[RADIOCARBON, VOL. 18, NO. 3, 1976, P. 290-320]

UNIVERSITY OF LUND RADIOCARBON DATES IX

SÖREN HÅKANSSON

Radiocarbon Dating Laboratory, Department of Quaternary Geology
University of Lund, Sweden

INTRODUCTION

Most of the ^{14}C measurements reported here were made between October 1974 and October 1975. Equipment, measurement, and treatment of samples are the same as reported previously (R, 1968, v 10, p 36-37) except for bone samples (see below).

Age calculations are based on a contemporary value equal to 0.950 of the activity of NBS oxalic acid standard and on the conventional half-life for ^{14}C of 5568 yr. Results are reported in years before 1950 (years BP), and in the AD/BC system. Errors quoted ($\pm 1\sigma$) include standard deviations of count rates for the unknown sample, contemporary standard, and background.

Corrections for deviations from $\delta^{13}C = -25.0‰$ in the PDB scale are applied for all samples; also for marine shells, because apparent age of recent marine shells is not always just counterbalanced by the effect of isotopic fractionation (*cf*, Recent marine shells series, R, 1973, v 15, p 506-507). $\delta^{13}C$ values quoted are relative to the PDB standard.

The remark, "undersized; diluted", in *Comments* means the sample did not produce enough CO_2 to fill the counter to normal pressure and "dead" CO_2 from anthracite was introduced to make up the pressure. "% sample" indicates amount of CO_2 derived from the sample present in the diluted counting gas; the rest is "dead" CO_2.

Collagen extraction method has been changed and treatment of bone samples are now in short as follows: removal of superficial contamination by mechanical cleaning, followed in some cases by ultrasonic washing, drying at 110°C, crushing or grinding to a size < 0.5mm, hydrolysis and removal of all bone carbonate with 0.8N HCl at room temperature under reduced pressure, washing to neutral, removal of humic material by leaching insoluble residue (mostly collagen) with 0.5% NaOH at room temperature for 18 to 20 hours, washing to neutral and adjusting pH with HCl to ca 3.0 in 250 to 500ml of water, transformation of collagen to gelatine by heating (with pH kept at ca 3.0) in a warming cupboard (ca 90°C) and leaving it there for about 24 hours with occasional stirring and control of pH, separation of gelatine from insoluble impurities by centrifugation, evaporation and drying. NaOH treatment is left out for bone samples without obvious signs of humus contamination, since main part of such contamination remains insoluble at a pH of 3.0. Organic carbon content reported for bone samples is calculated from yield of CO_2 by combustion of collagen remaining after treatment. Organic carbon lost during treatment is not included in calculated percentage.

The description of each sample is based on information provided by the submitter.

ACKNOWLEDGMENTS

The author thanks Kerstin Lundahl for sample preparation and routine operation of the dating equipment, and R Ryhage and his staff at the mass-spectrometric laboratory of Karolinska Inst, Stockholm, for the ^{13}C analyses.

SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

A. Sweden

Mammoth tusk series

Four mammoth tusks from different parts of S and W Sweden were dated. Closer scrutiny of find stratigraphy, description of laboratory treatment, and evaluation of dates will be pub elsewhere (Berglund *et al*, ms in preparation).

Lu-746. Örsjö mammoth 1972 (1) **31,200 $^{+3050}_{-2650}$ BC**
$\delta^{13}C = -20.0‰$

Collagen from ill-preserved material of mammoth tusk fragment from gravel pit at Örsjö, ca 2km E of Skurup, S Scania (55° 28′ 20″ N, 13° 32′ 20″ E). Coll 1972 by H Månsson; subm by E Lagerlund, Dept Quaternary Geol, Univ Lund. *Comment*: organic carbon content: 1%. Sample undersized; diluted; 40% sample. (4 1-day counts.)

Lu-880. Örsjö mammoth 1972 (2) **36,100 $^{+2000}_{-1600}$ BC**
$\delta^{13}C = -19.7‰$

Collagen from well-preserved material from same mammoth tusk fragment as Lu-746 above. *Comment*: organic carbon content: 4.75%. Not diluted. (3 1-day counts.)

Lu-796. Lockarp mammoth 1939 (1) **13,360 ± 95 BC**
$\delta^{13}C = -20.0‰$

Collagen from very well-preserved material from inner part of mammoth tusk from gravel pit at Lockarp, S of Malmö, SW Scania (55° 32′ 40″ N, 13° 03′ E). Coll 1939 by F Hansen; subm by B E Berglund, Dept Quaternary Geol, Univ Lund. Tusk described by Persson (1961, p 254-261). *Comment*: tusk surface was coated with shellac soon after collection. Analysis of extracted collagen with pyrolysis gas chromatography (PGC) showed complete absence of shellac contamination. The PGC analysis employed is described by Ericsson (1975). Organic carbon content: 8.7%. Not diluted. (2 2-day counts.)

13,090 ± 120
Lu-796:2. Lockarp mammoth 1939 (2) 11,140 BC
$\delta^{13}C = -20.0‰$

Collagen from same extraction as Lu-796 but treated with alcohol for removal of shellac. *Comment*: organic carbon content: 8.7%. Diluted; 90% sample. (3 1-day counts.)

13,260 ± 110
Lu-865. Lockarp mammoth 1939 (3) 11,310 BC
$\delta^{13}C = -20.0‰$

Collagen from well-preserved material from outer part of same tusk as Lu-796. *Comment*: collagen extracted by the Longin method (1971). Organic carbon content: 7.3%. Not diluted. (3 1-day counts.)

+900
22,000
−800
Lu-887. Arrie mammoth 1934 (1) 20,050 BC
$\delta^{13}C = -18.7‰$

Collagen from fairly well-preserved material from inner part of mammoth tusk fragment from gravel pit at Risebjär, Arrie, SW Scania (55° 31′ 15″ N, 13° 06′ 10″ E). Coll 1934; subm by B E Berglund. Find described by Persson (1961, p 261-262). *Comment*: extraction of preservatives had to be interrupted prematurely due to partial dissolution of collagen. Therefore date must be regarded as minimum for tusk. Diluted; 25% sample. (2 2-day counts.)

19,150 ± 390
Lu-887:E. Arrie mammoth 1934 (2) 17,200 BC
$\delta^{13}C = -18.7‰$

Alcohol extract from Lu-887 containing dissolved collagen to unknown extent. *Comment*: diluted; 67% sample. Date unreliable due to presence of preservatives.

21,040 ± 200
Lu-795. Dösebacka mammoth 1931 (1) 19,090 BC
$\delta^{13}C = -21.3‰$

Collagen from fairly well-preserved material from inner part of mammoth tusk fragment from gravel pit at Dösebacka, Göta R valley, Bohuslän, W Sweden (57° 54′ 41″ N, 12° 02′ 41″ E). Coll 1931; subm by Åke Hillefors, Dept Phys Geog, Univ Lund. Facts about find and detailed descriptions of stratigraphy at Dösebacka given by submitter (Hillefors, 1961, p 90-91; 1969, p 40-52, Fig 24, lower part, p 71-74 & 76-77; 1974, p 364 & 373). *Comment*: organic-carbon content: 5.2%. No alcohol treatment since material was taken from inner part of tusk. Later test on rest of collagen with PGC analysis revealed considerable contamination with shellac from original preservation. Date is much too young (*cf* Lu-879 below).

Lu-879. Dösebacka mammoth 1931 (2) **$+1550$ / 36,000 / -1300 34,050 BC**
$\delta^{13}C = -20.6‰$

Collagen from inner part of same mammoth tusk fragment as Lu-795. *Comment*: dried collagen was crushed to < 0.3mm and treated repeatedly with absolute alcohol at ca 40°C for 3 days for removal of shellac. Collagen was then dissolved in de-ionized water and remaining alcohol removed by evaporation. PGC analysis on collagen indicated that contamination with shellac was now < 0.4%, which means that date is < 3450 yr too young. Organic carbon content: 3.7%. Diluted; 93% sample. (4 1-day counts.)

Southern Baltic, pine stump series

Wood from pine stumps, id by T Bartholin, dredged by fishermen from bottom of S Baltic Sea at water depths 49 to 52m ENE of Stenshuvud. Coll 1973 by H Berntsson, Hällevik; subm by B E Berglund. Pretreated with HCl and NaOH.

Lu-890. Southern Baltic 4 **9420 ± 95 / 7470 BC**
$\delta^{13}C = -24.4‰$

Wood from large pine stump coll at 52m depth (55° 43′ N, 14° 28′ E).

Lu-891. Southern Baltic 5 **9520 ± 95 / 7570 BC**
$\delta^{13}C = -25.0‰$

Wood from pine stump coll at 49m depth (55° 42′ N, 14° 24′ E).

Lu-892. Southern Baltic 6 **9620 ± 95 / 7670 BC**
$\delta^{13}C = -25.8‰$

Wood from pine stump. Same depth and position as Lu-891.

General Comment: dates agree well with previous dates for similar stumps from same area (*cf* R, 1972, v 14, p 386; 1974, v 16, p 310-311).

Hallarumsviken series

Sediment from Hallarumsviken, a bay of S Baltic Sea, E Blekinge (56° 08′ N, 15° 48′ E). Samples are from 3m core taken with Mackereth sampler, 55mm diam, to date pollen-analytic and paleomagnetic sequence. Coll 1972 and subm by B E Berglund. Water depth 5m and distance to nearest shore ca 300m. Depths refer to water surface. Pollen zones refer to Nilsson (1961) and Berglund (1966). Sediment is brackish clayey gyttja and clay gyttja (Lu-1045). Pretreated with HCl. All samples undersized; diluted. Amount of CO_2 from sample is given in *Comments* below as "% sample".

Lu-1045. Hallarumsviken 1, 770 to 775cm **6650 ± 75**
4700 BC
$\delta^{13}C = -21.2‰$

Pollen Zone AT. *Comment*: 95% sample.

Lu-1046. Hallarumsviken 2, 710 to 715cm **4160 ± 65**
2210 BC
$\delta^{13}C = -19.4‰$

Pollen Zone SB 1. Decreased clay content and increased deposition rate above this level. *Comment*: 91% sample.

Lu-1047. Hallarumsviken 3, 645 to 650cm **2490 ± 70**
540 BC
$\delta^{13}C = -17.6‰$

Pollen Zone SA 1. *Comment*: 67% sample.

Lu-1048. Hallarumsviken 4, 570 to 575cm **1880 ± 75**
AD 70
$\delta^{13}C = -18.0‰$

Pollen Zone SA 1 (upper part). Sediment disturbed above this level. *Comment*: 54% sample.

General Comment (BEB): dates confirm pollen-analytic zoning and correlation to limnic sequence on land.

Tomtabacken series (II)

Sediment from Åkerhultagöl, a mire pool 1km SW of Tomtabacken, highest hill of South Swedish Upland (59° 29′ N, 14° 28′ E). Samples are from core taken with Livingstone sampler, 100mm diam. Site and main series described earlier (R, 1975, v 17, p 178-180). Coll 1973 and subm by B E Berglund. Depths refer to surface of mire. Pretreated with HCl.

Lu-1089. Tomtabacken 13, 500 to 502cm **10,580 ± 115**
8630 BC
$\delta^{13}C = -23.1‰$

Clay gyttja. Middle of Younger Dryas zone. *Comment*: undersized; diluted; 71% sample. (3 1-day counts.)

Lu-1090. Tomtabacken 14, 498 to 500cm **10,500 ± 130**
8550 BC
$\delta^{13}C = -22.9‰$

Clay gyttja. Middle of Younger Dryas zone. *Comment*: undersized; diluted; 70% sample.

Subfossil polar bear series

Subfossil bones of *Ursus maritimus* Phipps from the Swedish West Coast were studied paleoecologically and chronologically (Berglund *et al*, ms in preparation). One find, Kullaberg, Scania, was dated earlier (R, 1974, v 16, p 311; Lu-660, 12,710 ± 125; Lu-661, 12,740 ± 170, Lu-602, 12,580 ± 100). All finds subm by B E Berglund. Collagen extracted by new method (see introduction to this date list).

Lu-1076. Östra Karup, Scania

12,490 ± 105
10,540 BC
$\delta^{13}C = -14.1‰$

Collagen from ulna in beach gravel at +15m at Östra Karup, Båstad, Scania (56° 25′ N, 12° 57′ E). Coll 1925 by V Ewald. *Comments*: organic carbon content: 7%. (BEB): date corresponds well to dates of the Kullaberg find.

Lu-1074. Nedre Kuröd, Bohuslän

10,620 ± 105
8670 BC
$\delta^{13}C = -13.6‰$

Collagen from proximal fragment of rib from shell deposit at Nedre Kuröd, Uddevalla (58° 21′ N, 11° 59′ E). Coll 1952. *Comment*: organic carbon content: 7.5%.

Lu-1075. Kuröd, Bohuslän

10,430 ± 100
8480 BC
$\delta^{13}C = -14.1‰$

Collagen from distal epiphysis of femur from shell deposit at Kuröd, Uddevalla (58° 20′ N, 11° 59′ E). Coll 1931. *Comments*: organic carbon content: 6.4%. (BEB): date corresponds quite well to Lu-1074 above.

General Comment: no corrections are made for apparent age of bones of living polar bears (R, 1974, v 16, p 311-312). For apparent age of Late Weichselian polar bears on the Swedish West Coast, see Berglund *et al* (above).

Marine shells series

Marine subfossil shells from various parts of W Sweden. Coll 1974-75 and subm by Åke Hillefors. Dated as part of study of deglaciation of this area (Hillefors, 1975).

Lu-967:1. Torrekulla, *Hiatella*

12,450 ± 120
10,500 BC
$\delta^{13}C = +0.3‰$

Shells (*Hiatella arctica*) from brown glacial-marine clay at Torrekulla, Mölndal (57° 37′ 24″ N, 12° 02′ 35″ E). Alt ca 10m. *Comment*: outer 60% of shells removed by acid leaching.

Lu-967:2. Torrekulla, *Balanus*

12,350 ± 120
10,400 BC
$\delta^{13}C = +0.1‰$

Shells (*Balanus hammeri*) from same locality as Lu-967:1. *Comment*: outer 66% removed by acid leaching.

Lu-931. Mölndal

12,500 ± 120
10,550 BC
$\delta^{13}C = +0.1‰$

Large shells (*Balanus hammeri*) from shell accumulation a few m E of position for Lu-967:1 at Torrekulla, Mölndal. *Comment*: outer 39% removed by acid leaching. Only 3 shells used for dating.

Lu-968. Romesjö **11,400 ± 110**
9450 BC
$\delta^{13}C = -0.5‰$

Shells (*Balanus* sp) and shell fragments (*Mytilus* sp) from indistinctly varved, brown-gray glacial-marine clay, probably 1 to 2m above glaciofluvial sand and gravel in glaciofluvial accumulation at Lake Romesjö (57° 56′ 35″ N, 12° 01′ 15″ E), described by Björsjö (1949, p 222-226, Fig 57). *Comment*: outer 50% removed by acid leaching.

Lu-1042. Vinberg **13,410 ± 120**
11,460 BC
$\delta^{13}C = +0.7‰$

Shells (*Hiatella arctica*) from varved glacial-marine clay, ca 1.5m thick, underlain by glaciofluvial sand and overlain successively by marine sand, deflation horizon, and eolian sand, at Vinberg, 5km NE of Falkenberg (56° 56′ 30″ N, 12° 32′ 30″ E). Alt ca 21m. *Comment*: outer 50% removed by acid leaching.

Lu-1043. Lingome **12,490 ± 175**
10,540 BC
$\delta^{13}C = -0.3‰$

Shells and shell fragments (*Macoma* cf *calcarea, Hiatella arctica, Balanus* sp, and *Mytilus* sp) from marine clay, overlain by material derived from adjacent drumlin by wave action, at Lingomehöjden, 500m E of pt 55.8, Värö, N Halland (57° 15′ 55″ N, 12° 09′ 15″ E). Alt ca 38m. *Comment*: outer 27% removed by acid leaching. Undersized; diluted; 49% sample. (3 1-day counts.)

Lu-1105. Dalen, Orust, *Balanus* **12,530 ± 120**
10,580 BC
$\delta^{13}C = -0.1‰$

Shells (*Balanus* cf *balanus*) from shell accumulation, ca 30cm thick, underlain successively by ca 20cm gray, nonvarved glacial-marine clay, glaciofluvial sand, and bedrock, at Dalen, Storehamn, Orust (58° 08′ 40″ N, 11° 30′ 40″ E). Alt ca 90m. *Comment*: outer 65% removed by acid leaching.

Lu-1106. Dalen, Orust, *Mytilus* **12,470 ± 120**
10,520 BC
$\delta^{13}C = +0.1‰$

Shell fragments (*Mytilus* sp) from same shell accumulation as Lu-1105. *Comment*: outer 19% removed by acid leaching.

Lu-1108. Svedaskogen, *Balanus* **13,150 ± 130**
11,200 BC
$\delta^{13}C = \pm 0.0‰$

Shells (*Balanus* cf *balanoides*) from below ca 5m wave-washed sand and gravel at Svedaskogen, ca 3km N of Fjärås church (57° 28′ 45″ N, 12° 10′ 30″ E). Alt ca 50m. *Comment*: outer 40% removed by acid leaching.

Lu-1107. Fjärås, *Balanus* **12,980 ± 125**
11,030 BC
$\delta^{13}C = -0.1‰$

Shells (*Balanus* spp; mainly probably *B balanoides*) from sand in gravel pit ca 600m N of Fjärås church (57° 27′ 35″ N, 12° 11′ 10″ E). Alt ca 55m. *Comment*: outer 62% removed by acid leaching.

Lu-1115:1. Fjärås Bräcka, *Mytilus*, inner fraction **13,170 ± 125**
11,220 BC
$\delta^{13}C = -1.0‰$

Shells (*Mytilus edulis*) from varved glacial-marine clay underlain by glaciofluvial material and overlain by wave-washed gravel in ice-border moraine at Fjärås Bräcka (57° 25′ 40″ N, 12° 13′ E). *Comment*: inner fraction (48% of shells) was used.

Lu-1115:2. Fjärås Bräcka, *Mytilus*, outer fraction **13,050 ± 125**
11,100 BC
$\delta^{13}C = -1.2‰$

Outer fraction of shells used for Lu-1115:1. *Comment*: outer fraction formed 40% of shells; outermost 12% removed by acid leaching.

Lu-1041. Ö Öresjön **4960 ± 65**
3010 BC
$\delta^{13}C = -24.5‰$

Wood from submerged stump (*Pinus* sp) id by T Bartholin from extensive stump layer NE of Öresund in Lake Ö Öresjön (57° 26′ 40″ N, 12° 45′ 50″ E). Coll 1974 and subm by Å Hillefors. Pretreated with HCl and NaOH.

Lauralompolo series

Dy with varying amount of minerogenic matter from tarn near Rd 98, 600m SE of Lauralompolo, Torne Lappmark, N Sweden (67° 04′ N, 21° 07′ E). Alt ca 300m. Coll 1974 by W Karlén; subm by M Sonesson, Dept Plant Ecol, Univ Lund. Dated as part of study on late-glacial vegetational development in area. *Comment*: due to risk of contamination by graphite main part of organic matter was extracted with 5% NaOH solution at 80°C (2 days) after mild HCl pretreatment. Acid-precipitated part of this extract was used for dating. Insoluble residues were combined and dated together. All samples undersized; diluted. Amount of CO_2 from sample is given in *Comments* below as "% sample".

Lu-1001A. Lauralompolo, F:2, 0 to 4cm **8430 ± 130**
6480 BC
$\delta^{13}C = -29.6‰$

Acid-precipitated part of NaOH-soluble fraction from 0 to 4cm above mineral substratum in Core F:2. *Comment*: 55% sample.

Lu-1002A. Lauralompolo, F:4, 0 to 6cm **7770 ± 145**
5820 BC
$\delta^{13}C = -29.6‰$

Acid-precipitated part of NaOH-soluble fraction from 0 to 6cm above mineral substratum in Core F:4. *Comment*: 36% sample.

Lu-1003A. Lauralompolo, F:5, 0 to 6cm **8080 ± 100**
6130 BC
$\delta^{13}C = -30.2‰$

Acid-precipitated part of NaOH-soluble fraction from 0 to 6cm above mineral substratum in Core F:5. *Comment*: 79% sample.

Lu-1000. Lauralompolo, F:2, F:4, F:5 **8450 ± 95**
6500 BC
$\delta^{13}C = -31.1‰$

Insoluble residue from preceding 3 samples. *Comment*: 87% sample.

Lu-1049. Nakervare 7 **6300 ± 85**
4350 BC
$\delta^{13}C = -28.5‰$

Gyttja from Pollen Zone Boundary T2/T3 ca 2.5cm below silt layer in core from tarn at Nakervare, Torne Lappmark, N Sweden (68° 10′ N, 19° 35′ E). Alt ca 620cm. Coll 1974 by W Karlén; subm by M Sonesson. *Comment*: acid-precipitated part of NaOH-soluble fraction (ca 80% of total organic matter) used for dating. Extracted with 5% NaOH at 80°C (4 days) and 110°C (1 day). Diluted; 77% sample.

Flarken series

Sediment from Lake Flarken, Västergötland, central Sweden (58° 33′ N, 13° 41′ E). Alt 108m; area 0.2 sq km; max depth 1m. Coll 1974 and subm by G Digerfeldt, Dept Quaternary Geol, Univ Lund. Dating is part of study of Flandrian development of lake and vegetational history of surrounding region. Samples come from profile in central part of lake (Livingstone sampler, diam 100mm). Dated samples represent pollen-zone boundaries and characteristic horizons in pollen sequence. Water depth 90cm at sampling point. Depths given are below water surface. All samples pretreated with HCl.

Lu-1029. Flarken, 655 to 660cm **10,330 ± 100**
8380 BC
$\delta^{13}C = -16.7‰$

Clayey algae gyttja. At max of *Juniperus* and *Empetrum*.

Lu-1083. Flarken, 625 to 630cm **9720 ± 95**
7770 BC
$\delta^{13}C = -20.5‰$

Clayey algae gyttja. At rational *Corylus* limit.

Lu-1030. Flarken, 605 to 610cm **8960 ± 90**
7010 BC
$\delta^{13}C = -26.0‰$

Algae gyttja.

Lu-1031. Flarken, 555 to 560cm

8210 ± 85
6260 BC
$\delta^{13}C = -28.9‰$

Algae gyttja. Just below *Ulmus* rational limit.

Lu-1032. Flarken, 535 to 540cm

8060 ± 85
6110 BC
$\delta^{13}C = -30.2‰$

Algae gyttja.

Lu-1033. Flarken, 485 to 490cm

7370 ± 80
5420 BC
$\delta^{13}C = -30.8‰$

Detritus gyttja. At distinct increase of *Quercus*.

Lu-1034. Flarken, 435 to 440cm

6590 ± 75
4640 BC
$\delta^{13}C = -30.8‰$

Detritus gyttja.

Lu-1035. Flarken, 375 to 380cm

6130 ± 70
4180 BC
$\delta^{13}C = -29.9‰$

Detritus gyttja.

Lu-1036. Flarken, 325 to 330cm

5390 ± 70
3440 BC
$\delta^{13}C = -30.0‰$

Detritus gyttja. Just below distinct decrease of *Ulmus*.

Lu-1037. Flarken, 270 to 275cm

4520 ± 65
2570 BC
$\delta^{13}C = -29.6‰$

Detritus gyttja.

Lu-1038. Flarken, 215 to 220cm

4070 ± 60
2120 BC
$\delta^{13}C = -29.4‰$

Detritus gyttja. Further decrease of *Ulmus* and *Tilia*.

Lu-1039. Flarken, 155 to 160cm

2470 ± 55
520 BC
$\delta^{13}C = -27.6‰$

Detritus gyttja. Just below rational limit of *Picea*.

Lu-1040. Flarken, 110 to 115cm

1000 ± 50
AD 950
$\delta^{13}C = -28.3‰$

Detritus gyttja. Strong further increase of *Picea*.

Lu-1073. Lake Hullsjön

1400 ± 50
AD 550
$\delta^{13}C = -27.3‰$

Sediment from 300 to 305cm below sediment surface, at distinct sediment change from detritus gyttja to clay gyttja, Lake Hullsjön, Västergötland (58° 17′ N, 12° 23′ E). Alt 38.4m; area 1.8 sq km; max depth

1.5m. Coll 1975 and subm by G Digerfeldt. Distinct decrease of *Quercus* and increase of *Juniperus* at dated level. *Comment*: pretreated with HCl.

Mabo Mosse series

Peat from raised bog Mabo Mosse, 1km NW of Tyllinge, Dalhem parish, Kalmar län (58° 01′ 30″ N, 16° 04′ E). Alt 118m. Coll 1975 and subm by H Göransson, Dept Quaternary Geol, Univ Lund. Samples taken with 100mm Livingstone core sampler. Dating is part of study on vegetational development and human influence in area. For other dates from area, see R, 1970, v 12, p 541-543, Lake Striern series; 1974, v 16, p 315-316, Lake Vån series; 1975, v 17, p 180-182, Lake Ämmern series and Lake Striern series II. Mabo Mosse is situated 18.5km ESE of Lake Striern. Pollen analyses by submitter. *Sphagnum* species id by K Tolonen, Helsinki. Depths are below bog surface. All samples received mild pretreatment with HCl and NaOH.

Lu-1116. Mabo Mosse, 394 to 396cm — **8560 ± 90 / 6610 BC**

$\delta^{13}C = -25.2‰$

Eriophorum-Sphagnum peat (*Eriophorum vaginatum, Sphagnum acutifolia* cf *fuscum*). Humification H_6. At or just below rational *Alnus* limit.

Lu-1117. Mabo Mosse, 364 to 366cm — **7800 ± 80 / 5850 BC**

$\delta^{13}C = -25.8‰$

(*Eriophorum*)-*Sphagnum* peat (*Eriophorum vaginatum, Sphagnum fuscum* or *S rubellum*). H_{5-6}. Characteristic *Tilia* peak before rational *Tilia* limit, before mass distribution of *Tilia*.

Lu-1118. Mabo Mosse, 354 to 356cm — **7250 ± 75 / 5300 BC**

$\delta^{13}C = -26.5‰$

Eriophorum-Sphagnum peat. H_9. Rational *Tilia* limit.

Lu-1119. Mabo Mosse, 344 to 346cm — **6240 ± 70 / 4290 BC**

$\delta^{13}C = -26.4‰$

Pinus-Eriophorum-Sphagnum peat. H_{8-9}. High *Tilia* values; temporary decline of *Ulmus*. Rise of *Pteridium* (shown by analyses at 346, 345, and 344cm depth). One find of *Succisa pratensis*.

Lu-1120. Mabo Mosse, 334 to 336cm — **5600 ± 70 / 3650 BC**

$\delta^{13}C = -26.4‰$

Pinus-Eriophorum-Sphagnum peat. H_{8-9}. At 335cm temporary steep fall of *Fraxinus* and temporary rise of *Quercus*. From 335cm slightly and temporary falling *Ulmus* curve. At 337cm 1 pollen grain very like *Plantago major*. (Analyses every cm from 337 to 333cm.)

Lu-1121. Mabo Mosse, 319 to 321cm **5130 ± 65**
3180 BC
$\delta^{13}C = -25.9‰$

Pinus-Eriophorum-Sphagnum peat. H_{8-9}. From 319cm very strong and durable increase of amount of charcoal particles. Steep decrease of *Fraxinus*; gently falling *Ulmus* curve.

Lu-1122. Mabo Mosse, 309 to 311cm **4740 ± 60**
2790 BC
$\delta^{13}C = -23.8‰$

Eriophorum-Sphagnum-Pinus peat (*Sphagnum fuscum, S magellanicum*). H_6. Analysis on every cm from 315 to 305cm. At 314, 313, and 312cm slides are black from abundant charcoal particles, which diminish at 311cm. Two grains of *Plantago lanceolata* at 313cm; absolute *Ulmus* minimum at 309cm; small *Populus* peak at 310cm.

Lu-1123. Mabo Mosse, 304 to 306cm **4520 ± 60**
2570 BC
$\delta^{13}C = -25.2‰$

Eriophorum-Sphagnum peat (*Sphagnum balticum*). H_{5-6} Rise of *Ulmus* after decline; falling *Tilia*. At 305cm 2 grains of *Cerealia* and 6 grains of *Plantago lanceolata.*

Lu-1160. Mabo Mosse, 177 to 180cm **1760 ± 50**
AD 190
$\delta^{13}C = -26.5‰$

Sphagnum peat (*Sphagnum fuscum, S magellanicum*). H_{4-5}. Above or at recurrence surface. *Picea* 0.5%; peak of charcoal particles.

Lu-1161. Mabo Mosse, 173 to 177cm **1730 ± 50**
AD 220
$\delta^{13}C = -25.9‰$

Sphagnum peat (*Sphagnum fuscum, S balticum, S angustifolium*). H_4. Rational *Picea* limit; empiric Secale limit.

General Comment (HG): Mabo Mosse is a very old *Sphagnum* bog. Ombrotrophic phase starts before rational *Alnus* limit (transition minero/ombrotrophic peat at 400cm below bog surface). Radiocarbon dates and pollen analysis from Mabo Mosse do not contradict results obtained from Lake Vån (R, 1974, v 16, p 315-316) and Lake Striern II (R, 1975, v 17, p 181-182). *Cf* rational *Tilia* limit. The connection between mass distribution of *Picea* and cultivation (*Secale, Plantago lanceolata,* and charcoal) is clearly apparent in the Mabo Mosse study.

B. Greenland

East Greenland series (V)

Marine shells, whale bone, and reindeer antler from Kong Oscars Fjord—Vega Sund dist, Central East Greenland. Coll 1931-32 (Lu-1070) by A Noe-Nygaard and 1970-71 by C Hjort, Dept Quaternary Geol, Univ Lund, who subm the samples. Lu-1069 and -1070 dated as part of study

of glacial chronology and shoreline displacement, Lu-1095 and -1103 for comparison of ^{14}C age on various materials from same sediment, and Lu-1096 to date an early occurrence of reindeer. For other dates from area, see R, 1972, v 14, p 388-390; 1973, v 15, p 504-507; 1974, v 16, p 319-322; 1975, v 17, p 184-187.

Lu-1069. Forsblads Fjord, Sample 2 **6400 ± 70**
4450 BC
$\delta^{13}C = +0.8‰$

Shells (*Hiatella arctica*) from surface of silt at +7m on small peninsula on N shore of central Forsblads Fjord (72° 25′ N, 25° 55′ W). *Comment*: outer 42% of shells removed by acid leaching.

Lu-1070. Röhss Fjord **7530 ± 75**
5580 BC
$\delta^{13}C = +1.0‰$

Shells (*Hiatella arctica*) from silt at +2 to +4m at Strömnaes in central Röhss Fjord (72° 43′ N, 26° 50′ W). Sample (No. 1, Noe-Nygaard, 1932) also contained shells of *Chlamys islandica* and *Mytilus edulis* (*cf* Hjort & Funder, 1974). *Comment*: outer 36% of shells removed by acid leaching.

Lu-1095. Jaegerdalselv, Sample 2 **8580 ± 85**
6630 BC
$\delta^{13}C = -20.7‰$

Collagen from well preserved part of process of whale vertebra (probably *Balaena mysticetus*) from deltaic sand at +40m close to Jaegerdalselv (72° 08′ N, 23° 38′ W), S shore of Kong Oscars Fjord. *Comment*: organic carbon content: 7.0%.

Lu-1103. Jaegerdalselv, Sample 3 **8850 ± 85**
6900 BC
$\delta^{13}C = +0.1‰$

Shells (*Mya truncata, Hiatella arctica,* and *Macoma calcarea*) from same sediment and same alt as Lu-1095. *Comment*: outer 60% removed by acid leaching.

Lu-1096. Skeldal, Sample 2 **6200 ± 70**
4250 BC
$\delta^{13}C = -18.0‰$

Collagen from single antler of *Rangifer tarandus* found on present river bed (probably not in primary position) in lower Skeldal (72° 17′ N, 24° 10′ W), S shore of Kong Oscars Fjord. *Comment*: organic carbon content: 5.7%.

General Comment: corrections for deviations from $\delta^{13}C = -25.0‰$ in PDB scale are applied also for shell samples. No corrections are made for apparent age of shells of living marine mollusks and whale bones. For

apparent age of recent shells in area, see R, 1973, v 15, p 506-507 and Hjort (1973).

C. Poland

Lower Vistula valley series

Peat and mud samples

In order to date the lower terraces of Vistula valley, organic basal material from depressions on different terraces was coll and dated. Area is named Grudziądz Basin (Drozdowski, 1974, p 10-11). Coll 1968 (Lu-1044) and 1974 and subm by E Drozdowski, Inst Geog, Polish Acad Sci, Toruń, Poland. Pollen analysis by B E Berglund. All samples pretreated with HCl.

Lu-984. Rudnik — **11,630 ± 265** / **9680 BC** / $\delta^{13}C = -27.4‰$

Silty peat layer, 674 to 680cm below mire surface, overlain by limnic sequence of silt and mud at Rudnik (53° 25′ N, 18° 44′ E). Depression situated on Terrace II, the lowest and next youngest. *Comment* (BEB): date confirms pollen-analytic dating to Alleröd zone.

Lu-983. Przechowo — **6960 ± 75** / **5010 BC** / $\delta^{13}C = -26.0‰$

Peat layer 340 to 348cm below mire surface of overgrown oxbow lake at Przechowo, near mouth of R Wda (53° 24′ N, 18° 22′ E). Depression situated on present-day flood plain.

Lu-1044. Michale — **4940 ± 65** / **2990 BC** / $\delta^{13}C = -26.7‰$

Muddy layer (silty clay) from 696 to 700cm below surface of overgrown oxbow lake at Michale (53° 29′ N, 18° 43′ E). Depression situated on present-day flood plain.

Shell samples

Lu-1071. Rzadz — **38,100 $^{+2900}_{-2100}$** / **36,150 BC** / $\delta^{13}C = \pm 0.0‰$

Shell fragments (unidentifiable except for a few pieces of *Cardium* and 1 almost whole shell of *Nassa reticulata*) from sandy till and gravel in fossil landform (crevasse) carved in substratum and filled with superglacial and intraglacial deposits (see Drozdowski, 1974, p 66, Fig 31:3-4, Photo 12:E-B; p 132) at Rządz (53° 25′ N, 18° 45′ E). Coll 1974 and subm by E Drozdowski. *Comment*: outer 11% removed by acid leaching. Sample undersized; diluted; 63% sample. (3 1-day counts.)

+3550
41,800
−2450

Lu-1072:1. Gniewskie Mlyny, inner fraction **39,850 BC**
$\delta^{13}C = -0.9‰$

Shells and shell fragments (*Cardium edule, Macoma balthica, Cyprina islandica,* and *Nassa reticulata*) id by C Hjort, from sand below till in sand pits W of small town Gniew at Vistula R (53° 55′ N, 18° 50′ E). Coll 1974 and subm by E Drozdowski. *Comment*: inner fraction (46% of shells) was used. (4 1-day counts.)

+2300
37,200
−1800

Lu-1072:2. Gniewskie Mlyny, outer fraction **35,250 BC**
$\delta^{13}C = -0.6‰$

Outer fraction of shells used for Lu-1072:1. *Comment*: outer fraction was 49% of shells; outermost 5% removed by acid leaching. (3 1-day counts.)

D. Patagonia (Chile)

13,260 ± 115

Lu-794. Mylodon Cave **11,310 BC**
$\delta^{13}C = -19.4‰$

Collagen from part of vertebra from giant sloth, id by E Nordenskiöld, from Mylodon Cave (Cueva Eberhardt), Ultima Esperanza, Patagonia (ca 51° 35′ S, 72° 38′ W). Alt ca 160m. Coll 1899 by E Nordenskiöld; subm by G Andersson, Malmö Mus. Date important for evaluation of deglaciation history for area E of Ultima Esperanza. *Comment*: bone material extremely well preserved; organic carbon content: 9.4%.

II. ARCHAEOLOGIC SAMPLES

A. Sweden

Ageröd series

Charcoal, hazel-nut shells, peat, and bone from Mesolithic settlement area at raised bog Ageröds mosse, Munkarp parish, Scania (55° 56.5′ N, 13° 25′ E). Coll 1971-74 and subm by L Larsson, Hist Mus, Univ Lund. Dating is part of study of Mesolithic settlements in Scania (Althin, 1954; Nilsson, 1967; Larsson, 1973a, 1975a). See also Arlöv and Segebro series, below. Charcoal id by T Bartholin; bone id by J Lepiksaar and O Persson.

Site Ageröd I:HC

7740 ± 80

Lu-752. Ageröd I:HC, Sample 1 **5790 BC**
$\delta^{13}C = -25.5‰$

Hazel-nut shells from uppermost 3cm of lower peat. *Comment*: mild pretreatment with NaOH; small sample.

Lu-753. Ageröd I:HC, Sample 2 **7910 ± 80**
5960 BC
$\delta^{13}C = -26.4‰$

Hazel-nut shells from lowest 3cm of white layer. *Comment*: pretreated with HCl and NaOH.

Lu-754. Ageröd I:HC, Sample 3 **7860 ± 80**
5910 BC
$\delta^{13}C = -23.9‰$

Charcoal from same stratigraphic position as Lu-753. *Comment*: mild pretreatment with NaOH; small sample.

Lu-755. Ageröd I:HC, Sample 4 **7710 ± 80**
5760 BC
$\delta^{13}C = -20.3‰$

Collagen from bone fragments of red deer from white layer. *Comment*: collagen extracted as described previously (R, 1970, v 12, p 534).

Lu-872. Ageröd I:HC, Sample 6 **7220 ± 70**
5270 BC
$\delta^{13}C = -22.9‰$

Collagen from bone fragments of red deer from white layer. *Comment*: collagen extracted using the Longin method (1971). Organic carbon content: 1.5%. Sample was split in 2 equal parts after grinding and 1 part was subm to I U Olsson at Uppsala radiocarbon dating lab for check-dating after collagen extraction with the EDTA method (Olsson *et al*, 1974, p 178). Dating not yet finished. Final date will appear in next Uppsala date list.

Lu-871. Ageröd I:HC, Sample 7 **7880 ± 85**
5930 BC
$\delta^{13}C = -21.7‰$

Collagen from bone fragments of red deer from lower peat. *Comment*: collagen extracted in same way as Sample 6. Organic carbon content: 3.7%.

Lu-874. Ageröd I:HC, Sample 8 **7770 ± 80**
5820 BC
$\delta^{13}C = -24.4‰$

Charcoal from occupation layer, upper peat. *Comment*: pretreated with HCl and NaOH.

Lu-875. Ageröd I:HC, Sample 9 **7970 ± 80**
6020 BC
$\delta^{13}C = -25.0‰$

Charcoal (*Alnus, Betula, Tilia,* and *Corylus*) from lower peat. *Comment*: mild pretreatment with NaOH; small sample.

Lu-992. Ageröd I:HC, Sample 10 **8230 ± 85**
6280 BC
$\delta^{13}C = -23.8‰$

Charcoal (*Pinus*) from lower peat. *Comment*: pretreated with HCl and NaOH.

Lu-993. Ageröd I:HC, Sample 11 **7870 ± 80**
5920 BC
$\delta^{13}C = -24.2‰$

Charcoal (*Pinus*) from white layer. *Comment*: pretreated with HCl and NaOH.

Lu-994. Ageröd I:HC, Sample 12 **8000 ± 80**
6050 BC
$\delta^{13}C = -25.4‰$

Charcoal (*Pinus*) from upper part of lower peat. *Comment*: pretreated with HCl and NaOH.

Lu-1005. Ageröd I:HC, Sample 13 **8320 ± 85**
6370 BC
$\delta^{13}C = -25.4‰$

Charcoal (*Pinus*) from bottom layer. *Comment*: pretreated with HCl and NaOH.

Lu-1006. Ageröd I:HC, Sample 14 **7810 ± 80**
5860 BC
$\delta^{13}C = -24.2‰$

Charcoal (*Pinus*) from upper peat. *Comment*: pretreated with HCl and NaOH.

Site Ageröd I:B

Lu-598. Ageröd I:B, Sample 1, peat **6290 ± 70**
4340 BC
$\delta^{13}C = -27.4‰$

Allochthonous peat from ca 3m outside former shore line at Site Ageröd I:B. *Comment*: pretreated with HCl at 80°C and with 1% NaOH at room temperature.

Lu-598A. Ageröd I:B, Sample 1, humic acid **6040 ± 70**
4090 BC
$\delta^{13}C = -26.0‰$

Acid-precipitated part of NaOH-soluble fraction from Lu-598.

Lu-599. Ageröd I:B, Sample 2 **8020 ± 80**
6070 BC
$\delta^{13}C = -23.2‰$

Charcoal from lowest part of occupation layer. *Comment*: pretreated with HCl and NaOH.

Lu-600. Ageröd I:B, Sample 3 **6380 ± 70**
4430 BC
$\delta^{13}C = -26.5‰$

Peat from refuse layer. *Comment*: pretreated with HCl.

Lu-601. Ageröd I:B, Sample 4 **3930 ± 60**
1980 BC
$\delta^{13}C = -25.1‰$

Wood from lower part of occupation layer. *Comment*: pretreated with NaOH; small sample.

Lu-698. Ageröd I:B, Sample 5 **7960 ± 80**
6010 BC
$\delta^{13}C = -24.8‰$

Charcoal from lower part of occupation layer. *Comment*: pretreated with HCl and NaOH.

Lu-873. Ageröd I:B, Sample 6 **8000 ± 80**
6050 BC
$\delta^{13}C = -25.0‰$

Charcoal (*Alnus, Betula, Tilia,* and *Corylus*) from refuse layer. *Comment*: pretreated with HCl and NaOH.

Site Ageröd I:D

Lu-751. Ageröd I:D, Sample 1 **7940 ± 80**
5990 BC
$\delta^{13}C = -23.4‰$

Charcoal (*Pinus*) from refuse layer. *Comment*: pretreated with HCl and NaOH.

Lu-760. Ageröd I:D, Sample 2 **7630 ± 80**
5680 BC
$\delta^{13}C = -19.6‰$

Collagen from mandible fragment of wild boar from refuse layer. *Comment*: collagen extracted as described previously (R, 1970, v 12, p 534). Mild NaOH treatment possibly insufficient to remove all humus contamination.

Lu-991. Ageröd I:D, Sample 3 **7780 ± 80**
5830 BC
$\delta^{13}C = -26.3‰$

Charcoal (*Alnus* and *Corylus*) from refuse layer. *Comment*: mild pretreatment with NaOH and HCl; small sample.

Site Ageröd V

Lu-696. Ageröd V, Sample 1 **6720 ± 75**
4770 BC
$\delta^{13}C = -26.3‰$

Hazel-nut shells from bottom of occupation layer. *Comment*: pretreated with HCl and NaOH.

Lu-697. Ageröd V, Sample 2 **6540 ± 75**
4590 BC
$\delta^{13}C = -25.7‰$

Charcoal from occupation layer. *Comment*: pretreated with HCl and NaOH.

6800 ± 90
Lu-963. Ageröd V, Sample 3 **4850 BC**
$\delta^{13}C = -25.0‰$

Charcoal from occupation layer. *Comment*: no pretreatment; small sample; diluted; 75% sample.

General Comment (LL): dates from Ageröd I:HC, I:B, and I:D agree, with exceptions below, very well with pollen-analytic studies, indicating very short intervals between the 3 sites representing Late Maglemose culture (Nilsson, 1967). Lu-598, -598A, -600, and -601 prove later perturbations by plants. Dates from Ageröd V confirm that this site represents a late stage of the Kongemose culture.

Segebro series

Charcoal and bone from Mesolithic settlement Segebro in delta of Sege R, SW Scania (55° 37′ 25″ N, 13° 03′ 35″ E). Coll 1960 and 1973; subm by L Larsson. Site described by B Salomonsson (1971, p 31-41).

7390 ± 80
Lu-626. Segebro, Sample 1 **5440 BC**
$\delta^{13}C = -25.0‰$

Charcoal from occupation layer, x = +4, y = +5. Coll 1960 by B Salomonsson (No. 657). *Comment*: pretreated with HCl and NaOH.

6970 ± 90
Lu-758. Segebro, Sample 2 **5020 BC**
$\delta^{13}C = -25.1‰$

Charcoal from occupation layer, x = 27, y = 5. Coll 1960 (No. 675). *Comment*: mild pretreatment with NaOH; small sample; diluted; 79% sample.

7320 ± 130
Lu-759. Segebro, Sample 3 **5370 BC**
$\delta^{13}C = -25.4‰$

Charcoal from occupation layer, x = 26, y = 8.5-9. Coll 1960 (No. 676). *Comment*: no pretreatment; small sample; diluted; 50% sample.

7080 ± 80
Lu-854. Segebro, Sample 4 **5130 BC**
$\delta^{13}C = -21.4‰$

Collagen from bone fragments from occupation layer. Coll 1973 by L Larsson. *Comment*: collagen extracted using the Longin method. Organic carbon content: 3.4%.

7030 ± 80
Lu-855:1. Segebro, Sample 5:1 **5080 BC**
$\delta^{13}C = -22.0‰$

Collagen from bones of red deer from occupation layer. Coll 1973 by L Larsson. *Comment*: sample was split in 2 equal parts after grinding. Collagen from one part was extracted as described previously (R, 1970,

v 12, p 534) and dated as Lu-855:1. Collagen from other part was extracted using the Longin method and dated as Lu-855:2 below. Organic carbon content: 3.4%.

Lu-855:2. Segebro, Sample 5:2 **7140 ± 80** **5190 BC** $\delta^{13}C = -22.0‰$

Collagen from same bone sample as Lu-855:1. *Comment*: organic carbon content: 5%. See also *Comment* to Lu-855:1.

General Comment (LL): radiocarbon dates agree well with archaeol date.

Arlöv I series

Charcoal from Mesolithic settlement Arlöv I in delta of Sege R, SW Scania (55° 37′ 30″ N, 13° 04′ E). Coll 1961 by P U Hörberg (Lu-1007) and 1962 by B Salomonsson; subm by L Larsson. Site described by Salomonsson (1971, p 31-41). All samples pretreated with HCl and NaOH.

Lu-756. Arlöv I, Sample 1 **6160 ± 75** **4210 BC** $\delta^{13}C = -24.8‰$

Charcoal from Layer K, x = 52, y = 30. *Comment*: sample undersized; diluted; 90% sample.

Lu-757. Arlöv I, Sample 2 **6290 ± 70** **4340 BC** $\delta^{13}C = -25.4‰$

Charcoal from lower part of find layer (KS), x = 54, y = 30.

Lu-1007. Arlöv I, Sample 3 **6640 ± 100** **4690 BC** $\delta^{13}C = -25.4‰$

Charcoal (*Corylus*) id by T Bartholin, from same layer as Lu-757, x = 53, y = 30. *Comment*: sample undersized; diluted; 66% sample.

General Comment (LL): dates show a longer interval than expected between settling of Segebro site (see Segebro series above) and this site.

Lu-780. Fogdarp **4680 ± 120** **2730 BC** $\delta^{13}C = -25.4‰$

Charcoal (*Quercus, Betula, and Corylus*) from pit near find site for Late Bronze age hoard (Larsson, 1973b, 1975b) at Fogdarp, Bosjökloster parish, Central Scania (55° 49′ N, 13° 30′ E). Coll 1972 and subm by L Larsson. Assoc with fragmentary flint blade and piece of waste. *Comment*: no pretreatment; small sample; diluted; 26% sample. (4 1-day counts.)

Möllehusen series

Charcoal from Middle Neolithic settlement at Möllehusen, Nymölla, Gualöv parish, NE Scania (56° 02′ N, 14° 28′ E). Coll 1974-75 by B and

M Wyszomirski; subm by B Wyszomirski, Hist Mus, Univ Lund. Dating is part of study of Pitted Ware culture settlements in Scania. Möllehusen settlement is situated on littorina beach ridge and may, on stratigraphic grounds, be dated to Littorina Transgression V (Berglund & Welinder, 1972, p 89). Dating, situation, find circumstances, and economy agree with Pitted Ware culture settlement at Siretorp (*op cit*, p 73-93), ca 10km N of Möllehusen. Study shows that Möllehusen was permanent coastal settlement during MN I to III, specialized in sea fishing and seal hunting.

Lu-973. Möllehusen, Sample 1 **4650 ± 95** **2700 BC**

$\delta^{13}C = -28.5‰$

Charcoal from sand layer, Sq K7, L26, L27, L28, and L29, below transgressional gravel. Alt 3.77m. Assoc with flint tools, pit-ornamented pottery, and animal bones. *Comment*: mild pretreatment with HCl and NaOH. Sample undersized; diluted; 42% sample.

Lu-1028. Möllehusen, Sample 2 **280 ± 55** **AD 1670**

$\delta^{13}C = -24.4‰$

Charcoal from sand layer, Sq M7. Alt 3.50m. Assoc with flint tools, pottery, and animal bones. *Comment*: normal pretreatment with HCl and NaOH. Diluted; 77% sample.

Lu-1110. Möllehusen, Sample 3 **4380 ± 60** **2430 BC**

$\delta^{13}C = -24.6‰$

Charcoal from transgressional gravel, Sq L40. Alt 4.35 to 4.45m. Assoc with pit- and comb-ornamented pottery, diorite axe, flint tools, and animal bones. *Comment*: only HCl pretreatment.

Lu-1111. Möllehusen, Sample 4 **3850 ± 60** **1900 BC**

$\delta^{13}C = -24.7‰$

Charcoal from same layer as Lu-1110, Sq L41. Assoc with pit-ornamented pottery, flint and stone tools, and animal bones. *Comment*: only HCl pretreatment.

Lu-1112. Möllehusen, Sample 5 **3620 ± 65** **1670 BC**

$\delta^{13}C = -25.3‰$

Charcoal from same layer as Lu-1110, Sq L42. Alt 4.45 to 4.55m. Same artifact assemblage as Lu-1111. *Comment*: only HCl pretreatment. Diluted; 79% sample.

Lu-1113. Möllehusen, Sample 6 **4220 ± 110** **2270 BC**

$\delta^{13}C = -24.4‰$

Charcoal from Sq L40, L41, L42. Alt 4.35 to 4.55m. *Comment*: only HCl pretreatment. Diluted; 31% sample. (3 1-day counts.)

Lu-982. Hulu 1 **860 ± 50**
AD 1090
$\delta^{13}C = -23.8‰$

Charcoal from base of hearth pit at prehistoric settlement site, Hulu, V Ryd parish, Östergötland (57° 49′ N, 15° 13′ E). Coll 1974 and subm by S Welinder, Hist Mus, Univ Lund. *Comment*: pretreated with HCl and NaOH.

Hedbo series

Charcoal from Stone age settlement, Hedbo 1, and peat and lake sediments from adjacent carr Hedbokärret, Hedbo, Västerfärnebo parish, Västmanland (60° 58′ N, 16° 21′ E). Coll 1974 and subm by S Welinder.

Lu-1025. Hedbo 1 **3860 ± 60**
1910 BC
$\delta^{13}C = -24.4‰$

Charcoal from hearth pit. *Comment*: pretreated with HCl and NaOH.

Lu-1084. Hedbokärret 1 **4120 ± 60**
2170 BC
$\delta^{13}C = -27.1‰$

Peat from 57 to 64cm above transition clay/clay gyttja. *Comment*: pretreated with HCl.

Lu-1085. Hedbokärret 2 **6240 ± 90**
4290 BC
$\delta^{13}C = -28.2‰$

Coarse detritus gyttja from 27 to 32cm above transition clay/clay gyttja. *Comment*: pretreated with HCl. Sample undersized; diluted; 70% sample.

Lu-1086. Hedbokärret 3 **7190 ± 95**
5240 BC
$\delta^{13}C = -29.4‰$

Clay gyttja from 0 to 7cm above transition clay/clay gyttja. *Comment*: pretreated with HCl. Sample undersized; diluted; 50% sample. (4 1-day counts.)

Gårdlösa series

Charcoal from Gårdlösa, Smedstorp parish, SE Scania (55° 34′ N, 14° 08′ E). Coll 1964-74 and subm by B Stjernquist, Hist Mus, Univ Lund. Dated as complement to extensive study of continuity of settlement in Gårdlösa area. For other dates from area and refs, see R, 1972, v 14, p 264-266, 392-393; 1973, v 15, p 510-511; 1974, v 16, p 326; 1975, v 17, p 190. Charcoal id by T Bartholin.

Lu-996. Gårdlösa 3, Spring IV **2760 ± 55**
810 BC
$\delta^{13}C = -23.6‰$

Charcoal from feature connected with Spring IV on cult site (Stjern-

quist, 1964). Coll 1966. *Comments*: pretreated with HCl and NaOH. (BS): date agrees well with archaeol dating based on pottery found in spring.

Lu-1057. Gårdlösa 3, Spring II **1910 ± 50** **AD 40**

$\delta^{13}C = -24.5‰$

Charcoal (*Quercus, Alnus,* and *Ulmus*) from 25 to 55cm below surface in cultural layer connected with Spring II on cult-site. Coll 1964. *Comments*: mild pretreatment with NaOH and HCl. (BS): same comment as Lu-996 above.

Lu-1058. Gårdlösa 3, Spring III **1730 ± 50** **AD 220**

$\delta^{13}C = -24.2‰$

Charcoal (*Quercus* and *Corylus*) connected with Spring III, from 50 to 70cm below surface. Coll 1964. *Comments*: pretreated with HCl and NaOH. (BS): not possible to date this spring on archaeol finds.

Lu-1055. Gårdlösa 3, House IX **1320 ± 50** **AD 630**

$\delta^{13}C = -24.6‰$

Charcoal (*Quercus, Corylus,* and *Prunus*) from 25 to 50cm below surface in occupation layer, House IX. Coll 1963. *Comments*: mild pretreatment with NaOH and HCl. (BS): date agrees well with assoc bronze finds.

Lu-1056. Gårdlösa 3, Grave 20 **2230 ± 55** **280 BC**

$\delta^{13}C = -24.7‰$

Charcoal (*Alnus, Corylus,* and *Quercus*) from fire pit below stone near surface. Coll 1965. *Comments*: mild pretreatment with NaOH and HCl. (BS): date earlier than expected. Archaeol estimate based on artifact assemblage is AD 400 to 800.

Lu-997. Gårdlösa 10, Grave 112 **1360 ± 50** **AD 590**

$\delta^{13}C = -23.6‰$

Charcoal from hearth, depth 30 to 65cm, near Grave 112. Coll 1974. *Comments*: pretreated with HCl and NaOH. (BS): date shows that hearth is not connected to grave, but to Migration period structures at same site.

Lu-998. Gårdlösa 10, Grave 113 **1190 ± 50** **AD 760**

$\delta^{13}C = -24.8‰$

Charcoal from hearth, depth 30 to 65cm, near Grave 113. Coll 1974. *Comments*: pretreated with HCl and NaOH. (BS): same comment as Lu-997 above.

Lu-999. Hassle Bösarp 11, Grave 1 **1820 ± 50** **AD 130**

$\delta^{13}C = -25.7‰$

Charcoal from Grave 1 at Hassle Bösarp No. 11, Hassle Bösarp parish, S Scania (55° 27′ N, 13° 32′ E). Coll 1962 and subm by B Stjernquist. Results from study of adjacent Hassle Bösarp Mosse pub by submitter (Stjernquist, 1973). Pretreated with HCl and NaOH. *Comment* (BS): grave is difficult to date archaeologically but grave complex at Hassle Bösarp 11 seems to belong to Migration period.

Hagestad series

Charcoal from Hagestad, Löderup parish, Scania. Coll 1974 and subm by M Strömberg, Hist Mus, Univ Lund. Dated as complement to extensive archaeol study in area to clarify cultural development and different milieu-influencing factors from Early Stone age to Early Middle ages. Samples pretreated with HCl and NaOH.

Lu-1023. Hagestad 43[8] A, Sample 1:HT74 **1990 ± 50** **40 BC**

$\delta^{13}C = -23.2‰$

Charcoal from Grave 2:74 (cremation grave) at Hagestad 43[8] A (55° 23′ N, 14° 08′ E). Assoc with pottery.

Lu-1068. Hagestad 38[5], Sample 4:74-75 **1560 ± 50** **AD 390**

$\delta^{13}C = -25.2‰$

Charcoal from post-hole in house foundation at Hagestad 38[5] (55° 24′ N, 14° 11′ E). Assoc with pottery and iron objects.

General Comment (MS): dates agree well with archaeol results based on assoc finds.

Valleberga series

Charcoal and bone from settlement area with grave field at Valleberga, Scania. Coll Sept 1974 to Jan 1975 and subm by M Strömberg. Reports from study of Bronze age graves in Valleberga-Ingelstorp-Löderup area pub by submitter (Strömberg, 1975a, 1975b). For other dates from Valleberga, see R, 1974, v 16, p 324-325; 1975, v 17, p 192-193. Charcoal pretreated with HCl and NaOH; bone collagen extracted by new method (see Introduction, above).

Lu-1024. Valleberga 5[2], Sample 2:HT74 **1890 ± 50** **AD 60**

$\delta^{13}C = -24.4‰$

Charcoal from Grave 3:74 (cremation grave) at Valleberga 5[2] (55° 24′ N, 14° 04′ E). Assoc with bronze fragment, pottery, and burnt bones.

Lu-1067. Valleberga 5², Sample 3:HT74 **1820 ± 50**
AD 130
$\delta^{13}C = -24.7‰$

Charcoal from Grave 9 (cremation grave) at Valleberge 5². Assoc with bronze fibula and pottery.

Lu-1092. Valleberga 36², Sample 5:74-75 **2890 ± 55**
940 BC
$\delta^{13}C = -20.2‰$

Collagen from metatarsal bones of *Cervus elaphus*, id by O Persson, from occupation layer of Bronze age settlement (Strömberg, 1975a, p 140-144) at Valleberga 36² (55° 24′ N, 14° 03′ E). *Comment*: organic carbon content: 4.9%.

Lu-1093. Valleberga 36², Sample 6:74-75 **2960 ± 55**
1010 BC
$\delta^{13}C = -20.1‰$

Collagen from scapula of *Bos* sp from lower occupation layer, Trench 1, Valleberga 36². *Comment*: organic carbon content: 5.9%.

General Comment (MS): dates agree fairly well with result of preliminary examination of archaeol material, but Lu-1092 and -1093 are somewhat earlier than expected.

Ingelstorp series

Charcoal from grave field at Ingelstorp 31, Ingelstorp parish, Scania (55° 25′ N, 14° 03′ E). Coll 1975 and subm by M Strömberg. Pretreated with HCl and NaOH.

Lu-1091. Ingelstorp 31, Sample 7:74-75 **1920 ± 50**
AD 30
$\delta^{13}C = -24.7‰$

Charcoal from Grave 25 (cremation grave). Assoc with iron knife.

Lu-1100. Ingelstorp 31, Sample 8:74-75 **1330 ± 50**
AD 620
$\delta^{13}C = -23.2‰$

Charcoal from hearth at fringe of stone circle.

General Comment (MS): dates confirm archaeol estimate.

Lu-1109. Löderup 10¹, Sample 9:74-75 **3720 ± 60**
1770 BC
$\delta^{13}C = -24.4‰$

Charcoal from bottom of well with wooden construction at Löderup 10¹, Löderup parish, Scania (55° 23′ N, 14° 06′ E). Coll 1975 and subm by M Strömberg. Assoc with pottery and brittle-burnt stones. Pretreated with HCl and NaOH. *Comment* (MS): date agrees well with time estimate based on assoc pottery.

Stora Råby series

Charcoal and bone from Settlement No. 2 at Stora Råby, Lund, Scania (55° 42′ N, 13° 14′ E). Coll 1973-74 and subm by M Wyszomirski,

Hist Mus, Univ Lund. Results from surface study of settlement area reported by submitter (Wyszomirski, 1974). For other dates from settlement, see R, 1975, v 17, p 193-194.

Lu-1050. Stora Råby 2, Object 19 **1210 ± 50** **AD 740** $\delta^{13}C = -24.6‰$

Charcoal from rectangular pit house with stone packing, dug down to Early Neolithic occupation layer. Assoc with large amount of animal bones, pottery of Iron age character, and flint. *Comment*: pretreated with HCl and NaOH.

Lu-1052. Stora Råby 2, Object 32 **1250 ± 50** **AD 700** $\delta^{13}C = -24.7‰$

Charcoal from stone-filled cylindrical pit of same form as Object 21 (Lu-914, 1250 ± 50 BP, R, 1975, v 17, p 194). Assoc with bones and pottery of Iron age character. *Comment*: pretreated with HCl and NaOH.

Lu-1053. Stora Råby 2, Object 40 **1220 ± 50** **AD 730** $\delta^{13}C = -20.8‰$

Collagen from well preserved horse mandible from pit house with stone packing. Assoc with other animal bones and pottery of Iron age character. *Comment*: organic carbon content: 6.3%.

Lu-1097. Stora Råby 2, Pit 2 **1260 ± 55** **AD 690** $\delta^{13}C = -24.3‰$

Charcoal from large pit (diam ca 2m) with 2 find layers. Upper layer is from Migration period. Assoc with web-weight, pottery, and bones. *Comment*: only mild pretreatment with HCl; small sample; diluted; 81% sample.

St Clemens series

Bone, wood, and organic soil samples from excavation of probably oldest burial ground connected to church in town of Lund, Block St Clemens No. 8 (55° 42′ N, 13° 11′ E). Coll 1974-75 and subm by A W Mårtensson, Mus Cultural Hist, Lund. Oldest burial period is on archaeol evidence estimated by submitter to AD 1020 to 1060, corresponding approx to yr 420 to 460 in floating dendrochronology based on oak coffin planks from St Clemens No. 8 and adjacent site Kattesund (Bartholin, 1975, p 14-15). Soil samples are expected to be of same age as bone samples. Wood from 2 coffins dated as check on unexpectedly old bone dates. Other dates from same area are Lu-9, AD 960 ± 100 and Lu-18, AD 770 ± 100 (R, 1968, v 10, p 46) on charcoal samples. Wood and soil samples pretreated with HCl and NaOH. Bone collagen extracted by new method (see Introduction, above).

Lu-1061. St Clemens 8, Grave 85, bone (1) **1380 ± 50**
AD 570
$\delta^{13}C = -18.6‰$

Collagen from human femur (male) from Grave 85. *Comment*: organic carbon content: 4.4%.

Lu-1061:2. St Clemens 8, Grave 85, bone (2) **1230 ± 35**
AD 720
$\delta^{13}C = -18.6‰$

Collagen from other part of same femur as Lu-1061. *Comment*: organic carbon content: 5.7%. (3 1-day counts.)

Lu-1088. St Clemens 8, Grave 85, wood **1160 ± 35**
AD 790
$\delta^{13}C = -25.1‰$

Wood from coffin plank, Grave 85. Outer ca 50 tree rings, approx yr 370 to 420 in floating chronology, used for dating. Tree-ring analysis by T Bartholin (including Lu-1087, below). (4 1-day counts).

Lu-1062. St Clemens 8, Grave 109, bone **1160 ± 50**
AD 790
$\delta^{13}C = -18.4‰$

Collagen from human femur (male) from Grave 109. *Comment*: organic carbon content: 5.9%.

Lu-1087. St Clemens 8, Grave 109, wood **1140 ± 35**
AD 810
$\delta^{13}C = -26.0‰$

Wood from coffin plank, Grave 109. Outer ca 50 tree rings, approx yr 360 to 410 in floating chronology, used for dating. (4 1-day counts.)

Lu-1063. St Clemens 8, Grave 271, bone **1180 ± 50**
AD 770
$\delta^{13}C = -18.3‰$

Collagen from human femur (female) from Grave 271. Hocker position burial. *Comment*: organic carbon content: 6.6%.

Lu-1064. St Clemens 8, Grave 286, bone **1090 ± 50**
AD 860
$\delta^{13}C = -19.3‰$

Collagen from human femur (female) from Grave 286. Hocker position burial. *Comment*: organic carbon content: 5.5%.

Lu-1065. St Clemens 8, Sec 20m E **1230 ± 50**
AD 720
$\delta^{13}C = -25.6‰$

Soil sample from lowest allochthonous "peat" layer.

Lu-1066. St Clemens 8, plant layer **910 ± 50**
AD 1040
$\delta^{13}C = -25.3‰$

Soil sample from layer enriched in plant material. Fraction > 1mm

separated for dating. Position: 14m N, 16-17m E, +33.80. *Comment*: only mild pretreatment with NaOH and HCl.

General Comment: only Lu-1066 is in expected time interval. Dates on coffin planks agree fairly well with other dates in series, except Lu-1061 and -1066, but are > 200 yr older than expected. This may be due, in part, to variation in ^{14}C inventory judging from different bristlecone pine calibration curves, but most discrepancies between radiocarbon dates and expected age remain unexplained and need further study. A similar, but milder problem exists in St Clemens church series, Oslo (R, 1975, v 17, p 381), where all dates on bone and wood from oldest graves also are older than expected.

Löddeköpinge series

Bone, teeth, and wood from settlement area at Löddeköpinge, E Scania, (55° 45′ N, 13° 00′ E). Coll June 1973 to Sept 1974 and subm by T Ohlsson, Hist Mus, Univ Lund. Preliminary report from excavation pub by submitter (Ohlsson, 1973). For other dates from same settlement, see R, 1973, v 15, p 512-513. Wood samples pretreated with HCl and NaOH. Collagen from bone and teeth samples extracted by new method (see Introduction, above).

Lu-1077. Löddeköpinge, Banvallen, Structure 15 **1020 ± 50** **AD 930**

$\delta^{13}C = -20.8‰$

Collagen from horse mandible from filling layer in Structure 15. Assoc with Vendel period bird fibula, pottery, iron objects, and animal bones. *Comment*: organic carbon content: 6.4%.

Lu-1078. Löddeköpinge, Skolan, Structure 2 **1090 ± 50** **AD 860**

$\delta^{13}C = -20.8‰$

Collagen from humerus of *Bos* sp, id by R Liljegren, from floor level of Structure 2. Assoc with Slavonic pottery, 11th century coin, iron objects, and animal bones. *Comment*: organic carbon content: 7.3%.

Lu-1079. Löddeköpinge, Skola 3, Structure 18 **1120 ± 50** **AD 830**

$\delta^{13}C = -20.2‰$

Collagen from metacarpal bone of *Bos* sp, id by R Liljegren, from floor level of Structure 18. Assoc with pottery, bone combs, iron objects, and animal bones. *Comment*: organic carbon content: 2.6%.

Lu-1080. Löddeköpinge, Skolan 3, Structure 7 **1010 ± 50** **AD 940**

$\delta^{13}C = -20.4‰$

Collagen from teeth of horse, pig, and sheep or goat from filling layer in Structure 7. Assoc with Slavonic pottery, iron objects, and animal bones. *Comment*: organic carbon content: 3.1%.

Lu-1082. Löddeköpinge, Skolan **1110 ± 50** **AD 840**
$\delta^{13}C = -26.2‰$

Sample from wooden well-lining.

Lu-1081. Löddeköpinge 10, Grave 32 **1030 ± 50** **AD 920**
$\delta^{13}C = -18.5‰$

Collagen from human femur from Grave 32 at Löddeköpinge No. 10. *Comment*: organic carbon content: 7.6%.

General Comment (TO): Lu-1077 is younger and Lu-1078 is older than expected. Other dates agree with estimates based on assoc archaeol finds.

B. Denmark

Svendborg series

Wood and hazel-nut shells from excavations in town of Svendborg, Sunds herred, Fyn (55° 03′ N, 10° 36′ E). Coll Aug 1972 to Aug 1974 and subm by H M Jansen, Inst Hist & Social Sci, Univ Odense, Denmark. Reports on excavations pub by submitter (Jansen, 1973a, 1973b, 1974). Wood id by T Bartholin. All samples pretreated with HCl and NaOH.

Lu-932. Svendborg, Site NK I/265 **590 ± 50** **AD 1360**
$\delta^{13}C = -24.4‰$

Wood (*Quercus* sp) from post in ditch at St Nikolai kirkeplads (Jansen, 1973b, p 54).

Lu-933. Svendborg, Site 362, II, Pr 667 **740 ± 50** **AD 1210**
$\delta^{13}C = -26.7‰$

Wood (*Alnus* sp and *Populus* sp) from basal layer of inner foss (Jansen, 1974, p 59, Fig 8).

Lu-934. Svendborg, Site 362, II, Pr 668 **600 ± 50** **AD 1350**
$\delta^{13}C = -26.7‰$

Wood (*Corylus avellana*) from basal layer of outer foss.

Lu-1004. Svendborg, Site 544a, II, Nn 237 **570 ± 50** **AD 1380**
$\delta^{13}C = -27.7‰$

Wood (*Quercus* sp) from post used in structure connected with foss.

Lu-1098. Svendborg, Site 544a, II, N 123/74 **610 ± 50** **AD 1340**
$\delta^{13}C = -26.6‰$

Wood (*Corylus avellana*) from basal layer of foss.

Lu-1099. Svendborg, Site 544a, II, Nn 178/74 **580 ± 50** **AD 1370**
$\delta^{13}C = -25.9‰$

Wood (*Alnus* sp) from basal layer of foss.

Lu-1022. Svendborg, Site 449a, II **850 ± 50** **AD 1100**

$\delta^{13}C = -25.4‰$

Samples from staves (*Fagus sylvatica*) lining a well in oldest cultural layer, just above undisturbed mineral substratum (Jansen, 1973a, p 158-159; 1973b, p 58-60).

Lu-1021. Svendborg, Site 449a, I, 444/72 **790 ± 50** **AD 1160**

$\delta^{13}C = -24.5‰$

Hazel-nut shells found in and near well (*cf* Lu-1022, above).

References

Althin, C-A, 1954, The chronology of the Stone Age settlement of Scania, Sweden I: Archaeol Lundensia Acta, ser in 4°, no. 1.

Bartholin, T S, 1975, Dendrokronologi en ny naturvidenskab i arkaeologiens tjaenste: Ale, Hist tidsk för Skåneland, no. 2 1975, p 1-17.

Berglund, B E, 1966, Late-Quaternary vegetation in eastern Blekinge, southeastern Sweden. II. Post-Glacial time: Op Bot A Soc Lundensi, v 12, no. 2, 190 p.

Berglund, B E, Håkansson, Sören, and Lagerlund, Erik, 1976, Radiocarbon dated Mammoth finds in Scandinavia: Boreas (Oslo), in press.

Berglund, B E, Håkansson, Sören, and Lepiksaar, Johannes, 1976, Late Weichselian finds of the polar bear (*Ursus maritimus* Phipps) in North West Europe: Boreas (Oslo), in press.

Berglund, B E and Welinder, S, 1972, Stratigrafin vid Siretorp: Fornvännen, no. 2 1972, p 73-93.

Björsjö, Nils, 1949, Israndstudier i södra Bohuslän: Sveriges Geol Unders, ser C, no. 504, 321 p.

Drozdowski, Eugeniusz, 1974, Genesis of the Grudziadz Basin in the light of its deposits and glacial forms (in Polish with English summary): Polska Akad Nauk Inst Geog, Prace Geograficzne no. 104, Wroclaw, 139 p.

Ericsson, Inger, 1975, Qualitative, quantitative and kinetic studies of salts and polymers with a new pyrolyzer in combination with a gas chromatograph: Thesis, Dept Anal Chem, Chemical Centre, Lund.

Håkansson, Sören, 1970, University of Lund radiocarbon dates III: Radiocarbon, v 12, p 534-552.

———— 1972, University of Lund radiocarbon dates V: Radiocarbon, v 14, p 380-400.

———— 1973, University of Lund radiocarbon dates VI: Radiocarbon, v 15, p 493-513.

———— 1974, University of Lund radiocarbon dates VII: Radiocarbon, v 16, p 307-330.

———— 1975, University of Lund radiocarbon dates VIII: Radiocarbon, v 17, p 174-195.

Hillefors, Åke, 1961, Om vindslipade blockhorisonter i Dösebackagruppens bildningar: Gothia, Medd Geog Fören Göteborg, v 9, p 73-93.

———— 1969, Västsveriges glaciala historia och morfologi (with English summary): Lunds Univ Geog Inst Medd, Avh 60, 319 p.

———— 1974, The stratigraphy and genesis of the Dösebacka and Ellesbo drumlins. A contribution to the knowledge of the Weichsel-glacial history in western Sweden: Geol Fören Stockholm Förh, v 96, p 355-374.

———— 1975, Contributions to the knowledge of the chronology of the deglaciation of Western Sweden with special reference to the Gothenburg moraine: Svensk Geog Årsb, Årg 51, p 70-80.

Hjort, Christian, 1973, A sea correction for East Greenland: Geol Fören Stockholm Förh, v 95, p 132-134.

Hjort, Christian and Funder, Svend, 1974, The subfossil occurrence of *Mytilus edulis* L. in central East Greenland: Boreas (Oslo), v 3, p 23-33.

Jansen, H M, 1973a, Archeological investigations in medieval Svendborg. An interim report on excavations in the summer of 1972: Mediaeval Scandinavia (Odense), v 6, p 151-160.

Jansen, M H, 1973b, På sporet af vikingetidens Svendborg. Udgravingerne i sommeren 1972 (German summary): Fynske Minder 1972 (Svendborg), p 43-76.
———— 1974, Svendborgs befaestning i middelalderen. De arkeologiske undersøgelser sommeren 1973 (German summary): Fynske Minder 1973 (Svendborg), p 49-67.
Larsson, Lars, 1973a, Some problems of the Mesolithic based upon the finds from the raised bog Ageröds mosse, *in*: Kozlowski, S (ed), The Mesolithic in Europe, Warszawa, p 367-380.
———— 1973b, Jönstorpsfyndet. Ett offerfynd från yngre bronsåldern: Ale, Hist tidskr för Skåneland (Lund), no. 1, 1-48.
———— 1975a, A contribution to the knowledge of mesolithic huts in southern Scandinavia: Lunds Univ Hist Mus Medd 1973-74, p 5-28.
———— 1975b, The Fogdarp find. A hoard from the Late Bronze Age: Lunds Univ Hist Mus Medd 1973-74, p 169-238.
Longin, Robert, 1971, New method of collagen extraction for radiocarbon dating: Nature, v 230, p 241-242.
Nilsson, Tage, 1961, Ein neues Standardpollendiagramm aus Bjärsjöholmssjön in Schonen: Lunds Univ Årssk, NF avd 2, v 56, no. 18, p 1-34.
———— 1967, Pollenanalytische Datierungen mesolithischer Siedlungen im Randgebiet des Ageröds mosse im mittleren Schonen: Acta Univ Lundensis, Sec II, no. 16, 80 p.
Noe-Nygaard, A, 1932, Remarks on *Mytilus edulis* in raised beaches in East Greenland: Grönland Medd, v 95, no. 2, 23 p.
Ohlsson, Tom, 1973, Vikingatid och Medeltid i Löddeköpinge: Ale, Hist tidsk för Skåneland, no. 1 1973, p 27-42.
Olsson, I U, El-Daoushy, MFAF, Abd-El-Maged, A I, and Klasson, M, 1974, A comparison of different methods for pretreatment of bones. I: Geol Fören Stockholm Förh, v 96, p 171-181.
Persson, P O, 1961, Skånska mammutfynd: Geol Fören Stockholm Förh, v 83, p 253-268.
Salomonsson, Bengt, 1971, Malmötraktens förhistoria, *in*: Bjurling, O (ed), Malmö Stads Historia I. Allhems Förlag, Malmö, p 15-170.
Stjernquist, Berta, 1964, New light on spring-cults in Scandinavian prehistory: Archaeology, v 17, no. 3, p 180-184.
———— 1973, Das Opfermoor in Hassle Bösarp, Schweden: Acta Archaeologica (København), v XLIV, p 19-62.
Strömberg, Märta, 1975a, Untersuchungen zur Bronzezeit in Südostschonen. Probleme um die Besiedlung: Lunds Univ Hist Mus Medd 1973-74, p 101-168.
———— 1975b, Bronsålder på Österlen. Undersökningar i Valleberga-Löderup-Ingelstorp: Kulturnämnden i Ystad 1975, 80 p.
Wyszomirski, Mark, 1974, Metodiska ytundersökningar av stenålders-boplatser vid Stora Råby (summary in English): Fornvännen (Stockholm), Årg 69, p 57-69.