

biotite ages range from 2060 m.y. at Frederikshåb to 1770 m.y. in inner Kvane-fjord. A single age determination on muscovite from Nigerdlinguaq giving 2100 m.y. demonstrates that this mineral has retained argon better than biotite. A biotite separate from the same rock gives 1800 m.y. Future measurements on muscovite separates may demonstrate the difference between the two micas even more clearly, and this may lead to an estimate of the range of temperatures affecting the basement rocks of the Frederikshåb region during the Ketilidian orogenic episode.

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C¹⁴ DATING OF SURVEY MATERIAL PERFORMED IN 1971

General compilation by **Anker Weidick**

The systematic mapping of the Quaternary deposits by the Survey (S. Funder, M. Kelly, D. Laursen, L. Simonarson, N. W. Ten Brink and the present compiler) has produced a need for a regular dating of shell and driftwood material connected to Holocene shore-lines. It is hoped to erect a framework of dated shore-lines from Greenland coastal areas, which can be used for reference and for control in establishing the age of other Holocene events.

Only radiocarbon age determinations carried out in 1971, 38 in total, are included in the present compilation. A paper including all earlier dates on Survey material from Greenland is in preparation, and it is planned to publish all radiocarbon dates annually in the Report of Activities in the future.

Many of the samples (marked K) reported on here have been dated by Henrik Tauber, Carbon-14 Dating Laboratory, National Museum, Copenhagen; others (marked UW) have been dated in U.S.A., at the Quaternary Research Center, University of Washington, Seattle, by A. Fairhall and (those marked I) at Isotopes Inc., Westwood, New Jersey. Determinations of the wood samples have kindly been made by Jette Dahl Møller, Institute of Plant Anatomy and Cytology, University of Copenhagen. Unless otherwise stated the samples were submitted for dating by the collector.

Samples collected in Scoresby Sund region, East Greenland by S. Funder.

The reader is referred to the reports by Funder (1970, 1971a) for the general setting of the material treated here. Earlier dates from the same region have already been published (see Tauber, 1970; Funder, 1971b).

GGU 106524: I-5419. Heden, Jameson Land, 70° 46' N, 24° 07' W.
 21 020 ± 430 B.P. 24 300 ± 700 B.P.
 19 070 B.C. 22 350 B.C.

Shells of *Mya truncata*, *Hiatella arctica* and some unidentified shell fragments collected from a cliff of grey marine silt.

GGU 146505: K-1916. "Mortens Sø" at the entrance of Klitdal, Scoresby Sund, 70° 52' N, 22° 27' W.

9630 ± 120 B.P.
 7680 B.C.

A clayey gyttja from the lower 3 cm of a 403 cm thick deposit in a lake at 40-45 m above sea level.

GGU 146510: K-1915. Konglomeratelv, Scoresby Sund, 71° 21' N, 24° 50' W.

9900 ± 120 B.P.
 7950 B.C.

Shells of *Hiatella arctica* and *Mya truncata* collected from marine silt 97-100 m above sea level.

Samples collected in Peary Land, North Greenland, by P. R. Dawes.

The samples reported on here were collected in 1969 (Dawes, 1970) and have been discussed by Weidick (1972). Altitude measurements are based on hand-level and altimeter readings and should be considered approximate. Geographical coordinates given are taken from the U.S.A.F. World Aeronautical Chart 1.1 000 000, 5th edition.

GGU 100658: I-5591. Southern coast of Frederick E. Hyde Fjord at the snout of Tordenskjold Gletscher, 83° 05' N, 32° 15' W.

1935 ± 90 B.P.
 15 A.D.

A piece of driftwood of *Picea* sp. from a raised beach at about 4.2 m above sea level. The locality is on the west side of the semi-nunatak in front of the glacier, where the wood was partly buried in the gravel of the marine beach.

GGU 100659: I-5592. Southern coast of Frederick E. Hyde Fjord at the snout of Tordenskjold Gletscher, 83° 05' N, 32° 15' W.

4645 ± 115 B.P.
 2695 B.C.

A piece of driftwood of *Picea* sp. from raised beach about 15.1 m above sea level. Same locality as for I-5591. Taken from a large log which was partly buried in the gravel of the marine beach.

GGU 100660: I-5593. Southern coast of Frederick E. Hyde Fjord at the snout of Tordenskjold Gletscher, 83° 05' N, 32° 15' W.

4815 ± 115 B.P.

2865 B.C.

A piece of driftwood of *Larix* sp. from raised beach at about 18.5 m above sea level. Same locality as I-5591. The wood was partly buried in the gravel of the marine beach.

Samples collected in Holsteinsborg-Jakobshavn region, West Greenland, by A. Weidick.

The samples treated here were collected between 1961 and 1967. Sample I-5418 is discussed in Weidick (in press); the rest have not previously been mentioned and were obtained as supplementary information for the mapping of the Quaternary deposits of the region.

GGU 88962: I-5415. Erfalik, south side of entrance to Ikertôq fjord, 66° 25' N, 53° 37' W.

7010 ± 125 B.P.

5060 B.C.

Shells of *Mya truncata* collected from shell beds 1.7 m above sea level in a 4-5 m high cliff of marine silt.

GGU 88959: I-5416. Erfalik, south side of entrance to Ikertôq fjord, 66° 25' N, 53° 37' W.

8480 ± 130 B.P.

6530 B.C.

Shells of *Mya truncata* collected from shell-carrying sand under a small beach ridge 8 m above sea level.

GGU 88906: I-5417. Akunaq, Holsteinsborg district, 67° 02' N, 53° 48' W.

7670 ± 125 B.P.

5720 B.C.

Shells of *Mya truncata* and *Hiatella arctica* collected from the upper 20 to 40 cm of beach ridge gravel at altitude 12 m above sea level.

GGU 63119: I-5418. Pâkitsup ilordlia, Jakobshavn district, 69° 27' N, 50° 16' W.

285 ± 100 B.P.

1665 A.D.

Twigs of *Betula nana* found together with concretions containing marine shell fragments at the Inland Ice margin at altitude 390 m above sea level. All the material has been transported from the bottom of the present Inland Ice margin and only the wood was suitable for C¹⁴ dating.

Samples collected in the Søndre Strømfjord region, West Greenland, by N.W. Ten Brink.

Field work on the Quaternary deposits from which the present material was collected is reported in Weidick and Ten Brink (1970) and Ten Brink (1971a). In the latter paper three C^{14} dates carried out in 1970 are given and a complete description and interpretation of the samples treated here is given in Ten Brink (1971b).

GGU 119523: UW-171. Aussivit, about 3.75 km north-east of the north-east head of Itivdleg, $66^{\circ} 35' N$, $52^{\circ} 22' W$.

8610 ± 70 B.P.

6660 B.C.

Shells of *Mya truncata*, *Hiatella arctica* and *Pecten islandicus* collected 105 ± 5 m above sea level from silty clay matrix at the top of marine silt-clay terrace.

GGU 119522: UW-172. Aussivit, about 1.25 km north-east of the north-east head of Itivdleg on the west side of Aussivit, $66^{\circ} 34' N$, $52^{\circ} 24' W$.

8670 ± 100 B.P.

6720 B.C.

Shells of *Mytilus edulis*, *Balanus balanus* and *Mya truncata* collected 115 ± 5 m above sea level from silty clay matrix at the top of marine silt-clay terrace.

GGU 119503: UW-173. Umivît-Aussivigssuit, north side of main river valley about 6 km north-east of the river Umivît confluence, $66^{\circ} 52' N$, $50^{\circ} 38' W$.

2750 ± 90 B.P.

800 B.C.

Lacustrine peat, mostly *Drepanocladus aduncus*, collected at 35 ± 3 m above sea level from the basal 15 cm of a 2.5 m thick peat layer conformably overlying marine clay-silt at the top of a 35 m marine sediment terrace.

GGU 119513: UW-174. Pinguarssuk, cut bank in lacustrine sediments of a former shore-line at the north-west tip of an unnamed lake about 310 m above sea level, $66^{\circ} 49' N$, $50^{\circ} 09' W$.

1860 ± 80 B.P.

90 A.D.

Lacustrine peat, mostly *Drepanocladus aduncus*, collected 2 m above the present lake level from the lowest exposed beds of organic-rich clay and silt intercalated with fine-grained sand and 1-3 cm thick strata of peat.

GGU 119531: UW-180. Ørkendalen, north side of the head of the valley about 400 m west of the Inland Ice margin, $66^{\circ} 59' N$, $50^{\circ} 04' W$.

330 ± 75 B.P.

1620 A.D.

Organic detritus collected from the basal strata of lacustrine sand deposited in a former moraine-dammed lake that was formed when ice-marginal drainage was dammed by construction of the youngest "Ørkendalen" moraine against the north side of the valley.

GGU 119546: I-5424. Qêrdlutôrsiorfik, north shore of a small lake about 800 m south of the southern shore of Umîvît, 66°50'N, 50°56' W.

4010 ± 100 B.P.

2060 B.C.

Lacustrine peat, mostly *Drepanocladus aduncus*, collected 57 ± 2 m above sea level from the basal 15 cm of peat that conformably overlies marine clayey silt containing shell fragments, and is exposed in a shore-line cut bank.

GGU 119550: I-5504. Umîvît, eastern shore of the bay along the west side of Ningimaneq, 66° 50' N, 50° 43' W.

6150 ± 115 B.P.

4200 B.C.

Shells of *Mya truncata*, *Hiatella arctica*, *Balanus balanus*, *Macoma calcarea*, *Cardium ciliatum* and *Serripes groenlandicum* collected 34 ± 4 m above sea level from brown sandy silt capping a 38 ± 4 m marine silt-clay terrace.

GGU 119552: I-5505. Angujârtorfik, beach cliff at south-east head of the bay, 66° 43' N, 51° 26' W.

5070 ± 105 B.P.

3120 B.C.

Shells of *Mytilus edulis*, *Hiatella arctica*, *Macoma torelli* and *Serripes groenlandicum* collected 15 ± 1 m above sea level from poorly sorted silt-sand with pebbles and cobbles, exposed at the top of a 16-17 m high beach cliff.

GGU 119556: I-5506. Angujârtorfik, northern shore of the bay, about 1.2 km west-north-west of the head of the bay, 66° 44' N, 51° 28' W.

5845 ± 115 B.P.

3895 B.C.

Mytilus edulis, *Balanus* sp., *Hiatella arctica*, *Macoma torelli*, *Mya truncata*, *Macoma calcarea* and *Serripes groenlandicum* collected 9-10 m above sea level from well-sorted, fine-grained sand that underlies a 20-30 cm thick beach gravel at the terraced top of a 10-11 m modern beach cliff.

GGU 119558: I-5507. Angujârtorfik, beach cliff at the north-east corner of the bay, 66° 43' N, 51° 26' W.

2730 ± 90 B.P.

780 B.C.

Lacustrine peat, mostly *Drepanocladus aduncus*, collected 12 ± 1 m above sea level from a former small lake basin exposed at the top of a modern beach cliff composed of marine sediments.

GGU 119560: I-5508. Angujårtorfiup kûa, northern side of river about 750 m east of Angujårtorfik, 66° 43' N, 51° 24' W.

7260 ± 120 B.P.

5310 B.C.

Shells of *Balanus balanus*, *Mya truncata*, *Hiatella arctica*, *Cardium ciliatum* and *Astarte montagui* collected 14 ± 1 m above sea level from sand of a small 28 m terrace which occurs on the western side of a large 65 ± 5 m deltaic terrace.

GGU 119561: I-5509. Angujårtorfiup kûa, northern side of river about 750 m east of Angujårtorfik, 66° 42' N, 51° 24' W.

3600 ± 95 B.P.

1650 B.C.

Lacustrine peat, mostly *Drepanocladus aduncus*, collected 25 ± 2 m above sea level from the basal 15 cm of a 1.5 m thick peat layer that conformably overlies marine silt on top of the 28 m terrace described in connection with sample I-5508.

GGU 119566: I-5510. Angujårtorfik, at the head of the bay about 300 m north of the stream mouth, 66° 43' N, 51° 26' W.

5615 ± 115 B.P.

3665 B.C.

Shells of *Balanus* sp., *Hiatella arctica*, *Mya truncata*, *Macoma calcarea*, *Astarte montagui* and *Astarte* cf. *borealis* collected 3.5 ± 0.5 m above sea level from the gradational contact zone between overlying foreset deltaic sand beds and underlying massive silt, all of which are exposed in a 4-5 m high modern beach cliff.

GGU 119574: I-5511. South-eastern shore at the head of Søndre Strømfjord about 1.6 km south-south-west of the bridge over Ørkendalen, 66° 59' N, 50° 42' W.

6045 ± 115 B.P.

4095 B.C.

Shells of *Mytilus edulis*, *Balanus balanus*, *Hiatella arctica*, *Mya truncata*, *Macoma calcarea*, *Serripes* sp. and *Cardium ciliatum* collected 24 ± 2 m above sea level from sandy silt overlain by sand and gravel beach deposits capping the top of a 28-30 m marine sediment terrace.

GGU 119575: I-5512. South-eastern shore at the head of Søndre Strømfjord about 1.4 km south-south-west of the bridge over Ørkendalen, 67° 00' N, 50° 42' W.

7025 ± 120 B.P.

5075 B.C.

Shells of *Mya truncata*, *Cardium ciliatum* and *Serripes groenlandicum* collected 10 ± 1 m above sea level from a 50-90 cm gradational contact zone between underlying massive clay and overlying well-laminated fine silt of a marine sediment terrace with a surface at about 30 m above sea level.

GGU 119579: I-5587. Tatsip atâ, a beach cliff at the south-south-east corner of the bay, 66° 50' N, 51° 05' W.

4335 ± 110 B.P.

2385 B.C.

Shells of *Mya truncata* and *Hiatella arctica* collected at 1.0-1.5 m above sea level from well-sorted, poorly laminated, medium-grained sand with a few pebbles and cobbles – a littoral or deltaic deposit – exposed in a 3-4 m beach cliff.

GGU 119580: I-5588. Tapsip atâ, a beach cliff at the south-east tip of the bay about 200 m south-west of the stream mouth, 66° 50' N, 51° 05' W.

6030 ± 115 B.P.

4080 B.C.

Shells of *Mya truncata*, *Mya truncata* forma *ovata*, *Hiatella arctica*, *Macoma calcarea*, *Astarte borealis*, *Astarte* cf. *montagui*, *Cardium ciliatum* and *Serripes groenlandicum* collected 0-0.5 m above sea level from massive marine clay overlain by well-sorted, medium-grained sand of littoral or deltaic deposition (cf. I-5587), all exposed in a 4 m beach cliff.

GGU 119582: I-5589. Søndre Strømfjord Air Base about 400 m east of the Danish hotel, west bank of the river, 61° 01' N, 50° 41' W.

6505 ± 120 B.P.

4555 B.C.

Shells of *Balanus balanus* and *Mytilus edulis* collected at 31 ± 1 m above sea level from foreset deltaic beds that are truncated and overlain by a gravelly silt at 34-35 m above sea level, in a terrace with a surface at about 40 m above sea level.

GGU 119583: I-5590. Tatsip atâ and Angujârtorvik, modern tidal flats and beaches, 66° 43' N, 51° 26' W and 66° 50' N, 51° 05' W.

-(C¹⁴) = -119 ± 13

(C¹⁴) = 119 ± 13

Samples of *Mytilus edulis* collected alive, the shells of which were used as a check on C¹⁴ contamination of the sea water in Søndre Strømfjord.

The result indicates that modern sea water here has been enriched in C^{14} , no doubt by nuclear devices.

Samples collected in Disko Bugt-Egedesminde region, West Greenland, by D. Laursen.

The samples reported on here were submitted for age dating by Prof. A Rosenkrantz. The detailed setting of the samples can be found in Harder *et al.* (1949) and Laursen (1950).

GGU 820: K-1814. Zirphaea Pynt, Orpigsôq, Christianshåb district, 68° 37' N, 50° 51' W.

6360 ± 120 B.P.

4410 B.C.

Shells of *Mya truncata*, *Pecten islandicus* and *Macoma calcarea* excavated at 3 m above sea level from a cliff profile at Orpigsôq river.

GGU 822: K-1815. Zirphaea Pynt, Orpigsôq, Christianshåb district, 68° 37' N, 50° 51' W.

5820 ± 110 B.P.

3870 B.C.

Shells of *Pecten islandicus* collected from the upper layer of a cliff, 3.6 m above sea level.

GGU 826: K-1816. Zirphaea Pynt, Orpigsôq, Christianshåb district, 68° 37' N, 50° 51' W.

4870 ± 110 B.P.

2920 B.C.

Shells of *Zirphaea crispata*, *Mya truncata* and *Hiatella arctica* from a cliff profile at Orpigsôq river, 6.8 m above sea level.

GGU 828: K-1817. Zirphaea Pynt, Orpigsôq, Christianshåb district, 68° 37' N, 50° 51' W.

— 7030 ± 130 B.P.

5080 B.C.

Shells of *Balanus hammeri* collected from fine clayey sand containing abundant *Balanus* shells in a cliff profile at Orpigsôq river, 2 m above sea level.

GGU 867: K-1818. Qarsortup kûa, north of Claushavn, 69° 06' N, 51° 04' W.

8630 ± 140 B.P.

6680 B.C.

Shells of *Macoma calcarea* collected between 5 and 10 m above sea level from clay which is determined as having been "deposited under high-arctic climatic conditions" (Laursen, 1950, p. 19).

GGU 873: K-1819. Knold 3, Giesecke Sø, Egedesminde district, 67° 41' N, 53° 31' W.

8530 ± 140 B.P.

6580 B.C.

Shells of *Mya truncata* found 1 m above the lake level, which is about 11 m above sea level. The lake level was originally determined as being 22 m above sea level (Laursen, 1950, p. 57) but subsequent measurement by the Geodetic Institute shows the lake level to be 10 m above sea level (1:250 000, sheet 67 V.1).

GGU 893: K-1820. Knold 7, Giesecke Sø, Egedesminde district, 67° 41' N, 53° 31' W.

7940 ± 130 B.P.

5990 B.C.

Shells of *Mya truncata* collected from sandy clay 6 m above the level of the lake (see comment under K-1819).

GGU 899 + 1119: K-1821. Knold 11, Giesecke Sø, Egedesminde district, 67° 41' N, 53° 31' W.

8540 ± 140 B.P.

6590 B.C.

Shells of *Pecten islandicus*, *Hiatella arctica* and *Balanus hammeri* collected from clay with some sand at 13-14 m above the lake level (see comment under K-1819).

GGU 1121: K-1822. Knold 14, Giesecke Sø, Egedesminde district, 67° 42' N, 53° 31' W.

8640 ± 140 B.P.

6690 B.C.

Shells of *Pecten islandicus* collected from clay with sand 14 m above the level of the lake (see comment under K-1819).

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