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COPENHAGEN RADIOCARBON DATES X

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The following list comprises a selected number of measurements made on archaeologic samples from 1959 to December 1971. Measurements of geologic samples will be given in a later date list. A survey of the radiocarbon chronology for the Danish Mesolithic and Neolithic, ensuing from these and previously published dates from the laboratory, has recently been compiled (Tauber, 1972).

Age calculations are based on a contemporary value equal to 0.95 times the activity of the NBS oxalic acid standard (this also applies to shell dates), and on a half-life for C^{14} of 5570 years. Results are reported in years before 1950, and in the A.D./B.C. scale. Errors quoted include standard deviations of the count rates for the unknown sample, contemporary value, and background. Because possible errors arising from isotopic fractionation, or from fluctuations in the atmospheric C^{14} activity, are not incuded, calculated errors smaller than 100 years were increased by rounding to that figure as a minimum.

Sample descriptions were prepared in collaboration with collectors and submitters of samples.

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ARCHAEOLOGIC SAMPLES

A. Denmark

Draved Mose, Mesolithic dwelling place

Charcoal from Mesolithic dwelling place, No. 604 S, from shore of prehistoric "Draved Lake" in bog Draved Mose (55° 1′ N Lat, 8° 57′ E Long), S Jutland. Dwelling place was on former sand dunes, now covered by peat. Flint implements from Early Mesolithic culture (Kapel, 1964; Andersen, 1966). Coll. 1968 and 1969 by H. Kapel and E. Brinch Petersen; subm. by H. Kapel and A. Andersen, Geol. Survey Denmark. *Comment*: samples from Early Mesolithic dwelling places in Draved were previously dated (R., 1962, v. 4, p. 27-34; 1966, v. 8, p. 213-234; 1968, v. 10, p. 295-327). Dates agree well with oldest group of previous dates.

* Deceased.

K-1466. Draved Mose, D.G.U. 384 **9390 ± 120 / 7440 B.C.**

Charcoal of pine and deciduous species from gyttja layer together with worked flint. Layer pollen dated to time before immigration of hazel. Date is average of 2 measurements: 9330 ± 150 and 9460 ± 150.

K-1465. Draved Mose, D.G.U. 383 **9130 ± 150 / 7180 B.C.**

Charcoal of pine and deciduous species from gyttja layer with worked flint. Layer pollen dated to time shortly before immigration of hazel.

K-1605. Draved Mose, D.G.U. 407 **9280 ± 160 / 7330 B.C.**

Charcoal of pine and deciduous species from cultural layer, Field C/15, with flint implements.

K-1794. Draved Mose, D.G.U. 461 a+b **8790 ± 140 / 6840 B.C.**

Charcoal of pine from cultural layer, Field C/16 and D/16, together with flint implements.

Barmosen, Mesolithic dwelling place

Charcoal and peat from Mesolithic dwelling place, B I, in bog Barmosen (55° 3′ N Lat, 11° 54′ E Long), S Zealand, from 5 to 10 cm thick cultural layer with Early Mesolithic flint implements (Johansson, 1970), and from 30 to 40 cm thick peat cover. Coll. 1967 to 1968 and subm. by A. Johansson, Sydsjaellands Mus., Vordingborg and J. Troels-Smith, Natl. Mus., Copenhagen. *Comment*: cultural layer may have been uncovered for some time in antiquity (cp. K-1427 and K-1773); some mixing of cultural remains and organic matter may therefore have occurred, as dates suggest.

K-1359. Barmosen, B I, 2 **9240 ± 150 / 7290 B.C.**

Charcoal (*Betula* sp.) from 11 small finds from area 2 × 2 m in cultural layer.

K-1775. Barmosen, B I, 733 **8580 ± 110 / 6630 B.C.**

Charcoal (*Populus* sp.) from cultural layer. Date is average of 2 measurements: 8660 ± 140 and 8490 ± 140.

K-1774. Barmosen, B I, 621 **8330 ± 100 / 6380 B.C.**

Charcoal (*Populus* sp. or *Salix* sp.) from Pit A in cultural layer. Date is average of 3 measurements: 8300 ± 140, 8430 ± 140, and 8250 ± 140.

4470 ± 100

K-1773. Barmosen, B I, Hg 10969 **2520 B.C.**

Highly humified peat from 0 to 2 cm above upper part of cultural layer. A few flint pieces found in peat.

3690 ± 110

K-1427. Barmosen, B I, Pd 7052 **1740 B.C.**

Highly humified peat from 4 to 6 cm above upper part of cultural layer.

Klosterlund, Mesolithic dwelling place

Samples from profile just S of classic Klosterlund dwelling place (56° 11′ N Lat, 9° 22′ E Long), Jutland. Lowest in profile was sand, covered by 15 to 20 cm gyttja. Over gyttja was 5 to 6 cm brown peat with flint flakes of Klosterlund culture, covered by black peat. Samples were in or just below brown peat (cultural layer). Pollen dated to end of Zone IV, just before immigration of hazel. Coll. 1967 and subm. by A. Andersen, Geol. Survey Denmark.

8920 ± 140

K-1315. Klosterlund, D.G.U. 340 **6970 B.C.**

Bark (*Pinus* sp.) from upper part of brown peat. Presumably contemporary with Klosterund dwelling place.

9140 ± 150

K-1316. Klosterlund, D.G.U. 341 **7190 B.C.**

Outer year rings of wood (*Pinus* sp.) from lower part of brown peat. Probably just below cultural layer.

9230 ± 150

K-1317. Klosterlund, D.G.U. 342 **7280 B.C.**

Charred branch (*Pinus* sp.) from lowermost part of brown peat. Probably just below cultural layer.

9200 ± 140

K-1452. Klosterlund, D.G.U. 374 **7250 B.C.**

Outer year rings of branch (*Pinus* sp.) from lowermost part of brown peat.

Mullerup, Maglemose culture, type locality

Samples from old excavation of cultural layer on Sarauw's islet at classic Mullerup dwelling place (55° 30′ N Lat, 11° 13′ E Long), W Zealand. Early Maglemose culture in Zealand. Pollen dated to Zone Vb (K. Jessen). Coll. 1900 by G. F. L. Sarauw, subm. by E. Brinch Petersen, Univ. Copenhagen.

8660 ± 120

K-1609. Mullerup, A 18269/1 **6710 B.C.**

A single, large piece of charcoal (*Corylus* avel.) from lower part of cultural layer, Field I, H 1. Date is average of 2 measurements: 8720 ± 140 and 8610 ± 140.

K-1610. Mullerup, A 18269/2 **8500 ± 140**
6550 B.C.

Rolls of bark (*Betula* sp.) from lower part of cultural layer, Field III, B 5 and III, C 5.

K-1611. Mullerup, A 18269/3 **8520 ± 140**
6570 B.C.

Rolls of bark (*Betula* sp.) from lower part of cultural layer, Field IV, J 2.

K-1612. Mullerup, A 18269/4 **8330 ± 110**
6380 B.C.

Hazelnut shells from cultural layer. Date is average of 3 measurements: 8230 ± 140, 8440 ± 140, 8310 ± 140.

Ulkestrup, Maglemose culture

Samples from hut, House II, excavated at Ulkestrup Øst II (55° 35′ N Lat, 11° 32′ E Long), in bog Åmosen, W Zealand. Remains of hut was sealed in peat. Artifacts belong to youngest part of Maglemose culture, Svaerdborg phase, in Åmosen (Andersen, 1951, 1961). Pollen dated to Zone VI (ex Svend Jørgensen). Coll. 1951 and subm. by Knud Andersen, Natl. Mus., Copenhagen.

K-1507. Ulkestrup II, 16122, 16191 **8170 ± 120**
6220 B.C.

Rolls of bark (*Betula* sp.) from hut proper on a bark layer that formed floor of hut, covered by clay. Date is average of 2 measurements: 8320 ± 140 and 8030 ± 140.

K-1508. Ulkestrup II, 16351 **8030 ± 140**
6080 B.C.

Charcoal (*Pinus* sp.) 3 m from hut in refuse layer, 21 cm thick. Single piece of cleaved wood charred at one end.

K-1509. Ulkestrup II, 13885 **8050 ± 140**
6100 B.C.

Tinder, ca. 2.5 m from hut in refuse layer.

Kongemosen, Early Coastal culture

Samples from Mesolithic dwelling place at Kongemosen (55° 35′ N Lat, 11° 30′ E Long), in bog Åmosen, W Zealand. Cultural layer consisted of habitation layer, with many flint implements, on shore of former lake, and refuse layer of refuse from dwelling place embedded in gyttja off shore. Artifact assemblage characterized by rhombic arrowheads and large flint picks; represents Kongemose phase of Early Coastal culture (Jørgensen, 1956, 1961). Cultural layer presumably belongs to Pollen Zone VI (ex Svend Jørgensen). Coll. 1955 and subm. by Svend Jørgensen, Natl. Mus., Copenhagen. *Comment*: 2 pieces of wood from refuse layer were previously dated to 8830 ± 110 and 8400 ± 150 (R., 1966, v. 8, p. 213-234), *i.e.*, considerably older than these dates from habitation layer. Previous samples, therefore, can hardly originate from dwell-

ing place, but represent pieces of wood washed out from older deposits and later embedded in refuse layer.

7840 ± 140
K-1526. Kongemosen, II 20169 **5890 B.C.**

Swamp peat from immediately below habitation layer. Older than dwelling place.

7560 ± 120
K-1528. Kongemosen, XVIIa 20184 **5610 B.C.**

Hazelnut shells from habitation layer. Date is average of 2 measurements: 7840 ± 140 and 7630 ± 140.

7280 ± 130
K-1588. Kongemosen, XVIIb 20184 **5330 B.C.**

Bark (*Alnus* sp.) from habitation layer at dwelling place.

7350 ± 120
K-1589. Kongemosen, XI 20178 **5400 B.C.**

Bark (*Alnus* sp.) from refuse layer. Date is average of 2 measurements: 7380 ± 150 and 7320 ± 150.

6820 ± 120
K-1527. Kongemosen, XVI 20183 **4870 B.C.**

Swamp peat from immediately above cultural layer. Younger than dwelling place. Date is average of 2 measurements: 6800 ± 140 and 6850 ± 140.

Villingebaek, Early Coastal culture

Charcoal and wood from dwelling place at Villingebaek Øst A (56° 6′ N Lat, 12° 30′ E Long), at coast of N Zealand. Artifacts represent Kongemose phase of Early Coastal culture (Kapel, 1967, 1969). Cultural layer is older than, or contemporary with, 1st early-Atlantic Littorina transgression. Coll. 1966 to 1968 and subm. by H. Kapel, Natl. Mus., Copenhagen.

7280 ± 120
K-1368. Villingebaek, J, 18 **5330 B.C.**

Charred wood (*Corylus* sp.) from habitation layer on dwelling place. Layer was resting on sand and covered by clay deposited during following transgression.

7040 ± 120
K-1369. Villingebaek, C, 22 **5090 B.C.**

Charcoal (*Pinus* sp.) from habitation layer at land.

7030 ± 130
K-1486. Villingebaek, V, 12-4610a **5080 B.C.**

Twigs from fish trap from upper part of cultural layer, Fields H 13-14 and I 13-14.

K-1334. Villingebaek, 388 **7220 ± 120**
5270 B.C.

Outer 4 cm of tree trunk embedded in refuse layer, ca. 8 to 9 m outside old coast line.

K-1370. Villingebaek, 186 **7070 ± 120**
5120 B.C.

Charred branch (*Pinus* sp.) from refuse layer, ca. 5 to 6 m outside old coast line.

K-1371. Villingebaek, 345 **7090 ± 120**
5140 B.C.

Partly charred piece of branch (*Pinus* sp.) embedded in refuse layer, ca. 6 to 7 m from old coast line.

K-1372. Villingebaek, 387 **7120 ± 120**
5170 B.C.

Charred wood (*Pinus* sp.) from refuse layer, ca. 8 to 9 m from old coast line.

Månedalen, Early Coastal culture

Charcoal from dwelling place ca. 500 m S of previously mentioned dwelling place at Villingebaek (56° 6′ N Lat, 12° 30′ E Long), N Zealand. Artifacts represent Kongemose phase of Early Coastal culture and appear broadly contemporary to, or slightly older than, those from nearby Villingebaek dwelling place. Coll. 1969 to 1970 and subm. by H. Kapel. *Comment*: dates suggest dwelling places at Månedalen and Villingebaek are almost contemporary.

K-1826. Månedalen, F 17 **7150 ± 130**
5200 B.C.

Charcoal (*Ulmus* sp.) from cultural layer, Field F 17.

K-1825. Månedalen, B 12 **7040 ± 120**
5090 B.C.

Charcoal (*Pinus* sp.) from cultural layer, Field B 12.

K-1827. Månedalen, CDE 17 **7530 ± 130**
5580 B.C.

Charcoal (*Corylus* sp.) from pit below cultural layer, Fields CDE 17.

K-1303. Vedbaek, Early Coastal culture **6510 ± 110**
4560 B.C.

Wood (*Cornus* sp.) from dwelling place at Vedbaek Boldbane (55° 51′ N Lat, 12° 34′ E Long), Vedbaek, N Zealand. Part of wooden hafting sleeve, A 41666, from Field III C 2 at dwelling place, with artifacts characterized by core axes and dominance of rhombic arrowheads over transverse arrows (Mathiassen, 1946). Coll. 1946 by Th. Mathiassen; subm. by H. Norling-Christensen, Natl. Mus., Copenhagen. *Comment*: sample was treated with alun. Preservatives were extracted before dating.

Brovst, Early Coastal culture and Ertebølle culture

Shells and charcoal from former coastal dwelling place at Bratskov (57° 6′ N Lat, 9° 30′ E Long), Brovst, N Jutland. Dwelling place contained 2 cultural layers separated by marine sand, presumably deposited during a transgression. Lower cultural layer, representing phase of Early Coastal culture, consisted of clay and shells mixed with charcoal, bones, and flint tools, *e.g.*, rhombic arrowheads. It contained no ceramics. Upper cultural layer consisted mainly of minor isolated heaps of shells, with flake axes, transverse arrowheads and thick-walled, pointed-base ceramics from early phase of Ertebølle culture. Both layers were subdivided into a sequence (Andersen, 1970). Coll. 1969 to 1970 and subm. by O. Marseen and Søren H. Andersen, Forhist. Mus., Århus.

6680 ± 150
K-1661. Brovst, Pd 7567 **4730 B.C.**

Charcoal (*Quercus* sp.) from lower cultural layer, Field A 12, Layer 11.

6590 ± 130
K-1614. Brovst, SHg 902, 903 **4640 B.C.**

Shells (*Ostrea edulis*) from lower cultural layer at junction of Fields A 9, A 10, and E 1.

6420 ± 130
K-1660. Brovst, Pd 7569, 7570 **4470 B.C.**

Charcoal (*Ulmus* sp.) from lower cultural layer, Field A 22, Layer 2.

6560 ± 120
K-1860. Brovst, CYV **4610 B.C.**

Shells (*Ostrea edulis*) from lower cultural layer, Field 75/45, Layer 11(9).

6450 ± 120
K-1858. Brovst, CYM **4500 B.C.**

Shells (*Ostrea edulis*) from lower cultural layer, Field 58/39, Layer 11.

6160 ± 110
K-1862. Brovst, CZS **4210 B.C.**

Shells (*Ostrea edulis*) from lower cultural layer, Field 80/45, Layer 11(9).

5610 ± 100
K-1613. Brovst, SHg 900, 901 **3660 B.C.**

Shells (*Ostrea edulis*) from upper cultural layer at junction of Fields A 9, A 10, and E 1. Date is average of 2 measurements: 5680 ± 120 and 5550 ± 120.

5500 ± 100
K-1856. Brovst, CYJ **3550 B.C.**

Shells (*Ostrea edulis*) from upper cultural layer, Field 59/42, Layer 8. Date is average of 2 measurements: 5380 ± 110 and 5620 ± 110.

K-1859. Brovst, CYU **5490 ± 110**
3540 B.C.

Shells (*Ostrea edulis*) from upper cultural layer, Field 75/45, Layer 4.

K-1857. Brovst, CYL **5450 ± 110**
3500 B.C.

Shells (*Ostrea edulis*) from upper cultural layer, Field 57/42, Layer 4.

K-1864. Brovst, DAB **5420 ± 100**
3470 B.C.

Shells (*Ostrea edulis*) from upper cultural layer, Field 68/47, Layer 4. Date is average of 2 measurements: 5370 ± 110 and 5460 ± 110.

K-1855. Brovst, CYC **5410 ± 100**
3460 B.C.

Shells (*Ostrea edulis*) from upper cultural layer, Field 59/43, Layer 4. Date is average of 2 measurements: 5290 ± 110 and 5520 ± 110.

K-1863. Brovst, CZY **5400 ± 110**
3450 B.C.

Shells (*Ostrea edulis*) from upper cultural layer, Field 68/44, Layer 4.

K-1861. Brovst, CZO **5410 ± 110**
3460 B.C.

Shells (*Ostrea edulis*) from upper cultural layer, Field 80/45, Layer 4.

Henriksholm, Early Coastal culture

Charcoal from dwelling place at Henriksholm, Bøgebakken (55° 51′ N Lat, 12° 33′ E Long), N Zealand. Early coastal dwelling place with artifacts dominated by transverse arrowheads and core axes that suggest younger age than Vedbaek (this date list) and older than ceramic Ertebølle culture. Coll. 1924 by G. Hatt; subm. by E. Brinch Petersen, Univ. Copenhagen.

K-1829. Henriksholm, A 33003-3 **6170 ± 120**
4220 B.C.

Charcoal (*Quercus* sp.) from hearth in Fields Aj 1, Aj 2, Ba 1, and Ba 2 in lower part of cultural layer.

K-1828. Henriksholm, A 33003-2 **6050 ± 120**
4100 B.C.

Charcoal (*Corylus* avel.) from lower part of cultural layer in Fields Ag 1 and Ah 1, under small irregular stone packing.

K-1844. Henriksholm, A 33003-1 **5910 ± 120**
3960 B.C.

Charcoal (*Corylus* avel. and *Tilia* sp.) from stone-lined hearth in lower part of cultural layer, Field Aj 2.

Ertebølle, Ertebølle culture, type locality

Shells (*Ostrea edulis*) from kitchen midden at Ertebølle (56° 48′ N Lat, 9° 11′ E Long), N Jutland. A column of shells, 1 × 1 m and

1.33 m high, from center of Ertebølle midden, Field E 9, was transferred for exhibition in Natl. Mus., Copenhagen, at excavation in 1895. Samples from this column was taken at intervals of 20 cm. In levels of 22 to 104 cm above base, thick-walled ceramics of Ertebølle-type were found in adjacent fields in midden (Brinch Petersen, 1971). Topmost of dated samples may represent layer with later admixtures. Coll. 1895 by G. Sarauw; subm. by H. Tauber and E. Thorvildsen, Natl. Mus., Copenhagen.

5760 ± 100
3810 B.C.

K-1529. Ertebølle, Eb 1

Shells, 5 to 7 cm above base of column. Date is average of 2 measurements: 5810 ± 120 and 5710 ± 120.

5660 ± 120
3710 B.C.

K-1530. Ertebølle, Eb 2

Shells 22 to 23 cm above base.

5600 ± 120
3650 B.C.

K-1531. Ertebølle, Eb 3

Shells 44 to 45 cm above base.

5550 ± 110
3600 B.C.

K-1532. Ertebølle, Eb 4

Shells 67 to 68 cm above base.

5570 ± 110
3620 B.C.

K-1533. Ertebølle, Eb 5

Shells 84 to 85 cm above base.

5580 ± 110
3630 B.C.

K-1534. Ertebølle, Eb 6

Shells 102 to 104 cm above base.

5110 ± 100
3160 B.C.

K-1535. Ertebølle, Eb 7

Shells 125 to 127 cm above base. Date is average of 2 measurements: 5180 ± 110 and 5030 ± 110.

5630 ± 120
3680 B.C.

K-1612. Haldrup Strand, Ertebølle culture

Fragment of wooden shaft (*Fraxinus* sp.) of paddle or spade from submarine dwelling place at Haldrup Strand (55° 52′ N Lat, 9° 58′ E Long), Jutland. Cultural layer consisted of cardium gyttja and contained charcoal, flint, bones, and thick-walled ceramics, representing an early phase of Ertebølle culture. Coll. 1969 and subm. by Søren H. Andersen.

Ringkloster, Ertebølle culture and Early funnel beaker culture (A,B)

Charcoal and wood from inland dwelling place at former fresh water lake at Ringkloster (56° 1′ N Lat, 9° 57′ E Long), Jutland. Cultural layer consisted of refuse from dwelling place with assemblage of

flint, bone, antler, wood and ceramics; among bones were several of fur animals. Lower and middle cultural layer represents various phases of Ertebølle culture, upper part represents Early Neolithic funnel beaker culture. Coll. 1969 to 1970 and subm. by Søren H. Andersen.

K-1652. Ringkloster, Hg 11362 **5610 ± 110**
3660 B.C.

Charcoal (*Tilia* sp.) from lower part of cultural layer with thick-walled ceramics; in direct contact with old-type stag antler axe with shaft hole near burr.

K-1765. Ringkloster, ABRK **5500 ± 110**
3550 B.C.

Wood (*Quercus* sp.) from outer 14 year-rings of tree trunk from lower part of cultural layer.

K-1653. Ringkloster, Hg 11363 **5490 ± 100**
3540 B.C.

Charcoal (*Quercus* sp.) from middle of cultural layer with thick-walled ceramics; in direct contact with T-shaped stag antler axe. Archaeologically contemporaneous with Dyrholmen II phase. Date is average of 2 measurements: 5550 ± 110 and 5430 ± 110.

K-1654. Ringkloster, Pd 8459 **5320 ± 100**
3370 B.C.

Charcoal (*Fraxinus* sp.) from upper part of cultural layer with thin-walled sherds of A and B funnel beakers. Date is average of 2 measurements: 5390 ± 110 and 5250 ± 110.

Sølager, Ertebølle culture and Early funnel beaker culture (B,C)

Charcoal from old excavation of kitchen midden at Sølager (55° 56′ N Lat, 11° 54′ E Long), N Zealand. Midden contained several separate layers with different assemblages of artifacts. Lowest layer, I, represents a classic Ertebølle culture, Layer II, Early Neolithic Funnel Beaker culture, Phase B/C, and Layer IV, Middle Neolithic Funnel Beaker culture, Period II, with small admixture of artifacts belonging to Pitted Ware culture. Coll. 1901; subm. by J. Skårup, Univ. Copenhagen.

K-1723. Sølager, A 19733, R 6, 11 + U 7, 11, 12 **5520 ± 110**
3570 B.C.

Charcoal (*Quercus* sp.) from Layer I. Classic Ertebølle culture.

K-1724. Sølager, A 19733, S 7, 6 + T 7, 7 **4650 ± 100**
2700 B.C.

Charcoal (*Quercus* sp. and *Betula* sp.) from Layer II. Early Neolithic Funnel Beaker culture, Phase B/C. Date is average of 2 measurements: 4660 ± 110 and 4630 ± 110.

K-1725. Sølager, A 19733, P 6, 1 + S 7, 2 **4030 ± 100**
2080 B.C.

Charcoal (*Quercus* sp.) from Layer IV. Date is average of 2 measure-

ments: 4050 ± 100 and 4020 ± 100. *Comment*: date is incompatible with other dates for Middle Neolithic Funnel Beaker culture (R., 1964, v. 6, p. 215-225; 1966, v. 8, p. 213-234; and this list) and suggests that charcoal originates from Pitted Ware culture or later admixture.

K-1450. Flynderhage, 1564 RG, Ertebølle culture **5230 ± 100 3280 B.C.**

Piece of worked branch (*Corylus* sp.) from kitchen midden at Flynderhage (56° 1′ N Lat, 10° 14′ E Long), Jutland. From refuse layer at midden, with artifacts of Dyrholm II-type and thick-walled ceramics (Andersen, 1970). Coll. 1968 and subm. by Søren H. Andersen.

K-1659. Lindebjerg, Early Funnel Beaker culture (B) **5010 ± 100 3060 B.C.**

Charcoal (*Quercus* sp.) from long barrow of hitherto unknown type from Lindebjerg (55° 42′ N Lat, 11° 11′ E Long), NW Zealand. Sample was part of wooden flake, 30 × 30 cm, standing edgewise in Pit C, which also contained 5 Type B funnel beakers, considered a primary feature of barrow. Coll. 1969 and subm. by G. D. Liversage, Natl. Mus., Copenhagen.

Praestelyngen, dug-out and Early Funnel Beaker culture (A or C)

Wood and moss samples from dug-out boat, embedded in gyttja, from Praestelyngen (55° 35′ N Lat, 11° 35′ E Long) in bog Åmosen, W Zealand. Boat was 6 m long, of square-stern type, with rounded stem, and fixed in position by pointed sticks along sides. Clay plate with remains of a fire in stem. Stern was formed by bark flake supported by moss and clay. Resting on clay were 3 thick pointed sticks and many potsherds, presumably of funnel beaker, Type A or C. Coll. 1968 to 1969 and subm. by C. Christensen, Natl. Mus., Copenhagen.

K-1473. Praestelyngen, B II, 1 **5010 ± 100 3060 B.C.**

Wood (*Tilia* sp.) from stem of dug-out. Date is average of 2 measurements: 5020 ± 120 and 4990 ± 120.

K-1650. Praestelyngen, B II, 128 **4960 ± 110 3010 B.C.**

Wood (*Salix* sp.) from long, pointed stick, used for fixing boat in position.

K-1651. Praestelyngen, B II, 421, 428, 447 **4890 ± 110 2940 B.C.**

Moss from stern of dug-out.

Vroue, Middle Neolithic Funnel Beaker culture, Per. I to V

Charcoal from megalithic graves and stone packing graves at Vroue (56° 25′ N Lat, 9° 4′ E Long), Jutland. Represents time from transition between Early Neolithic and Middle Neolithic Funnel Beaker cul-

ture to end of Middle Neolithic Funnel Beaker culture. Coll. 1966 to 1967 and subm. by Erik Jørgensen, Haderslev Mus., Haderslev.

4570 ± 100

K-1566. Vroue, Sb. 89, No. 42 **2620 B.C.**

Charcoal (*Quercus* sp.) immediately below stone pavement in ruin of dolmen. Represents 1st megalithic habitation at site, transition between Early Neolithic and Middle Neolithic, Per. Ia. Date is average of 2 measurements: 4530 ± 110 and 4600 ± 110.

4560 ± 100

K-1568. Vroue, Sb 21, XI **2610 B.C.**

Charcoal (*Quercus* sp.) from original vegetation surface below barrow with passage grave, 1.5 m outside chamber. Represents time of construction of passage grave, Middle Neolithic, Per. Ib.

4430 ± 100

K-1567. Vroue, Sb. 21, III **2480 B.C.**

Charcoal (*Alnus* sp.) from same passage grave as K-1568. From below barrow, just inside circle of edge stones. Represents time of construction of passage grave, Middle Neolithic, Per. Ib.

4040 ± 100

K-1569. Vroue, Sb. 21, XIII **2090 B.C.**

Charcoal (*Quercus* sp.) from same passage grave as K-1568. From top of red-burnt sand on floor of chamber, containing artifacts belonging to Upper Grave period of Single Grave culture. *Comment*: date suggests charcoal is a remain from Single Grave people.

4980 ± 100

K-1570. Vroue, Sb. 115, IV, No. 5 **3030 B.C.**

Charcoal (*Quercus* sp.) from post hole between funeral House C and Grave D in stone packing grave complex from Middle Neolithic Funnel Beaker culture, Per. IV or V. Date is average of 2 measurements: 5070 ± 110 and 4900 ± 110. *Comment*: post hole was assumed contemporary with stone packing graves. Date suggests charcoal originates from earlier construction at site.

4300 ± 100

K-1571. Vroue, Sb. 117, I, No. 3 **2350 B.C.**

Charcoal (*Quercus* sp.) from under stone paving in funeral House C in stone packing grave complex from Middle Neolithic Funnel Beaker culture, Per. IV or V.

4230 ± 100

K-1572. Vroue, Sb. 117, II, No. 2 **2280 B.C.**

Charcoal (*Quercus* sp.) from under stone paving in funeral House C in stone packing grave complex from Middle Neolithic Funnel Beaker culture, Per. IV or V.

4270 ± 100

K-1573. Vroue, Sb. 112, VII, No. 5 **2320 B.C.**

Charcoal (*Quercus* sp.) from under stones in Graves A and B in stone packing graves from Middle Neolithic Funnel Beaker culture, Per. V. Date is average of 2 measurements: 4260 ± 100 and 4280 ± 100.

4210 ± 100

K-1574. Vroue, Sb. 112, VII, No. 6 **2260 B.C.**

Charcoal (*Quercus* sp.) from under stone paving in funeral House C in stone packing grave complex from Middle Neolithic Funnel Beaker culture, Per. V. Date is average of 2 measurements: 4240 ± 100 and 4180 ± 100.

Fovlum, Middle Neolithic Funnel Beaker culture, Per. I

Charcoal from cult building belonging to Middle Neolithic Funnel Beaker culture, Per. I, from Fovlum (56° 29′ N Lat, 9° 36′ E Long), Jutland. Coll. 1968 and subm. by H. Langballe, Viborg Stiftsmuseum, Viborg.

4540 ± 110

K-1601. Fovlum, 185 B 76 **2590 B.C.**

Charcoal (*Quercus* sp.) from supposed floor level in cult building; originates presumably from fallen wall planks. *Comment*: paraffin was poured over charcoal pieces, extracted before dating.

4530 ± 100

K-1602. Fovlum, 185 B 26 **2580 B.C.**

Charcoal and charred bark (*Quercus* sp.) from floor level, supposed remains of fallen roof of building. Date is average of 2 measurements: 4560 ± 110 and 4500 ± 110.

Herrup, Middle Neolithic Funnel Beaker culture, Per. I

Charcoal and bark from cult building from Herrup (56° 24′ N Lat, 8° 56′ E Long), W Jutland. Cult building belonged to Middle Neolithic Funnel Beaker culture, Per. I, same type as previously dated cult buildings at Tustrup and Ferslev (R., 1964, v. 6, p. 215-225) (Becker, 1969). Coll. 1967 and subm. by C. J. Becker, Univ. Copenhagen. *Comment*: dates agree well with dates for Tustrup and Ferslev, except for K-1770 which, as suspected by excavator, does not belong to Neolithic construction.

4650 ± 100

K-1766. Herrup, XXVI, 67 **2700 B.C.**

Charcoal (*Quercus* sp.) from wall post in E wall of building.

4530 ± 100

K-1768. Herrup, XXVI, 74 **2580 B.C.**

Charcoal (*Quercus* sp.) from layer below stones in building.

4530 ± 100

K-1769. Herrup, XXVI, 69 **2580 B.C.**

Charred bark from layer below stones, but above potsherds lying on floor. Assumed part of previous roof cover. Date is average of 2 measurements: 4610 ± 100 and 4450 ± 100.

4510 ± 100

K-1767. Herrup, XXVI, 107 **2560 B.C.**

Charcoal (*Quercus* sp.) from roof post in building.

780 ± 100

K-1770. Herrup, XXVI, 103 **A.D. 1170**

Charcoal from pit in cult building.

4510 ± 100

K-1771. Lånum, Middle Neolithic, Per. I-II **2560 B.C.**

Charcoal (*Sorbus* sp.) from funeral house in stone packing grave complex from Lånum II (56° 27′ N Lat, 9° 6′ E Long), Jutland. Found scattered in N ditch in funeral house, in which was narrow flint axe of thin butted type. Coll. 1970 and subm. by Ole Faber, Univ. Copenhagen.

4420 ± 110

K-1649. Praestelyngen, dug-out, B II 378 **2470 B.C.**

Wood from outer year rings of dug-out boat from Praestelyngen (55° 35′ N Lat, 11° 35′ E Long), in bog Åmosen, W Zealand. From same excavation as dug-out K-1473 (this list), but placed clearly higher in series of layers and therefore younger. Coll. 1969 and subm. by C. Christensen.

4310 ± 100

K-1789. Øster Ristofte, Middle Neolithic, Per. V **2360 B.C.**

Charcoal (*Quercus* sp.) from stone paving in stone packing grave complex at Øster Ristofte (56° 11′ N Lat, 8° 26′ E Long), W Jutland. Found with sherds of pot from Middle Neolithic Funnel Beaker culture, Per V. Sample XIV, K. Coll. 1966 and subm. by C. J. Becker.

4150 ± 100

K-1582. Vester Nebel, Single Grave culture **2200 B.C.**

Charcoal (*Corylus* sp.) from lowest layer in undisturbed circle grave at Vester Nebel (55° 33′ N Lat, 9° 25′ E Long), Jutland. Grave belongs to Younger Under Grave period during Single Grave culture. It contained 2 battle axes of Glob type D (Glob, 1945), 1 thick butted, and 1 thin bladed flint axe, and an amber dish and amber ring (Madsen, 1971). Sample 1595 R. Coll. 1969 and subm. by H. H. Andersen and H. J. Madsen, Forhist. Mus., Århus. Date is average of 2 measurements: 4170 ± 100 and 4130 ± 100.

4080 ± 100

K-1843. Gabøl, Single Grave culture **2130 B.C.**

Charcoal (*Quercus* sp.) from bottom layer in Single Grave, 45 cm below ancient surface at Gabøl (55° 15′ N Lat, 9° 9′ E Long), S Jutland.

In grave was battle axe of Glob type B (Glob, 1945), *i.e.*, from Early Under Grave period during Single Grave culture. Charcoal is supposedly from wooden coffin. Coll. 1970 and subm. by E. Jørgensen, Haderslev Mus., Haderslev.

4000 ± 100

K-1451. Gammelstrup, Single Grave culture **2050 B.C.**

Shells (*Ostrea edulis*) from stone cist at Gammelstrup (56° 30′ N Lat, 9° 13′ E Long), Jutland. In grave was straight-walled beaker ornamented with groups of vertical engraved lines, dating grave to transition between Younger Ground Grave and Upper Grave periods during Single Grave culture. Shells were covered by 60 to 70 cm thick sand that leaked into cist. Grave also contained bones of lower part of left leg of child, 7 to 10 yr old. Coll. 1968 and subm. by P. Seeberg.

4110 ± 100

K-1367. Kobberup, Single Grave culture **2160 B.C.**

Charcoal (*Quercus* sp.) from post in wooden fore-court to stone cist from Kobberup (56° 31′ N Lat, 9° 10′ E Long), Jutland. Post belonged to row of wooden post in S side of forecourt. Wooden coffin in stone cist contained several well-preserved wooden objects and a Glob type I battle axe (Glob, 1945). Coll. 1966 and subm. by P. Kjaerum, Forhist. Mus., Århus. Date is average of 2 measurements: 4110 ± 100 and 4120 ± 100. *Comment*: 1 to 2 yr old hazel twigs from under wooden coffin in stone cist previously dated to 3900 ± 120 (K-1284, R., 1968, v. 10, p. 295-327). Sample is more likely to date time of entombment, than oak post with several year rings.

3910 ± 100

K-1831. Hald, Single Grave culture **1960 B.C.**

Charcoal (*Quercus* sp.) from grave (B) in tumulus from late Single Grave culture at Hald (56° 36′ N Lat, 9° 13′ E Long), Jutland. Tumulus contained several entombments. Among artifacts in Grave B were 2 battle axes of Glob Type H and I. Coll. 1970 and subm. by Per Noe, Viborg Stiftsmus., Viborg.

4170 ± 100

K-1529. Vestensø, aurochs **2220 B.C.**

Fragment of rib (*Bos primigenius*) from drained lake Vestensø (56° 9′ N Lat, 10° 43′ E Long), Hasnaes, Jutland. Skeleton found *in situ* during plowing. Boreal type arrowhead assoc. with skeleton. Coll. 1968 and subm. by U. Møhl, Zoolog. Mus., Copenhagen.

3440 ± 100

K-1301. Hvorslev, crook-ard **1490 B.C.**

Wood (*Fraxinus* sp.) from Hvorslev-ard (Glob, 1951, p. 14), a 1-piece ard from bog in Hvorslev (56° 22′ N Lat, 9° 47′ E Long), Jutland. Coll. 1942; subm. by A. Steensberg, Univ. Copenhagen. Date is average of 2 measurements: 3460 ± 100 and 3420 ± 100. *Comment*: ard was

treated with alun before dating. Preservatives were extracted and lignin fraction was isolated and dated.

3470 ± 100

K-1339. Lundergaards Mose **1520 B.C.**

Wood (*Quercus* sp.) from tree trunk with carving of ship from bog Lundergaards Mose (57° 12′ N Lat, 9° 37′ E Long), N Jutland. Remains of a whole forest were found in bog. Trees were killed, and stumps preserved due to swamping. Tree trunk contained ca. 150 yr rings. Rings 1 to 40 from center were used; sample therefore ca. 130 yr older than time when tree was killed. Coll. 1966 and subm. by Palle Friis, Vendsyssel Mus., Hjørring. *Comment*: sample treated with preservatives, which were extracted, and lignin and cellulose were isolated and dated separately: lignin-fraction 3540 ± 100, cellulose fraction 3400 ± 100. Date is average of measurements. Sample from outer rings of another trunk in bog previously dated (R., 1966, v. 8, p. 213-234).

Stenmark, Early Bronze age, Per. II

Charcoal from Bronze age house and pit from Stenmark (57° 14′ N Lat, 9° 38′ E Long), N Jutland. Flint sickle and potsherds were found in post hole in house. The latter were of Early Bronze age type, presumably Per. II. No covering cultural layer found. Coll. 1967 and subm. by O. Marseen, Aalborg Mus., Aalborg.

3170 ± 100

K-1373. Stenmark, 30 **1220 B.C.**

Charcoal (*Alnus* sp.) from horizontal wooden flake from sand directly above untouched soil in oblong stone lined hearth in house.

3070 ± 100

K-1374. Stenmark, 57 **1120 B.C.**

Charcoal (*Alnus* sp.) 10 to 50 cm from K-1373 in same hearth.

3080 ± 100

K-1375. Stenmark, 49 **1130 B.C.**

Charcoal (*Alnus* sp., *Betula* sp., *Quercus* sp., and *Ulmus* sp.) in scattered positions in pit slightly E of house. Pit also contained a flint sickle and potsherds.

2890 ± 120

K-853. Else Made, holy spring **940 B.C.**

Wood (*Quercus* sp.) from hollowed out trunk inserted in well or holy spring at beach at Else Made (55° 50′ N Lat, 10° 32′ E Long), Samsø. Coll. 1963 and subm. by O. Bertelsen, Samsø Mus., Samsø.

2860 ± 100

K-1495. Vebbestrup, crook-ard **910 B.C.**

Wood (*Alnus* sp.) from Vebbestrup-ard (Glob, 1951, p. 16) from bog Kirketerp Mose (56° 43′ N Lat, 9° 49′ E Long), Vebbestrup, Jutland. Coll. 1928; subm. by A. Steensberg, Univ. Copenhagen. *Comment*:

sample treated with preservatives. These were extracted and lignin fraction was isolated and dated.

Jyderup Skov, Late Bronze age

Charcoal from ca. 8 m long, oblong pits below habitation layer at dwelling place in forest Jyderup Skov (55° 51′ N Lat, 11° 31′ E Long), NW Zealand. Layer contained bronze and ceramics from middle of Late Bronze age, Per. V (Thrane, 1971). Dates time when pits were used, and antedates habitation layer. Coll. 1970 and subm. by H. Thrane, Natl. Mus., Copenhagen.

2990 ± 100

K-1694. Jyderup Skov, XXXI, 29 cm **1040 B.C.**

Charcoal (*Quercus* sp.) 24 cm long, 4.5 cm wide, and 3 cm thick, in upright position, W side of Pit XXXI, 29.

2740 ± 100

K-1693. Jyderup Skov, XXXI, 29 cl **790 B.C.**

Charcoal (*Quercus* sp.) 38 cm long, 7 cm wide, and 3 cm thick, in horizontal position in same pit as K-1694.

2800 ± 100

K-1691. Jyderup Skov, II, 6q **850 B.C.**

Charcoal (*Quercus* sp.) from vertical branch or stick, Pit II 6.

2790 ± 100

K-1690. Jyderup Skov, II, 6p **840 B.C.**

Charcoal (*Quercus* sp.) from piece, 10 cm thick, lying horizontally in same pit as K-1691.

2750 ± 100

K-1692. Jyderup Skov, XXIX, 16 ab **800 B.C.**

Charcoal (*Quercus* sp.) 18 cm long, 7 cm wide, and 5 cm thick from Pit XXIX 16.

2580 ± 100

K-575. Bjergagergård, Late Bronze age, Per. VI **630 B.C.**

Charcoal (*Alnus* sp., *Quercus* sp., *Sorbus* sp., and *Betula* sp.) from pit below level field at Bjergagergård (55° 50′ N Lat, 9° 39′ E Long), Havrum, Jutland. Pit contained small circular stone with rock carving and potsherds from Late Bronze age, Per. VI (Glob, 1969). Coll. 1956 and subm. by P. V. Glob, Natl. Mus., Copenhagen.

2560 ± 100

K-1494. Døstrup, bow-ard **610 B.C.**

Wood (*Alnus* sp.) from Døstrup-ard (Glob, 1951, p. 36) from bog at Døstrup (56° 42′ N Lat, 9° 45′ E Long) N Jutland. Ard is with detachable, arrow-shaped share. Coll. 1884; subm. by A. Steensberg.

Grøntoft, Pre-Roman Iron age villages

Charcoal from complex of Iron age villages at Grøntoft (56° 10′ N Lat, 8° 35′ E Long), W Jutland. Several stages (named A, B, etc.)

of development of Iron age village were separated. Village and houses had been removed between different stages; 100 to 200 m between early stages and only very slightly between later stages. During later stages, village was surrounded by enclosures of varying extent, which helped separate different stages. Village consisted of 12 to 20 houses of which only post holes and wall furrows were left. Potsherds dated stages to various periods during Pre-Roman Iron age (Becker, 1965, 1968). Coll. 1961 to 1967 and subm. by C. J. Becker, Univ. Copenhagen.

2480 ± 100

K-1593. Grøntoft, E XVIII, 61b **530 B.C.**

Charcoal (*Quercus* sp.) from Post Hole 61b in House XVIII, Village E. Pre-Roman Iron age, Per. I/II.

2470 ± 100

K-1591. Grøntoft, E XII, 75 **520 B.C.**

Charcoal (*Alnus* sp.) from Post Hole 75 in House XII, Village E. Pre-Roman Iron age, Per. I/II.

2450 ± 100

K-1592. Grøntoft, E XII, 108 **500 B.C.**

Charcoal (*Quercus* sp.) from Pit 108 (a+b) in House XII, Village E. Pre-Roman Iron age, Per. I/II.

2390 ± 100

K-1625. Grøntoft, E V, 74b **440 B.C.**

Charcoal (*Quercus* sp.) from floor in House V, Village E. Pre-Roman Iron age, Per. I/II.

2300 ± 100

K-1590. Grøntoft, E VII **350 B.C.**

Charcoal (*Quercus* sp.) from N wall furrow in House VII, Village E. Pre-Roman Iron age, Per I/II.

2270 ± 100

K-1594. Grøntoft, E XXVI **320 B.C.**

Charcoal (*Quercus* sp.) from NE corner of House XXVI, Village E. Pre-Roman Iron age, Per. I/II.

2210 ± 100

K-1027. Grøntoft, B III (1) **260 B.C.**

Charcoal (*Corylus* avel.) from post hole in House III, Village B. Pre-Roman Iron age I.

2160 ± 100

K-1026. Grøntoft, B III (2) **210 B.C.**

Charcoal (*Alnus* sp.) from wall furrow in House III, Village B. Pre-Roman Iron age I.

2250 ± 100

K-1130. Grøntoft, A II, 1 **300 B.C.**

Charcoal (*Quercus* sp.) from Post Hole 1 in House II, Village A. Pre-Roman Iron age, Per. II. Date is average of 2 measurements: 2320 ± 100 and 2180 ± 100.

2160 ± 100

K-1132. Grøntoft, A III, W **210 B.C.**

Charcoal (*Quercus* sp.) from hearth in W part of House III, Village A. Pre-Roman Iron age, Per. II.

2140 ± 100

K-1129. Grøntoft, A I, 22 **190 B.C.**

Charcoal (*Quercus* sp.) from Post Hole 22 in House I, Village A. Pre-Roman age, Per. II.

2060 ± 100

K-1131. Grøntoft, A III, h **110 B.C.**

Charcoal (*Quercus* sp.) from hearth in House III, Village A. Pre-Roman Iron age, Per. II.

2050 ± 100

K-1133. Grøntoft, A **100 B.C.**

Charcoal (*Quercus* sp.) from Pit B 37 with potsherds in Village A. Pre-Roman Iron age, Per. II.

2400 ± 100

K-1185. Grøntoft, 338 **450 B.C.**

Charcoal (*Quercus* sp.) from Pit 338 assoc. with 6-fold row of posts crossing a grave field. Pit older than posts.

2240 ± 100

K-1186. Grøntoft, 292a **290 B.C.**

Charcoal (*Quercus* sp.) from Pit. 292a assoc. with 6-fold row of posts. Older than posts.

2210 ± 100

K-1184. Grøntoft, 438 **260 B.C.**

Charcoal (*Quercus* sp.) from Pit 438 assoc. with 6-fold row of posts. Younger than posts.

2180 ± 100

K-1187. Grøntoft, 453 **230 B.C.**

Charcoal (*Quercus* sp.) from Pit 453 assoc. with 6-fold row of posts. Younger than posts.

B. Greenland

4500 ± 110

K-1628. Gammel Nugdlit, Group I **2550 B.C.**

Bone (probably rib) of whale from house ruin on Paleo-Eskimo dwelling place "Gammel Nugdlit" at Nugdlit (76° 38′ N Lat, 70° 36′ W Long), Thule Dist., N Greenland. Oldest house ruins (Group I) are at ca. +11 m; a younger group of houses (Group II) ca. +8 m. Sample

from stone-lined ash pit in house ruin No. 13, Group I. Artifacts which include burins had similarities to those from Denbigh Flint Complex, but cannot be equated with any known Paleo-Eskimo culture. Coll. 1966 and subm. by E. Knuth, Natl. Mus., Copenhagen.

3620 ± 100

K-1537. Tuapagssuit, Sarqaq culture **1670 B.C.**

Charcoal (*Betula* sp. and *Salix* sp.) from fireplace on beach terrace (No. 4) +4 m at Paleo-Eskimo camp site at Tuapagssuit (64° 32′ N Lat, 51° 5′ W Long), Godthåb Dist., W Greenland. Campsite contained artifacts of Sarqaq culture. Fireplace was under 5 cm thick vegetational cover. Coll. 1968 and subm. by H. C. Gulløv, Natl. Mus., Copenhagen. Date is average of 2 measurements: 3600 ± 120 and 3640 ± 120.

Engnaes, Independence II culture

Samples of local plant material from Paleo-Eskimo ruins at Engnaes (82° 16′ N Lat, 35° 43′ W Long) at W end of Lakes Midsommer Søerne, Peary Land, N Greenland. Ruins contained artifacts of Independence II culture (Knuth, 1968). Coll. 1968 and subm. by E. Knuth. *Comment*: date for K-1522 agrees well with previous date for Independence II culture (K-1059, R., 1968, v. 10, p. 295-327), also made on local plant material.

3080 ± 100

K-1544. Engnaes, Ruin 1 **1130 B.C.**

Charcoal (*Salix* sp.) coll. in and around central hearth in Ruin 1. Date is average of 2 measurements: 3060 ± 100 and 3100 ± 100.

2610 ± 100

K-1522. Engnaes, Ruin 5 **660 B.C.**

Charcoal (*Salix* sp.) coll. in and around hearth in open air cooking place, Ruin 5. Many bones of trout found in hearth.

Nugdlit, Thule culture

Samples from house ruins on large Eskimo dwelling place representing early Thule culture at Nugdlit (76° 47′ N Lat, 70° 20′ W Long), Thule Dist., W Greenland. Dates arrival of early Thule culture to Greenland. Finds show close connection with early Thule culture in Alaska and Canada (Holtved, 1954). Coll. 1947 by E. Holtved; subm. by J. Meldgaard, Natl. Mus., Copenhagen. *Comment*: dates for different materials (tusk and wood) from same house ruin agree very well. Dates are older than expected.

1040 ± 100

K-1078. Nugdlit 29(A) **A.D. 910**

Tusk of walrus from house ruin No. 29 on Nugdlit dwelling place. Early Thule culture.

1020 ± 100

K-1099. Nugdlit 29(B) **A.D. 930**

Wood (*Pinus* sp.) from house ruin No. 29 (same ruin as K-1078) on Nugdlit dwelling place. Early Thule culture.

1010 ± 100

K-1080. Nugdlit 4(A) **A.D. 940**

Tusk of walrus from house ruin No. 4 on Nugdlit dwelling place. Early Thule culture.

1040 ± 100

K-1100. Nugdlit 4(B) **A.D. 910**

Wood (*Salix* sp.) from house ruin No. 4 (same ruin as K-1080) on Nugdlit dwelling place. Early Thule culture.

Ruin Island, Thule culture

Samples from Eskimo house ruins on Ruin I. (78° 50′ N Lat, 69° 15′ W Long), Thule Dist., N Greenland. Houses contained artifacts from late Nugdlit phase of Thule culture. House 6 also contained objects of Norse origin (Holtved, 1944, p. 74-78), these probably originate from later visit by Norse people. Coll. 1936 by E. Holtved; subm. by J. Meldgaard. *Comment*: samples of walrus tusk and wood may have been treated superficially with glycerine and phenol. Possible preservatives were extracted before dating. Eskimos tend to re-use artifacts. Dates (K-1487 and K-1488) suggest this occurrence at Ruin I.

1120 ± 100

K-1487. Ruin Island, R-1 **A.D. 830**

Tusk of walrus from quiver handle (L.3.2494) from floor in house ruin No. 4.

930 ± 100

K-1505. Ruin Island, R-1a **A.D. 1020**

Wood (*Picea* sp.) from fire drill (L.3.2495), from floor in house ruin No. 4.

1150 ± 100

K-1488. Ruin Island, R-2 **A.D. 800**

Walrus tusk, fragment with perforations (L.3.2599), from floor in house ruin No. 6.

880 ± 100

K-1506. Ruin Island, R-2a **A.D. 1070**

Wood (*Picea* sp.) from lamp trimmer (L.3.2583) from floor in house ruin No. 6. Date is average of 2 measurements: 850 ± 100 and 900 ± 100.

680 ± 100

K-1489. Ruin Island, R-3 **A.D. 1270**

Woolen cloth of Norse origin from floor in house ruin No. 6. *Comment*: not known if cloth was treated with preservatives, but it looked slightly greasy under microscope. Sample extracted several times with ether and acetone to remove possible preservatives.

730 ± 100

K-1449. Kølnaes, 6 **A.D. 1220**

Wood (*Quercus* sp.) from lock piece with 3 perforations used as part of umiaq (whale hunting boat) from Kølnaes (82° 40′ N Lat, 20° 65′ W Long), Herlufholms Strand, Peary Land, N Greenland. The umiaq has previously been dated on baleen to 460 ± 100 (K-566, R., 1960, v. 2, p. 5-11). Oak of Norse origin found in Inglefield Land by Holtved (1944). Submitter suggested that Eskimos acquired oak here passing through Smith Sound to Peary Land. Coll. 1949 and subm. by E. Knuth. *Comment*: date agrees with suggestion (cf. K-1489, Ruin I.).

C. Alaska

13,070 ± 280

K-1327. Trail Creek, Cave 9, Bison **11,120 B.C.**

Organic fraction of *calcaneus sinistra* of Bison found outside S entrance to Cave 9, Trail Creek (65° 48′ N Lat, 163° 13′ W Long), Alaska. Heel bone was apparently worked by man (Larsen, 1968). Found with scapula of horse dated as K-1210 (R., 1968, v. 10, p. 295-327). Coll. 1950 and subm. by H. Larsen, Natl. Mus., Copenhagen.

9570 ± 150

K-1583. Onion Portage, Akmak culture **7620 B.C.**

Organic fraction of scapula and bone fragments of Caribou found at Onion Portage (67° 6′ N Lat, 158° 15′ W Long), Alaska. A 3 m thick deposit with several stratified habitation layers discovered in gully. Sample from base of deposit below Band 8, supposedly contemporary with artifacts of Akmak culture (Andersson, 1970). Coll. 1966 and subm. by D. D. Anderson, Brown Univ., Rhode Island, U.S.A.

D. Poland

3880 ± 100

K-1836. Kesocha, Early Corded Ware culture **1930 B.C.**

Charcoal (*Pinus* sp.) from 0.9 m high mound at Kesocha (53° 8′ N Lat, 20° 36′ E Long), Warsaw prov., Poland. From lower parts of grave pit in mound. Base of pit 150 cm below ancient surface. Grave contained 3 pots, with a beaker similar to Glob Type C (Glob, 1945), Early Corded Ware culture. Coll. 1969 and subm. by A. W. Kempisty, Univ. Warsaw. Date is average of 2 measurements: 3970 ± 100 and 3780 ± 100.

3960 ± 100

K-1837. Miernow, Early Corded Ware culture **2010 B.C.**

Charcoal (*Quercus* sp.) from Barrow II at Miernow (50° 21′ N Lat, 20° 34′ E Long), Kielce prov., Poland. From various places below skeleton in lower part of grave pit No. 2 in mound. Pit contained stone axe, small cup, and bone-awl, Early Corded Ware culture. Coll. 1963 and subm. by A. W. Kempisty.

3450 ± 100

K-1838. Miernow, Bronze age **1500 B.C.**

Wood (*Quercus* sp.) from Barrow II at Miernow (50° 21′ N Lat, 20° 34′ E Long), Kielce prov., Poland. Rotten timber from timber construction covering pit in mound. Pit contained vessel of Trzciniec culture. Coll. 1963 and subm. by A. W. Kempisty.

E. Syria

Tall Sukas, Chalcolithic period to Iron age

Samples from city mound at Tall Sukas (35° 43′ N Lat, 35° 55′ E Long), Syria, excavated by Carlsberg Expedition to Phoenicia, 1958 to 1963. Samples from layers representing Chalcolithic period to Iron age. Excavation area was divided into 10 m squares; samples originate from Sq. G 11 (Riis, 1970). Coll. 1958 to 1960, subm. by P. J. Riis, Univ. Copenhagen.

5910 ± 100

K-936. Tall Sukas, 14 **3960 B.C.**

Charcoal (*Quercus* sp.) from Layer 58, Chalcolithic period. Date is average of 2 measurements: 5960 ± 120 and 5870 ± 120.

4450 ± 120

K-713. Tall Sukas, 13 **2500 B.C.**

Charred grains from Layer 48, Early Bronze Age I.

4290 ± 120

K-1124. Tall Sukas, 19 n **2340 B.C.**

Charcoal (*Olea europaea*) from Layer 39, Early Bronze age.

4220 ± 120

K-1128. Tall Sukas, 33 **2270 B.C.**

Charcoal (*Olea europaea*) from Layer 39, Early Bronze age.

4250 ± 120

K-1127. Tall Sukas, 32 **2300 B.C.**

Charcoal (*Olea europaea*) from Layer 38, Early Bronze age.

4260 ± 120

K-1126. Tall Sukas, 18, 2 **2310 B.C.**

Charcoal (*Olea europaea*) from Layer 38, Early Bronze age.

4320 ± 120

K-1125. Tall Sukas, 15 **2370 B.C.**

Charcoal (*Arbutus* sp.) from Layer 35, Early Bronze age.

4270 ± 120

K-1123. Tall Sukas, 13 c **2320 B.C.**

Charcoal (*Quercus* sp.) from Layer 33, Early Bronze age.

4210 ± 120
K-714. Tall Sukas, 7 **2260 B.C.**
Charcoal from Layer 27, Early Bronze age III.

3090 ± 100
K-937. Tall Sukas, 4 **1140 B.C.**
Charcoal (*Ostrya carpinifolia*) from Layer 7, Iron age. Date is average of 2 measurements: 3060 ± 110 and 3130 ± 110.

3660 ± 110
K-935. Tall Daruk, Middle Bronze age **1710 B.C.**
Charcoal (*Quercus* sp.) from mound at Tall Daruk (35° 41′ N Lat, 35° 56′ E Long), Syria. From sounding in mound, S and center ÷920/925, Layer 32, Middle Bronze age. Dated for comparison with corresponding layers at Tall Sukas (Riis, 1970). Coll. 1959 and subm. by P. J. Riis.

F. Thailand

Bang site, Neolithic Ban Kao culture

Charcoal from Neolithic site at Ban Kao (13° 57′ N Lat, 99° 20′ E Long), Kanchanaburi prov., Thailand. Bang site covers ca. 8000 m² of which ca. 400 m² was excavated. Situated on river terrace between R. Kwai and tributary river. Habitation layer was without clear stratification. It contained huge amounts of stone, bone implements, and ceramics. Many burials belonging to culture were embedded in habitation layer. Graves were separated into Group I (early subphase) and Group II (late subphase) (Sørensen, 1967). Coll. 1961 to 1962 and subm. by Per Sørensen, Natl. Mus., Copenhagen.

3720 ± 140
K-838. Bang site, 1 **1770 B.C.**
Charcoal from base of habitation layer, Field Ea, found with Neolithic ceramics. Earliest phase at locality.

3310 ± 140
K-842. Bang site, 3 **1360 B.C.**
Charcoal from undisturbed part of habitation layer, found with many Neolithic artifacts.

3520 ± 120
K-1088. Bang site, 6 **1570 B.C.**
Charcoal (*Dicotyledones*) from habitation layer. Directly above graves of Group II.

3440 ± 120
K-1089. Bang site, 7 **1490 B.C.**
Charcoal (*Dicotyledones*) from habitation layer. Directly above graves of Group I.

3290 ± 120

K-1090. Bang site, 8 **1340 B.C.**

Charcoal (*Dicotyledones*) from habitation layer. Directly above graves of Group I.

3280 ± 120

K-1087. Bang site, 5 **1330 B.C.**

Charcoal (*Dicotyledones*) from habitation layer. Directly above graves of Group II.

3260 ± 120

K-1091. Bang site, 9 **1310 B.C.**

Charcoal (*Dicotyledones*) from part of habitation layer with graves of Group II.

3250 ± 120

K-1092. Bang site, 10 **1300 B.C.**

Charcoal (*Dicotyledones*) from habitation layer. Directly above graves of Group II.

4370 ± 100

K-1474. Lue Site I, Neolithic Ban Kao culture **2420 B.C.**

Charcoal (*Xylia dolabriformis*) from Lue site (13° 57′ N Lat, 99° 20′ E Long), Kanchanaburi prov., Thailand. From dwelling place on small island in tributary river to R. Kwai. Habitation layer, ca. 1 m thick, contained Neolithic artifacts from a single phase which typologically is younger than late subphase at Bang site (this list). Charcoal ca. 1 m below base of habitation layer. Supposed to be the charred pointed base of post from house. Coll. 1962 and subm. by Per Sørensen. *Comment*: date older than expected. Suggests that sample is unrelated to cultural deposit.

Tham Ongbah, Mesolithic and Metal age

Charcoal from cultural deposits in cave at Tham Ongbah (15° 3′ N Lat, 98° 54′ E Long), Kanchanaburi prov., Thailand. Cave, ca. 98 m total length, had a N entrance and W entrance, and the following rooms: Hall I, Hall II, Gallery with stalactites, Hall III, and Hall IV. Layers in cave were stratified. Cultural deposits range from Mesolithic to Early Metal age. Coll. 1965 and subm. by Per Sørensen. *Comment*: K-1298 and K-1299 older than expected. Dates suggest apparently undisturbed layers in Hall 4 were mixed, possibly because of repeated burying in this part of cave.

11,180 ± 180

K-1366. Tham Ongbah, XII, e **9230 B.C.**

Charcoal from lower part of Layer III, which was resting on sterile layer, 7 to 8 m from N entrance in Hall I, Sec. B-D. Dates earliest occupation of cave.

10,760 ± 170

K-1340. Tham Ongbah, XI, a **8810 B.C.**

Charcoal from Layer III, 8 to 9 m from N entrance in Hall I, Sec. B-D. Layer contained bones and Mesolithic implements of Hoabinhian culture.

9970 ± 150

K-1365. Tham Ongbah, XII, d **8020 B.C.**

Charcoal from upper part of Layer III, 8 to 9 m from N entrance in Hall I, Sec. B-D.

10,010 ± 150

K-1364. Tham Ongbah, XII, c **8060 B.C.**

Charcoal from lower part of Layer II, separated from lowermost Layer III by 8 cm sterile layer, 8 to 9 m from N entrance in Hall I, Sec. B-D. Layer contained Mesolithic implements of Hoabinhian culture.

10,090 ± 160

K-1363. Tham Ongbah, XII, b **8140 B.C.**

Charcoal from upper part of Layer II, 8 to 9 m from N entrance in Hall I, Sec. B-D.

9750 ± 150

K-1341. Tham Ongbah, XI, b **7800 B.C.**

Charcoal from Layer II, 8 to 9 m from N entrance in Hall I, Sec. B-D.

9350 ± 140

K-1362. Tham Ongbah, XII, a **7400 B.C.**

Charcoal from lower part of Layer I, separated from Layer II by sterile layer, 7 to 8 m from N entrance in Hall I. Layer contained Mesolithic implements of Hoabinhian culture.

4240 ± 100

K-1298. Tham Ongbah, I, a **2290 B.C.**

Charcoal (*Monocotyledones*) from Layer 2 at S wall in Hall 4. Layer contained burials of late Metal age. Supposed age ca. 200 B.C., cf. K-1300.

3960 ± 100

K-1299. Tham Ongbah, I, c **2010 B.C.**

Charcoal (*Monocotyledones*) from Layer 5 at S wall in Hall 4. Layer contained traces of bronze. Supposed age ca. 200 B.C. cf. K-1300.

2180 ± 100

K-1300. Tham Ongbah, X, 2 **230 B.C.**

Charcoal (*Dalbergia* sp.) from partly burned wooden coffin under undisturbed layers in Gallery. Parallel to boat-shaped coffins from Szechwan prov. in SW China.

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