsula (Hopkins, 1953; Hopkins and others, 1983; Sainsbury, 1965, 1967a, 1967b) and on the widespread Cenozoic volcanism of the central Seward Peninsula (Hopkins, 1963, Turner and Swanson, 1981).

The greater part of the complex Quaternary geologic record preserved in this area lies beyond the range of radiocarbon dating. However, twelve previously published and one yet unpublished K/Ar age determinations on volcanic rocks provide a crude chronology of Cenozoic volcanism in the region. In addition, 156 published and previously unpublished radiocarbon dates obtained from 76 natural exposures, archeological sites, sediment cores, and test pits provide information about the paleogeographic history of the region during late Pleistocene and Holocene time.

Table 1 is a comprehensive listing of reported late Cenozoic radiometric dates from the Seward Peninsula and Kotzebue Sound area, and includes 26 dates published here for the first time. Omitted from the table are uranium-series age determinations that have been attempted on marine mollusks; these have been discredited by Kaufman and others (1971). The nomenclature used in the table follows Hopkins (1963) for the volcanic rocks, Hopkins (1953) and Hopkins and others (1983) for glacial intervals, and Hopkins (1967) for marine transgressive units. Recent refinements in the glacial sequence and descriptions of the deposits mentioned in the table are presented in a surficial geologic map of the Solomon, Bendeleben and southern portion of the Kotzebue quadrangles (scale, 1:250,000) (Kaufman, 1985).

The frequency distribution of 113 finite radiocarbon dates for 1000 year intervals is shown in Figure 1. If the distribution of dates is a true representation of changing rates of organic productivity, then the pattern shown in Figure 1 may reflect late Quaternary environmental changes in the Seward Peninsula and Kotzebue Sound region. The histogram can be divided into five distinct segments, each reflecting a unique environmental condition:

1) The period between 17,000 and 30,000 years B.P. includes only 8 radiocarbon dates indicating that the climate of this period may have been unfavorable for the growth of vegetation. This period is encompassed by the Duvanny Yar
interval (Hopkins, 1982), which was characterized by extremely dry, probably cold periglacial conditions in unglaciated parts of Beringia, and by the Mount Osborn glacial phase of the central Seward Peninsula. The Mount Osborn interval coincides with the late Wisconsin Walker Lake glacial interval of the Brooks range which Hamilton (1982) has dated as beginning about 24,000 years B.P. and ending transgressively between about 12,000 and 10,000 years ago.

2) The period between 11,000 and 17,000 years B.P. includes 16 radiocarbon dates. Encompassed by this interval are five dates from offshore bore holes that record an exposed continental shelf above approximately -20 m during the time when sea level was recovering from its Wisconsin minimum. The dates from this period establish the presence of large herbivores, and the initiation of an increase in the abundance of vegetation on the Seward and Baldvln Peninsulas.

3) The short period between 8,000 and 11,000 years B.P. is most distinct. A cluster of 28 radiocarbon dates records the rapid and dramatic environmental change of the late Wisconsin-early Holocene transition. This was a period of substantial climatic warming accompanied by the flooding of the continental shelf which brought an increase in moisture to the region. The time spanned by these dates is encompassed by the birch zone spectra in lake-sediment pollen cores (Hopkins, 1982) and was characterized by an overall increase in precipitation and development of snowy winters with warm, dry summers. Evidence of a warm climate includes the extension of the range of beaver, the melting of ice-wedges, the presence of tree species beyond their present limits, and widespread accumulation of peat. Also included in this time interval are three radiocarbon dates that record the volcanic eruptions at the Devil Mountain Lake maar.

4) The period of 3,000 to 8,000 years B.P. includes a sparse 17 radiocarbon ages reflecting environmental conditions less suitable to the growth of vegetation. This period may include one or more brief reversions to a colder climate and expansions of cirque glaciers along the crests of the Kigluaik and Denali Mountains, as indicated by the presence of glacial moraines apparently older than Neoglacial but younger than the Mount Osborn glacial interval, and by the history of other regions (Calkin and Haworth, 1983; Ellis and Calkin, 1984).

5) Over two thirds of the 44 radiocarbon ages included in the period of 0-3,000 years B.P. were taken from archaeological sites at Trail Creek Caves, Cape Prince of Wales, Deering, and the Choris Peninsula. Evidence for renewal of ice-wedge growth near Nome (Hopkins and others, 1960) and the presence of what are likely to be Neoglacial deposits in the Kigluaik Mountains (P. D. Calkin, oral communication, 1983) indicate that this interval includes a brief cold cycle. Buried peat layers suggest that though cooler, precipitation was not greatly reduced.
Table 1. Radiometric dates

Locations, ages, and laboratory numbers are shown on Plate 1

<table>
<thead>
<tr>
<th>Quadrangle</th>
<th>Material and stratigraphic context</th>
<th>Chronological significance</th>
<th>Age (BP) Lab number</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bend:C-2</td>
<td>Three samples of basalt from one or more flows exposed in east wall of Kugruk River canyon.</td>
<td>Dates the type locality of the Kugruk volcanics [the unit was abandoned by Hopkins and others (1971)]</td>
<td>28.8 ± 1.8 my (PT80-40); 28.1 ± 1.4 my (PT80-38); 26.4 ± 1.4 my (PT80-37)</td>
<td>Swanson and others, 1981; Turner and Swanson, 1981</td>
</tr>
<tr>
<td>Bend:D-3</td>
<td>Basalt from tholeiitic flow overlying terrace gravel at Lava Camp Mine on the Innachuk River.</td>
<td>Dates flow contemporary with the Imuruk volcanics.</td>
<td>5.85 ± 0.2 my (USGS determination)</td>
<td>Hopkins and others, 1971; Hopkins, 1972</td>
</tr>
<tr>
<td>Tell:B-4</td>
<td>Basalt from flow forming divide between California and Agiapuk Rivers.</td>
<td>Flow is cut by wave attack which formed the inner edge of the York Terrace thus providing a maximum limit on its age.</td>
<td>2.92 ± 0.14 my (MP-101)</td>
<td>Berry and others, 1976; Hopkins and others, 1974; Turner and Swanson, 1981</td>
</tr>
<tr>
<td>Tell:B-3</td>
<td>Three samples of basalt from one or more flows 15 km northeast of Teller at hill 1220, near Eva Mountain.</td>
<td></td>
<td>2.7 ± 0.2 my (PT80-50A); 2.6 ± 0.2 my (PT80-51B)</td>
<td>Turner and Swanson, 1981</td>
</tr>
<tr>
<td>Tell:B-3</td>
<td>Basalt from Eva Mountain, 15 km northeast of Teller.</td>
<td></td>
<td>2.5 ± 0.3 my (PT80-50B)</td>
<td>Turner and Swanson, 1981</td>
</tr>
</tbody>
</table>
Bend:C-2 Basalt from one or more flows 0.5 km west of head of Kugruk River canyon.
65° 34' 162° 58'

Bend:C-2 Two samples of basalt from a single flow that entered the modern Kugruk River canyon.
65° 34' 162° 55'

Bend:B-4 Basalt from a lava flow assigned to the Gosling volcanics that overran a moraine of the Nome River glacial interval on the right bank of Minnie Creek where it bends sharply to the west; north flank of the Bendeleben Mountains.
65° 31' 164° 09'

Dates the type locality of the Imuruk volcanics.
2.2 ± 0.02 my (PT80-33);
2.2 ± 0.02 my (PT80-35A)
Swanson and others, 1981; Turner and Swanson, 1981

Flow contemporary with the Gosling volcanics.
0.91 ± 0.09 my (PT80-36A);
0.82 ± 0.08 my (PT80-34)
Swanson and others, 1981; Turner and Swanson, 1981

Provides a limiting age for the Nome River glacial interval indicates that the Nome River glaciation is much older than previously thought (Hopkins, 1967). Age agrees well with others by Turner and Swanson (1981) from the Gosling volcanics. Flow is magnetically normal (Jack Hillhouse, written communication).
0.81 ± 0.09 my3 D. S. Kaufman, (84 AKn 106; U.S. Geological Survey determination by Nora Shew and F. H. Wilson)

| 14C DATES |
|-----------------|-----------------|-----------------|
| Cand:D-6 Log from the base of a 21 m core taken from Mud Creek. The hole penetrated 10 m of ice-rich silt, 5 m of coarse gravel, and 6 m of sandy gravel. | Wood thought to have been taken from marine sediments. | >59,000 (QL-1725) Noranda Exploration, Inc., unpublished data |
| Bend:B-6 Peat at top of silty, carbonaceous layer intercalated in Kougarok gravel of Hopkins (1963) in a pit at Kougarok landing strip. | | >45,000 (W-2161) Sullivan and others, 1970 |
| Bend:B-6 Wood in carbonaceous lens of sand in Kougarok gravel of Hopkins (1963) from Brakes Bottom gravel pit. | | >45,000 (W-2159) Sullivan and others, 1970 |
Seli:B-5  66° 15'  161° 18'
Peat from approximately 8.5 m below
surface of sea cliff at Elephant
Point, Kotzebue Sound.

Kots:B-4  66° 16'  163° 50'
Shore bluffs about 0.5 km north of
Koungachuk Creek, west shore of Good-
hope Bay. Sample consists of root-
ed stems of dwarf Salix and Betula
app. Covering cryoturbated silt over
an ancient ice-wedge about 3 m wide.
Shrubs are buried by bedded tephra
deposited as an alluvial fan at the
time of eruption of South Kileak
Lake maar; younger ice-wedge pseudo-
morphs are developed in tephra fan.

Kots:C-1  66° 44'  162° 28'
Logs directly overlying till of Nome
River glacial interval and overlain
by woody peat and silt on the Bald-
win Peninsula.

Seli:B-6  66° 24'  161° 35'
Wood from ice-wedge cast enclosed in
beach deposits of last interglacial
age on the Baldwin Peninsula.

Kots:C-1  66° 40'  162° 08'
Woody peat at the base of thaw-lake
deposits on the Baldwin Peninsula.

Nome D-2  64° 59'  165° 59'
Fine organic detritus from a low
horizon in lake clay over glacial
drift of Salmon Lake age in Canyon
Creek valley.

Bend:B-6  65° 20'  164° 40'
Plant material in block of silt ex-
posed in sandy Kougarok gravel
overlain by 3 to 8 m of windblown
silt in a pit 0.5 km south of Quartz
Creek bridge.

Dates eruption of South Kileak Lake >42,000
maar, shows that permafrost on north-
ern Seward Peninsula has persisted
for more than 40,000 years, and pro-
vides well-preserved vegetation at
time of eruption.

Thought to represent a buried forest
of last interglacial age.  >42,000
(W-1253)
Levin and others, 1965

Provides a minimum age for the last
interglacial (Pleistocene) marine trans-
I-10,622
D. M. Hopkins, 1979,
unpublished data

Provides a minimum age for the Sal-
mon Lake glacial interval.  >40,000
(I-7710)
Hopkins and others, 1983

Provides a minimum age for the Kou-
agarock gravel of Hopkins (1963) at
the type locality.  Reported as
>30,000 years by Hopkins (1963) and
Rubin and Alexander (1958).
<table>
<thead>
<tr>
<th>Location</th>
<th>Event Description</th>
<th>Age (yr)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tell: A-6</td>
<td>Peat from a fresh water mud layer of a core taken approximately 31 m below msl, 29 km northeast of King Island.</td>
<td>&gt;40,000</td>
<td>Robinson and Trimble, 1981</td>
</tr>
<tr>
<td>Bend: A-4</td>
<td>Peat overlying foreset (lake delta?) sand in a river bluff exposure on the Pargen River.</td>
<td>Thought to date the existence of a moraine-dammed lake within the inner-most moraine of Nome River age.</td>
<td>&gt;40,000</td>
</tr>
<tr>
<td>Kotz: A-2</td>
<td>Deformed peat over interbedded silt and peat at a coastal exposure near Deering.</td>
<td>&gt;39,900</td>
<td>Giterman and others, 1982; Guthrie and Matthews, 1971; Matthews, 1974</td>
</tr>
<tr>
<td>Kotz: C-1</td>
<td>Twigs in ice-wedge pseudomorph at base of youngest of three thaw-lake sequences in coastal bluffs, Riley's Wreck area, Baldwin Peninsula.</td>
<td>Dates deposits of ancient thaw-lake.</td>
<td>&gt;38,000</td>
</tr>
<tr>
<td>Kotz: C-1</td>
<td>Twigs from frost-stirred silt and peat below pond sediments cut by ice-wedge casts from which W-1262 was collected on the Baldwin Peninsula.</td>
<td>Represents local ice-wedge melting of Wisconsin age.</td>
<td>&gt;38,000</td>
</tr>
<tr>
<td>Nome: C-1</td>
<td>Organic material from thick marine sand and gravel overlying glacial drift of the Nome River glacial interval.</td>
<td>Provides a distant minimum age for the type locality of the Pelukian marine transgression and the preceding Nome River glacial interval.</td>
<td>&gt;38,000</td>
</tr>
<tr>
<td>Bend: C-3</td>
<td>Peat from 2.5 m below the top of a core from Imuruk Lake.</td>
<td>Pollen from this level assigned to an alder and spruce zone comparable to the surface spectra.</td>
<td>&gt;37,000</td>
</tr>
<tr>
<td>Tell: C-3</td>
<td>Deciduous tree wood from top of marine gravel, California River.</td>
<td>Indicates marine gravel filling an old cut in California River is pre-rather than post-Wisconsin. Reported as &gt;35,000 years by Sainsbury (1967b).</td>
<td>&gt;37,000</td>
</tr>
</tbody>
</table>
Kotz:C-5
66° 31'
164° 02' Cutbank of Espenberg River. Wood from 0.8 m layer of peaty pond silt and fine sand 6.9 m below top of bluff near river level. Over- and underlain by succession of thaw-lake deposits all resting on marine deposits of the Pelukian transgression. Abundance and size of wood suggests that the thaw-lake existed during an interstadial interval, perhaps the Boutellier interval of Hopkins (1982).

Spiker and others, 1978

Tel1:B-4
65° 24'
166° 36' Wood from beach deposits which enclose a wedge of conglomerate of continental origin which is overlain by thin glacial deposits of the York glacial interval at the California River.

Provides a distant minimum age for the York glacial interval of Sainsbury (1967a). Reported as >37,000 years by Masters and others (1969).

Sainsbury, 1967b

Kotz:A-2
66° 51'
162° 45' Wood from coastal exposure at Cape Decept.

>35,000
(W-192)

D. M. Hopkins, 1948, unpublished data

Bend:C-3
65° 34'
163° 12' Peat from 1.2 m below the top of a core from Imuruk Lake.

Pollen from this level assigned to an herb zone.

>34,500
(Y-1142)

Colinvaux, 1964;
Colinvaux, 1967;
Stuiver and others, 1963

Kotz:C-5
66° 32'
164° 00' Twigs in lacustrine silt interbedded with sand in cut bank of Espenberg River.

Deposits contain a distinctive Pelukian (last interglacial) fauna.

>34,000
(W-2878)

Spiker and others, 1978

Nome:B-1
64° 27'
165° 07' Shells in marine nearshore sand, core depth 6.6 to 8.4 m, water depth 12.9 m near Cape Nome.

>34,000
(W-2116)

Spiker and others, 1978

Kotz:C-1
66° 42'
162° 12' Twigs and willow leaves in basal transgressive layer of upper of two thaw-lake sequences in coastal bluff Riley's Wreck area, Baldwin Peninsula.

Dates deposits of ancient thaw-lake. Should probably be regarded as a minimum date (i.e., >34,000 years).

Levin and others, 1965; McCulloch, 1967; McCulloch and others, 1965
<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Age (Years)</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nome D-2</td>
<td>Fine organic detritus from a high horizon in lake clay over glacial drift of Salmon Lake age in Canyon Creek valley.</td>
<td>&gt;33,000</td>
<td>Hopkins and others, 1983 (I-7709)</td>
</tr>
<tr>
<td>Kotz: C-5</td>
<td>Peat, possibly buried turf, inter-bedded with silt and sand, 1.8 m below W-2881, cutbank of Espenberg River.</td>
<td>&gt;32,000</td>
<td>Spiker and others, 1978 (W-2884)</td>
</tr>
<tr>
<td>Kotz: C-5</td>
<td>Screen residue from 2.4 m below W-2806, at base of thaw lake beds, cutbank of Espenberg River.</td>
<td>&gt;31,000</td>
<td>Spiker and others, 1978 (W-2884)</td>
</tr>
<tr>
<td>Tell: A-6</td>
<td>Peat under Yukon River silt, core depth 24 cm, water depth 36.5 m, 36.8 km west of Point Spencer.</td>
<td>&gt;30,000</td>
<td>Spiker and others, 1978 (W-2534)</td>
</tr>
<tr>
<td>Nome: C-2</td>
<td>Wood in alluvium overlain by Holocene sand, core depth 3.6 to 5.4 m, water depth 13 m.</td>
<td>&gt;30,000</td>
<td>Spiker and others, 1978 (W-2115)</td>
</tr>
<tr>
<td>Bend: B-6</td>
<td>Wood from the Kougarok gravel 0.5 km south of Quartz Creek bridge.</td>
<td>&gt;30,000</td>
<td>Hopkins, 1963; Rubin and Alexander, 1958 (W-196)</td>
</tr>
<tr>
<td>Bend: C-3</td>
<td>Peat from 7.5 m level of Imuruk Lake core.</td>
<td>29,000 ± 1000</td>
<td>Stuvier, 1969 (Y-1417)</td>
</tr>
<tr>
<td>Kotz: C-5</td>
<td>Organic residue from loess exposed in wave-cut bluff at Northwest Corner Light.</td>
<td>28,700 ± 1000</td>
<td>Spiker and others, 1978; Hopkins, 1982 (W-2804)</td>
</tr>
<tr>
<td>Sample</td>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kotz:C-5</td>
<td>Organic material at base of thaw-lake sequence, artificial excavation in cut bank of Espenberg River. Same locality as W-2880. An age reversal between this sample and underlying W-2880 suggests that either samples were mislabeled in the field or that this sample consists mostly of reworked organic debris.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>66° 30'</td>
<td>164° 06'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kotz:C-1</td>
<td>Twigs and peaty debris from thaw-lake deposits underlain by glacial drift of Nome River age on the west coast Baldwin Peninsula. Dates a mammoth skeleton buried at same horizon. Pollen suggests deposition during interstadial interval.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>66° 37'</td>
<td>162° 08'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kotz:C-5</td>
<td>Well-macerated peat involved in ice-wedge collapse in exposure on Espenberg River. Ice-wedge pseudomorph lies below weathered loess and intrudes lake beds containing lenses of basaltic ash. Unexpectedly old, ice-wedge collapse was thought to have formed during the early Holocene warm period. Ash may be correlative with ash collected near Kougachuk Creek dated as &gt;42,000 years old (W-2670).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>66° 31'</td>
<td>164° 00'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bend:C-3</td>
<td>Peat from 7.5 m level of Imuruk Lake core. Infinite dates obtained higher in the core (Y-1142, Y-1143) suggest error.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65° 34'</td>
<td>163° 12'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kotz:C-5</td>
<td>Screen-washed organic material from thaw-lake sediments overlying aeolian sand near river level on cutbank of Espenberg River. Confirms that thaw-lakes existed on Seward Peninsula during Duvanny Yar cold-dry interval of Hopkins (1982) and dates enclosed plant and animal remains.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>66° 31'</td>
<td>164° 01'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kotz:B-6</td>
<td>Cutbank on thaw-lake about 1.2 km north of Whitefish Lake. Organic duff on soil developed in loess buried by basaltic tephra covered by 2.5 m of loess and aeolian sand, a few cm of basaltic tephra, and 1 m of aeolian sand and modern turf. Dates vegetation buried by tephra probably from South Devil Lake maar. Upper tephra probably records eruption of North Kelleak Lake maar.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>66° 22'</td>
<td>164° 43'</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Kotz:B-6  Silt (W-3492) and wood and rooted twigs (W-3488) from a bluff at the westernmost tip of a small, unnamed lake, about 1 km southwest of Whitefish Lake.  
19,600 + 1000  D. M. Hopkins, 1976, (W-3492) unpublished data

Kotz:C-5  Organic debris, 0.5 m below W-2879 in cutbank of Espenberg River. Much basaltic tephra is incorporated in deposits of a later thaw-lake 3.8 m higher in section.  
16,950 + 500  Spiker and others, 1978

Tell:A-6  Peat layer with wood fragments from 120 cm level of core taken from 28 m below msl, 40 km west of Port Clarence spit.  
16,540 + 200  Robinson and Trimble, 1983

Tell:A-6  Peat and twigs from freshwater layer in core taken from approximately 28 m below msl 31 km northeast of King Island.  
16,400 + 430  Robinson and Trimble, 1981

Bend:D-3  Organic fraction of horse scapula from Trail Creek Cave 9. Found with heel bone of Bison which apparently had been worked by man.  

Tell:A-6  Peaty silt from 40 cm level of a core taken 31 m below msl, 35 km west of Port Clarence spit.  
15,450 + 250  Robinson and Trimble, 1983

Kotz:C-5  Screen residue from lakebeds exposed in cutbank of Espenberg River. Underlain by deposits of a series of older thaw-lakes, one of which is dated by W-2884 (>31,000 years).  
14,490 + 400  Spiker and others, 1978

Sample suspected of contamination.  
16,950 + 500  Spiker and others, 1978

Tell:A-6  Dates top of Pleistocene freshwater sediment below Holocene marine sediment in region subject to uplift.  
16,540 + 200  Robinson and Trimble, 1983

16,400 + 430  Robinson and Trimble, 1981

Tell:A-6  Provides age when large herbivores were present on the Seward Peninsula. If carried into cave by man, it is the earliest evidence of man in Alaska.  

Tell:A-6  Dates top of Pleistocene freshwater sediment below Holocene marine sediment in region subject to uplift.  
15,450 + 250  Robinson and Trimble, 1983

Screen residue from lakebeds exposed in cutbank of Espenberg River. Underlain by deposits of a series of older thaw-lakes, one of which is dated by W-2884 (>31,000 years).  
14,490 + 400  Spiker and others, 1978
<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Date Range</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nome: A-1</td>
<td>Lenses of peat from 1.4 m level in a core taken 20 m below msl, 40 km south of Nome.</td>
<td>13,770 ± 210</td>
<td>Robinson and Trimble, 1983</td>
</tr>
<tr>
<td>Bend: C-3</td>
<td>Peat from 0.5 m below the top of a core from Imuruk Lake.</td>
<td>13,250 ± 700</td>
<td>Colinvaux, 1964; Colinvaux, 1967; Trautman, 1963</td>
</tr>
<tr>
<td>Tell: A-6</td>
<td>Peat and wood fragments from freshwater layer in core taken from approximately 34 m below msl, 20 km northeast of King Island.</td>
<td>13,200 ± 110</td>
<td>Robinson and Trimble, 1981</td>
</tr>
<tr>
<td>Bend: D-3</td>
<td>Organic fraction of Bison heel bone found in Trail Creek Cave 9. Bone apparently had been worked by man.</td>
<td>13,070 ± 280</td>
<td>Larson, 1968; Morlan and Cinq-Mars, 1982; Tauber, 1973</td>
</tr>
<tr>
<td>Nome: C-1</td>
<td>Wood and peat from silty colluvium overlying estuarine sediments of the Pelukian marine transgression.</td>
<td>13,040 ± 300</td>
<td>Hopkins and others, 1960; Hopkins and others, 1981</td>
</tr>
<tr>
<td>Krotz: A-2</td>
<td>Wood fragments in clayey silt from a coastal exposure near Deering.</td>
<td>12,420 ± 180</td>
<td>Gitterman and others, 1982; Guthrie and Matthews, 1971; Matthews, 1974</td>
</tr>
<tr>
<td>Bend: C-3</td>
<td>Peat from 0.4 m below the top of a core from Imuruk Lake.</td>
<td>12,355 ± 160</td>
<td>Colinvaux, 1964; Colinvaux, 1967; Stuvier and others, 1963</td>
</tr>
</tbody>
</table>
Peaty lamina 0.3 m above base of 1.7 m layer thick of loess-like silty colluvium, the lowest unit in a sequence of non-volcanic sediments separating tephra of North Devil Mountain Lake maar (below) from tephra of South Devil Mountain Lake maar (above).


Twigs in ice-wedge pseudomorph at base of one lacustrine unit in complex sequence of thaw-lake deposits in Riley's Wreck area, coast of the Baldwin Peninsula.

Peat and organic silt from pond deposits over glacial drift in a terrace of the Pilgrim River.


Shore bluffs on southwest shore of North Devil Mountain Lake. From detrital peat and twigs 1.0 m above base of 1.7 m layer of loess-like silty colluvium, the lowest tephra of North and South Devil Mountain Lakes.
| Name: B-1 | Wood picked from drill cuttings, 0 to 420 cm depth in core, water depth 20.4 to 18.6 m just southeast of Nome. | From an outwash fan of the Nome River. | 10,250 ± 350 Spiker and others, 1978 (W-2325) |
| Solo: D-6 | Peat from a continuous layer in pond deposits over glacial drift in a terrace of the Pilgrim River. | Indicates that the Salmon Lake glacial interval took place more than 10,000 years ago. | 10,210 ± 160 D. M. Hopkins, 1973, unpublished data (I-7701) |
| Bend B-6 | Wood from thick organic-rich silt overlying gravel at Coffee Creek. | Provides age when climate and vegetation were much like present. | 10,200 ± 800 McCulloch, 1967; McCulloch and Hopkins, 1966 (L-1376) |
| Name: C-1 | Wood and peat from silty colluvium overlying estuarine sediments of the Pelukian beach near Nome. | Dates local inception of deposition of colluvial silt and collapse of ice-wedges. Pollen spectra similar to modern except for abundant Juniperus. | 10,050 ± 270 Colinvaux, 1967; Hopkins and others, 1960 (W-461) |
| Bend C-3 | Wood in lacustrine peat from a terrace of Imuruk Lake at Granite Bay. | Provides a maximum age for faulting which warped the terrace and shifted the outlet of Imuruk Lake. | 9900 ± 400 Levin and others, 1965 (W-1213) |
| Name: B-1 | Peaty mud from 0 to 1 m below sediment in 18 to 20 m of water off the mouth of Hastings Creek, approximately 7 km east of Nome. | Date is minimum for sea level rise to -20 m in northern Bering Sea. Sample apparently represents subaerial nonmarine bog soil. | 9700 ± 350 Masters and others, 1969 (W-1800) |
| Name: C-1 | Wood and peat from silty colluvium overlying estuarine sediments of the Pelukian beach near Nome. | Dates ice-wedge collapse during early Holocene interval of warm summers. | 9690 ± 400 Hopkins and others, 1960; McCulloch, 1967 (W-485) |
| Kotz: B-6 | Peat from bluffs at southwest shore of North Devil Mountain Lake. | | 9630 ± 350 D. M. Hopkins, 1976, unpublished data (W-3491) |
Kotz A-3
66° 04’
163° 03’
Populus wood from ice-wedge pseudomorphs at base of thaw-lake deposits in coastal bluffs between Cape Deceit and Rex Point on south shore of Kotzebue Sound.

Dates Populus beyond present western limits during early Holocene warm interval.

9625 + 350 (W-2620)
Hopkins and others, 1981; Spiker and others, 1978

Selj:B-5
66° 15’
61° 18’
Wood from a beaver dam 6.7 m below the surface at Elephant Point, Kotzebue Sound.

Provides age when beaver and forest ranges were more extensive than present.

9480 + 160 (Y-1351)
McCulloch, 1967; McCulloch and Hopkins, 1966; Stuiver, 1969

Kotz:B-6
66° 24’
164° 32’
Shore bluffs on southwest shore of Devil Mountain Lake. From sedge-sphagnum peat 0.6 m thick, the middle unit in a 2.3 m sequence of non-volcanic sediments.

W-2801, W-2803, W-2802, and W-2800 form an ascending series that date sediments accumulated during interval between eruptions at Devil Mountain Lake.

9410 + 350 (W-2802)
Spiker and others, 1978

Cand:D-6
65° 52’
161° 50’
Wood from a beaver dam 3 m below the surface, enclosed in peaty silt at Candle Creek.

Provides age when beaver and forest ranges were more extensive than present.

9400 + 750 (L-137N)
McCulloch 1967; McCulloch and Hopkins, 1966

Kotz:B-6
66° 24’
164° 32’
Shore bluffs on southwest shore of Devil Mountain Lake. From peaty, twiggy layer 0.5 cm thick within 0.5 m of colluvial silty gravel which forms the top unit in 2.3 m sequence of non-volcanic sediments.

W-2801, W-2803, W-2802, and W-2800 form an ascending series that dates sediments accumulated during interval between eruptions at Devil Mountain Lake. W-2800 closely dates the eruption that formed the South Devil Mountain Lake maar.

9350 + 350 (W-2800)
Spiker and others, 1978

Bend:C-6
65° 44’
164° 52’
Wood from fossil beaver dam overlying auriferous gravel along Washington Creek.

Dates expansion of beaver far west of modern limits during early Holocene warm period.

9330 + 300 (W-2160)
Sullivan and others, 1970

Kotz:C-5
66° 32’
164° 16’
Thaw-lake deposit containing beaver-chewed wood and Anodonta beringiana shells in exposure on shore of lake southwest of Cape Espenberg.

Dates extension of beaver and Anodonta beringiana west of present limits during early Holocene warm period.

9190 + 350 (W-2619)
Spiker and others, 1978
<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Age (±)</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kotz:A-2</td>
<td>Fibrous peat more than 1 m thick overlying platey silt in a coastal exposure near Deering.</td>
<td>9150 ± 150 (I-4780)</td>
<td>Gitterman and others, 1982; Guthrie and Matthews, 1971; Matthews, 1974</td>
</tr>
<tr>
<td>Bend:D-3</td>
<td>Marrow-cracked bones of caribou from 66° 05' Trail Creek Cave 2.</td>
<td>9070 ± 150 (X-980)</td>
<td>Tauber, 1968</td>
</tr>
<tr>
<td>Kotz:C-1</td>
<td>Wood in ice-wedge pseudomorph at the base of thaw-lake sequence, coastal bluffs, east of Cape Blossom.</td>
<td>9020 ± 350 (W-1255)</td>
<td>Hopkins and others, 1981; Levin and others, 1965; McCulloch and Hopkins, 1966</td>
</tr>
<tr>
<td>Bend:C-5</td>
<td>Poplar log from 1 m below the surface at Black Gulch.</td>
<td>8800 ± 1000 (L-117F)</td>
<td>McCulloch and Hopkins, 1966; Hopkins, 1967</td>
</tr>
<tr>
<td>Kotz:C-1</td>
<td>Beaver-gnawed wood from a dam containing spruce, birch and poplar logs within a silty peat over deformed marine sediments on the Baldwin Peninsula.</td>
<td>8550 ± 400 (W-1249)</td>
<td>Hopkins and others, 1981; Levin and others, 1965; McCulloch, 1967; McCulloch and Hopkins, 1966</td>
</tr>
<tr>
<td>Kotz:B-6</td>
<td>Birch or aspen wood from a fossil beaver dam from shore bluffs north of mouth of Kungealarook Creek, Goodhope Bay.</td>
<td>8480 ± 300 (W-2596)</td>
<td>Hopkins and others, 1981; Spiker and others, 1978</td>
</tr>
<tr>
<td>Tell:C-6</td>
<td>Woody stems, some 6 cm thick and 0.6 m long, in locally thick peat; probably an ice-wedge pseudomorph exposed on south shore of Lopp Lagoon.</td>
<td>8360 ± 300 (W-2592)</td>
<td>Hopkins, 1972; Spiker and others, 1978</td>
</tr>
<tr>
<td>Bend:B-6</td>
<td>Wood from peat interbedded with silt overlying windblown silt and auriferous gravel on Coffee Creek.</td>
<td>8350 ± 200 (L-117C)</td>
<td>Kulp and others, 1952; McCulloch, 1967; McCulloch and Hopkins, 1966</td>
</tr>
<tr>
<td>Location</td>
<td>Description</td>
<td>Event</td>
<td>Date or Event Details</td>
</tr>
<tr>
<td>----------</td>
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</tr>
<tr>
<td>Cand: D-6</td>
<td>Rooted birch stump (W-2809) and beaver-chewed birch wood (W-2808) from peat layer overlying course sand and overlain by about 2 m of even-bedded sand and silt on Mud Creek.</td>
<td>Dates occurrence of species outside of present limits.</td>
<td>8310 ± 300 (W-2809) 8080 ± 300 (W-2808)</td>
</tr>
<tr>
<td>Bend: C-3</td>
<td>Wood in lacustrine peat from a terrace of Imuruk Lake at Salix Bay.</td>
<td>Provides a maximum age of faulting which warped the terrace and shifted the outlet of Imuruk Lake.</td>
<td>7400 ± 300 (W-1235)</td>
</tr>
<tr>
<td>Kotz: C-1</td>
<td>Log from a wood-rich basal zone which fills ice-wedge casts in thaw-lake sediments, consisting of silt with fresh water mollusk shells on the Baldwin Peninsula.</td>
<td>Dates ice-wedge thaw and provides age when forest range was more extensive than present.</td>
<td>7270 ± 350 (W-1250)</td>
</tr>
<tr>
<td>Kotz: B-5</td>
<td>Alder wood from cutbank of outlet stream about 0.4 km downstream from North Killeek Lake.</td>
<td>Sample provides distant minimum age for North Killeek Lake maar and dates occurrence of large shrubs of Salix, Betula, and Alnus at this locality.</td>
<td>7070 ± 145 (AU-113)</td>
</tr>
<tr>
<td>Tell: B-2</td>
<td>Twigs from peat overlying river gravel in a terrace of the Agiapuk River.</td>
<td>Mammoth and bison bones scattered along beach at river level indicate that the gravel is of late Pleistocene age; a greater age had been anticipated for the buried turf layer.</td>
<td>6485 ± 110 (I-7705)</td>
</tr>
<tr>
<td>Bend: B-6</td>
<td>Peat from the base of a 3 m thick sequence of organic silt and peat at Dome Creek.</td>
<td>Dates the base of a section analyzed for pollen (T. A. Ager, unpublished data).</td>
<td>6450 ± 240 (I-13,991)</td>
</tr>
<tr>
<td>Nome D-2</td>
<td>Peat and wood from kettle-fill deposits in Canyon Creek valley.</td>
<td>Provides a distant stop date for the Salmon Lake glacial interval.</td>
<td>6150 ± 110 (I-7708)</td>
</tr>
</tbody>
</table>
Tell:B-3
65° 15'
166° 23'
Twigs from ice-wedge pseudomorph covered by 4 m of colluvial peaty silt and intruding Pelukian beach sediments in coastal bluffs on shore of Port Clarence about 1.6 km southwest of Teller. Provides distant stop date for Pelukian marine transgression. 5170 ± 265 (AU-109) Reeburgh and Young, 1976

Nome D-2
64° 59'
165° 59'
Two samples of peat and wood from kettle-fill deposits overlaying glacial drift in the Canyon Creek valley. Provides distant stop dates for the Salmon Lake glacial interval. 5010 ± 100 (I-7707) D. M. Hopkins, 1973, unpublished data 4430 ± 95 (I-7706)

Kotze:B-6
66° 22'
164° 43'
Peat from a bluff at westernmost tip of small, unnamed lake, about 1 km southwest of Whitefish Lake.

Tell:C-6
65° 43'
167° 28'
Lacustrine sediments overlain by about 2.5 m of dimictic in a bank of an intermorainal pond within an end moraine of York age (Sainsbury, 1967a) near Lopp Lagoon. Sample unexpectedly young. Probably collected from kettle lake that was later covered by colluvium from a nearby morainal knob. 4290 ± 250 (W-2810) Spiker and others, 1978

Tell:A-3
65° 03'
166° 12'
Peat from a high terrace of Gold Run Creek. Provides minimum age on an interval of alluviation. 4190 ± 90 Beta-7762 D. S. Kaufman and D. M. Hopkins, 1983, unpublished data

Bend:A-4
65° 06'
163° 31'
Peat beneath fine grained tephra taken from river bluff exposure on the Pargon River. Provides a maximum age for a volcanic eruption of an unknown source which is possibly correlative with the tephra unit found at Dome Creek (Beta-7760, 7761), 75 km to the southwest. 4000 ± 100 (I-13,990) D. S. Kaufman, 1985 unpublished data

Tell:D-5
65° 40'
167° 05'
Two samples of wood from upper part peat deposit underlain by shingled outwash of the York glacial interval of Sainsbury (1967a), on the Pinguk River. Interpreted as shrub vegetation growing on old tundra or around a thaw-lake. 3760 ± 250 (W-1823) 3750 ± 250 (W-1773) Masters and others, 1969; Sainsbury, 1967a
<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Date/Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camp D-6</td>
<td>Wood from beaver dam burying floodplain gravel with rooted stumps overlain by thick interbedded silt and peat on Mud Creek.</td>
<td>Date discredited by Spiker and others (1978). Date of $8300 \pm 300$ (W-2809) was obtained from the same location. 3600 ± 500 (L-117F) Broecker and others, 1956; McCulloch and Hopkins, 1966</td>
</tr>
<tr>
<td>Bend-B-6</td>
<td>Peat layer below very fine grained, 2 cm thick tephra layer at Dome Creek.</td>
<td>Provides a maximum age for a volcanic eruption of an unknown source. A date of $2400 \pm 80$ (Beta-7761) was obtained on organics overlying tephra. 3340 ± 90 (Beta-7761) D. S. Kaufman and D. M. Hopkins, 1983, unpublished data</td>
</tr>
<tr>
<td>Bend-D-3</td>
<td>Marrow-cracked bones of caribou from Trail Creek Cave 2.</td>
<td>Layer contained implements of older Choris or closely related culture. 2810 ± 110 (K-979) Tauber, 1968</td>
</tr>
<tr>
<td>Nome:C-1</td>
<td>Wood and peat from silty colluvium over estuarine sediments of the Pekukian beach near Nome.</td>
<td>Dates small ice-wedges which began to form after peat accumulated. 2770 ± 300 (W-484) Hopkins and others, 1960</td>
</tr>
<tr>
<td>Bend:</td>
<td>Dark-colored bones of caribou from layer in west room, Trail Creek Cave 9.</td>
<td>2770 ± 110 (K-1290) Tauber, 1968</td>
</tr>
<tr>
<td>Bend:B-6</td>
<td>Sedge peat from 3 m below the surface at Coffee Creek.</td>
<td>Provides minimum age when climate and vegetation became similar to present. 2750 ± 350 (L-137F) McCulloch and Hopkins, 1966</td>
</tr>
<tr>
<td>Bend:</td>
<td>Well-preserved antler of caribou from Trail Creek Cave 2.</td>
<td>Same layer as K-979. 2700 ± 110 (K-983) Tauber, 1968</td>
</tr>
<tr>
<td>Sela:B-6</td>
<td>Charcoal from below roof level of Oval House 2 pit, Baldwin Peninsula.</td>
<td>From the Choris period. 2646 ± 177 (P-203) Ralph and Ackerman, 1961</td>
</tr>
<tr>
<td>Sela:B-6</td>
<td>Wood from Oval House 1, Baldwin Peninsula.</td>
<td>From the Choris period. 2635 ± 125 (P-96) Ralph and Ackerman, 1961</td>
</tr>
<tr>
<td>Location</td>
<td>Description</td>
<td>Date</td>
</tr>
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</tr>
<tr>
<td>Tell:A-2</td>
<td>Wood from interbedded silt and peat on west shore of Imuruk Basin.</td>
<td>2605 ± 90 (I-7700)</td>
</tr>
<tr>
<td>Tell:C-7</td>
<td>Two samples of charcoal and charred sand from Norton stratum in House 2, approximately 1 m below sod, Cape Prince of Wales.</td>
<td>2583 ± 60 (P-592)</td>
</tr>
<tr>
<td>Tell:C-7</td>
<td>Charcoal from Norton hearth on third beach line, Agulass site, Cape Prince of Wales.</td>
<td>2566 ± 53 (P-598k)</td>
</tr>
<tr>
<td>Tell:C-7</td>
<td>Wood from post in pond associated with Norton houses, Cape Prince of Wales.</td>
<td>2402 ± 43 (P-599A)</td>
</tr>
<tr>
<td>Solo:B-6</td>
<td>Peat overlying very fine grained, 7 cm thick tephra layer at Dome Creek.</td>
<td>2400 ± 80 (Beta-7760)</td>
</tr>
<tr>
<td>Sela:B-6</td>
<td>Worked fragments of antler from floor deposits of Oval House 1.</td>
<td>2306 ± 38 (P-629)</td>
</tr>
<tr>
<td>Solo:B-6</td>
<td>Charcoal from single habitation level of Pit House 1, 29 km east of Nome.</td>
<td>2284 ± 56 (P-1633)</td>
</tr>
<tr>
<td>Sela:B-6</td>
<td>Charcoal from hearth in single habitation level of House 285, 29 km east of Nome.</td>
<td>2210 ± 90 (P-1809)</td>
</tr>
<tr>
<td>Sela:B-6</td>
<td>Charcoal from Choris site, Area 3, two beaches forward of the &quot;House Beach&quot;, Choris Peninsula, Kotzebue Sound.</td>
<td>2190 ± 51 (P-611)</td>
</tr>
<tr>
<td>Bend:D-3</td>
<td>Antler from Trail Creek Cave 9.</td>
<td>2620 + 120 (K-147)</td>
</tr>
</tbody>
</table>
Nome D-1
64° 57' 165° 12'
Organic-rich silt overlying gray silt which overlies Mount Osborn age till at the mouth of Thompson Creek.

Bend D-3
65° 48' 163° 13'
Bones of caribou from Trail Creek Cave 2.
Layer contained implements presumably belonging to the Dengigh Flint Complex. Date is considered too young. 2160 ± 110 (K-1289) Tauber, 1968

Tell A-3
65° 03' 166° 12'
Peat from a low river terrace of Gold Run Creek.
Provides minimum age in interval of alluviation. 2090 ± 60 (Beta-7763) D. S. Kaufman and D. M. Hopkins, 1983, unpublished data

Solo D-6
64° 58' 164° 43'
Twigs from ice-wedge fill material in lower section of terrace of Pilgrim River.

Bend C-3
65° 39' 163° 10'
Wood from peat beneath white ash layer at Salix Bay, Imiruk Lake.
Dates volcanic eruption of an unknown source, perhaps the Lost Jim volcanic flow. 1655 ± 220 (I-8293) D. M. Hopkins, 1961, unpublished data

Tell C-7
65° 36' 168° 04'
Wooden dish from Kurigitavik site located south of Wales.
1480 ± 240 (P-63) Ralph and Ackerman, 1961

Tell A-7
65° 14' 168° 07'
Rounded shells in basal pebbly clay layer from a core at 47 m below msl, 43 km south of Cape Prince of Wales.
Helps establish transgressive history of northern Bering Sea. 1400 ± 250 (W-2684) Spiker and others, 1978

Nome D-1
64° 57' 165° 12'
Organic-rich silt overlying gray silt which overlies Mount Osborn age till at the mouth of Thompson Creek.

Kotz A-2
66° 04' 162° 45'
Birch bark from main room of Ipiutak House, Deering.
1380 ± 200 (K-532) Trautman and Walton, 1962
Tell: C-7
65° 36'
168° 04'
Wooden dish and shafts from Kurigitavik site located south of the village of Wales. Associated with a Birnirk harpoon head.
1350 ± 360 (P-68)
1320 ± 230 (P-68)
Ralph and Ackerman, 1961

Kotz: A-2
66° 04'
162° 45'
Dog faces from Anteroom 3, Ipiutak House, Deering.
1290 ± 200 (K-537)
Trautman and Walton, 1962

Bend: D-3
65° 48'
163° 13'
Charcoal from fireplace in Trail Creek Cave 9.
1260 ± 130 (K-108)
Tauber, 1960

Tell: C-7
65° 36'
168° 04'
Wooden dish from Kurigitavik site located south of Wales.
1230 ± 240 (P-67)
Ralph and Ackerman, 1961

Bend: D-3
65° 48'
163° 13'
Marrow-cracked bones of caribou from Trail Creek Cave 2.
1100 ± 100 (K-982)
Tauber, 1968

Nome: D-2
64° 24'
165° 35'
Shell fragments in shell bed buried by fine sand from a core at 30.6 m below sea level, 45 km southeast of Nome.
Helps establish Holocene transgressive history of northern Bering Sea.
980 ± 200 (W-2466)
Spiker and others, 1978

Nome: A-3
64° 14'
166° 15'
Shells in silty sand from a core at 24.6 m below sea level, 45 km southeast of Nome.
Helps establish Holocene transgressive history of northern Bering Sea.
750 ± 200 (W-2462)
Spiker and others, 1978

Tell: A-6
65° 11'
167° 53'
Infaunal shells isolated in basal sand from 11 cm level of a core taken from 31 m below sea level, 48 km south of Cape Prince of Wales.
Shell species: Hyatella Arctica and Mya Truncata.
740 ± 250 (W-2683)
Spiker and others, 1978

Bend: D-3
65° 48'
163° 13'
Light-colored bones of caribou from Trail Creek Cave 9.
510 ± 100 (K-1291)
Tauber, 1968

Bend: D-3
65° 48'
163° 13'
Marron-cracked bones of caribou from Trail Creek Cave 2.
1100 ± 100 (K-982)
Tauber, 1968

Nome: D-2
64° 24'
165° 35'
Shell fragments in shell bed buried by fine sand from a core at 30.6 m below sea level, 45 km southeast of Nome.
Helps establish Holocene transgressive history of northern Bering Sea.
980 ± 200 (W-2466)
Spiker and others, 1978

Nome: A-3
64° 14'
166° 15'
Shells in silty sand from a core at 24.6 m below sea level, 45 km southeast of Nome.
Helps establish Holocene transgressive history of northern Bering Sea.
750 ± 200 (W-2462)
Spiker and others, 1978

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Spiker and others, 1978

Bend: D-3
65° 48'
163° 13'
Light-colored bones of caribou from Trail Creek Cave 9.
510 ± 100 (K-1291)
Tauber, 1968
Shis:B-3  Peat underlying crossbedded sand at Shishmaref. Provides maximum age of sand dune. 450 + 200 (W-1778) Sainsbury, 1967b

Bend:B-6  Wood and sedge peat 1 m below the surface of valley fill material at Coffee Creek. Indicates that deposition of muck-like material has taken place during the past few hundred years. 450 + 100 (L-117D) Kulp and others, 1952; McCulloch and Hopkins, 1966

Tell:B-4  Deciduous tree from buried igloo exposed in beach cut at site of an Eskimo camp on Brevig Lagoon. Site was probably a bird-shooting camp. 400 + 250 (W-1998) Masters and others, 1969

Shis:B-3  Log within crossbedded sand overlying peaty zone at Shishmaref. 200 + 200 (W-1771) Sainsbury, 1967b

1Bend = Bendeleben quadrangle
Cand = Candle quadrangle
Kotz = Kotzebue quadrangle
Nome = Nome quadrangle
Sela = Selawik quadrangle
Solo = Solomon quadrangle
Shis = Shishmaref quadrangle
Tell = Teller quadrangle

2Radiocarbon laboratories as follows:
AU=University of Alaska
Beta=Beta Analytic, Inc.
I=Isotopes, Inc.
K=Copenhagen
L=Lam Geological Observatory, New York
P=University of Pennsylvania
QL=Quaternary Research Center, University of Washington, Seattle
USGS=U.S. Geological Survey, Reston, Virginia
Y=Yale Radiocarbon Laboratory
PT=Geochron Laboratories Division, Krueger Enterprises Inc., Cambridge, Mass

3Analytical data: \( \% K_2O = 0.154, 0.154 \)
\( \text{moles} \frac{40Ar}{40Ar_{ad}} \text{gm} = \frac{1.8675 \times 10^{-13}}{1.7153 \times 10^{-13}} \)
\( \text{mole} \frac{40Ar_{ad}}{40Ar_{total}} = 0.031 (%3.1\%), \frac{0.018 (1.8\%)}{\text{Constants:}} \)
\( \lambda_C = 0.572 \times 10^{-16} \text{ year}^{-1}, \lambda_{\beta} = 4.93 \times 10^{-10} \text{ year}^{-10}, \lambda_{\epsilon'} = 8.78 \times 10^{-13} \text{ year}^{-1} \)
REFERENCES


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