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UNIVERSITY OF LUND RADIOCARBON DATES XX

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INTRODUCTION

Most of the ^{14}C measurements reported here were made between October 1985 and October 1986. Equipment, measurement, and treatment of samples are as reported previously (R, 1968, v 10, p 36–37; 1976, v 18, p 290; 1980, v 22, p 1045; 1986, v 28, no. 3, p 1111).

Age calculations are based on a contemporary value equal to 95% of the activity of NBS oxalic acid standard (No. 4990A) and on the conventional half-life for ^{14}C of 5568 yr. Results are reported in years before 1950 (years BP). Errors quoted with the dates are based on counting statistics alone and are equivalent to ± 1 standard deviation ($\pm\sigma$).

Corrections for deviations from $\delta^{13}C = -25.0‰$ in the PDB scale are applied for all samples; also for marine shells. The apparent age for marine material due to the reservoir effect must be subtracted from our dates on such samples.

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. Organic carbon content reported for bone samples is calculated from the yield of CO_2 by combustion of gelatine remaining after treatment. Organic carbon lost during treatment is not included in the calculated percentage.

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

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GEOLOGIC SAMPLES

Sweden

Långören series

Wood of *Pinus* coll by scuba diving outside Långören I., Torhamn archipelago, SE Blekinge, S Sweden (56° 04′ N, 15° 50′ E). Coll Aug 1984 (Lu-2485) and Aug 1985 by P Berglund; subm by B Berglund, Dept Quaternary Geol, Univ Lund. Pretreated with HCl and NaOH.

Lu-2485. Långören, Pine Stump 1 **9380 ± 90** $\delta^{13}C = -27.4‰$

Wood from ca 25 tree rings of pine stump exposed at ca 3m water

depth after dredging away ca 1m sediment. *Comment:* previous date for pine stump from same area is 9300 ± 130 BP (St-806; R, 1963, v 5, p 204).

70 ± 40

Lu-2484. Långören, Ship Wreck 1 $\delta^{13}C = -24.7‰$

Wood from ship board coll at 2.5m depth. Wreck partly exposed above sand. *Comment:* possible calibrated 1σ intervals (Stuiver, 1982, p 8) are: cal AD 1690–1725, 1815–1840, 1880–1915.

7200 ± 70

Lu-2492. Ljunghusen $\delta^{13}C = -26.2‰$

Wood (*Quercus* sp) id by T Bartholin, from ca 4.8m below surface at Höllviken, near Ljunghusen Train Stop (55° 24′ 30″ N, 13° 55′ 30″ E), SW Scania. Coll Aug 1985 and subm by G Söderlund, Vellinge Local Authority, Vellinge. *Comment:* pretreated with HCl and NaOH.

Southern Småland series

Sediment and water mosses from lakes Spjällsjön (56° 41′ N, 14° 35′ 40″ E), Hälsegyl (56° 32′ 40″ N, 14° 37′ E), and Kalven (56° 32′ N, 14° 33′ 40″ E), S Småland. Coll 1985 and subm by S Björck, Dept Quaternary Geol, Univ Lund. Dating is part of study of Late Weichselian stratigraphy and chronology of lake sediments in S Sweden. Depths (m) refer to sediment surface. All samples pretreated with HCl. Lu-2511 and −2514 received additional treatment with NaOH, and soluble fractions were dated separately.

Spjällsjön

Samples were taken with 5 and 10cm Russian-type corer. Water depth 1.65m at coring point.

12,540 ± 140

Lu-2511. Spjällsjön 1, insoluble $\delta^{13}C = -20.5‰$

Insoluble fraction of muddy clay, depth 3.975 to 4.025m. *Comment:* insoluble fraction contained ca 40% of total organic carbon in pretreated sample. Total organic carbon content: ca 1.2%. Sample undersized; diluted; 78% sample. Expected age ca 12,300 BP.

12,240 ± 110

Lu-2511A. Spjällsjön 1, soluble $\delta^{13}C = -20.4‰$

Acid-precipitated part of NaOH-soluble fraction, depth 3.975 to 4.025m. *Comment:* this fraction contained ca 60% of total organic carbon in pretreated sample. Two 24-hour extractions with 4% NaOH at 80°C.

11,760 ± 220

Lu-2512. Spjällsjön 2 $\delta^{13}C = -25.7‰$

Water mosses, depth 4.04 to 4.06m. Lithostratigraphy indicates Bølling pollen zone. *Comment:* very small sample; diluted; 26% sample. (4 1-day counts.)

11,710 ± 140

Lu-2514. Spjällsjön 3, insoluble $\delta^{13}C = -20.6‰$

Insoluble fraction of clay gyttja, depth 3.88 to 3.91m. *Comment:* this fraction contained ca 45% of total organic carbon in pretreated sample. Total organic carbon content: ca 1.8%. Sample undersized; diluted; 70% sample. Expected age ca 11,700 BP.

11,420 ± 130

Lu-2514A. Spjällsjön 3, soluble $\delta^{13}C = -20.6‰$

Acid-precipitated part of NaOH-soluble fraction, depth 3.88 to 3.91m. *Comment:* this fraction contained ca 55% of total organic carbon in pretreated sample. Sample undersized; diluted; 88% sample.

10,420 ± 180

Lu-2515. Spjällsjön 4 $\delta^{13}C = -25.6‰$

Water mosses, depth 3.63 to 3.67m. Lithostratigraphy indicates Early Younger Dryas pollen zone. *Comment:* very small sample; diluted: 28% sample. (4 1-day counts.)

Hälsegyl

Samples were taken with 5 and 10cm Russian-type corer. Water depth 1.55m at coring point.

11,860 ± 110

Lu-2513. Hälsegyl, 4.355–4.405m $\delta^{13}C = -18.4‰$

Clay gyttja. *Betula-Pinus* zone of Allerød chronozone. *Comment:* organic carbon content: ca 5%.

11,500 ± 110

Lu-2516. Hälsegyl, 4.30–4.355m $\delta^{13}C = -20.0‰$

Clay gyttja. End of *Betula-Pinus* and beginning of *Betula-Pinus-Empetrum* zone of Allerød chronozone. *Comment:* organic carbon content: ca 7%.

Kalven

Samples taken with 10cm Russian-type corer. Water depth ca 0.75m at coring point.

11,460 ± 150

Lu-2517. Kalven, 3.59–3.63m $\delta^{13}C = -18.8‰$

Clay gyttja. At very end of *Betula-Pinus* zone of Allerød chronozone. *Comment:* sample undersized; diluted; 58% sample. Organic carbon content: ca 6%.

10,480 ± 150

Lu-2518. Kalven, 3.38–3.41m $\delta^{13}C = -22.6‰$

Clay gyttja. At very end of *Artemisia* zone of Younger Dryas chronozone. *Comment:* sample undersized; diluted; 44% sample. (3 1-day counts.) Organic carbon content: ca 5%.

Hanö Bay series

Peat from submarine bog ca 8 to 11m below present sea level in Hanö Bay E of Scania (55° 43.5′ N, 14° 12.3′ E). Coll June 1985 by L Hansen; subm by S Björck. Pollen analysis by T Persson, Lab Quaternary Biol, Univ Lund. Dating is part of study of shore displacement and paleogeography of Hanö Bay region during Late Weichselian-Early Holocene. Samples taken with Russian-type corer. Bog surface ca 8m below sea level at coring point (Hansen, 1985, p 13–14). Depths (cm) refer to bog surface. Samples pretreated with HCl.

8120 ± 80

Lu-2594. Hanöbukten 2C, 80–85cm $\delta^{13}C = -29.3‰$

Sandy, highly humified peat. Just above beginning of *Tilia* pollen curve (T°).

8070 ± 80

Lu-2595A. Hanöbukten 2C, 7–12cm $\delta^{13}C = -29.5‰$

Acid-precipitated part of NaOH-soluble fraction from highly humified peat.

Hammarmossen series

Peat and gyttja from Hammarmossen, 1km W of Hällefors, Västmanland, central Sweden (59° 45′ N, 14° 30′ E). Coll July 1985 and subm by D R Foster, Harvard Univ. Dated as complement to Kräckelbäcken series (R, 1986, v 28, no. 3, p 1115–1117). Results of previous study of patterned fen in Canada pub by Foster *et al* (1983), and Foster and King (1984). All samples taken with 5cm Russian-type peat corer. Pretreated with HCl. All samples except Lu-2526 charred in nitrogen atmosphere before burning. Depths (cm) refer to bog or sediment surface.

20 ± 45

Lu-2526. Hammarmossen 1, Core I1, 25–30cm $\delta^{13}C = -27.2‰$

Basal, slightly humified *Sphagnum* peat from S end of mire. *Comment:* peat apparently contaminated by recent plant material influenced by ^{14}C from nuclear bomb testing.

920 ± 45

Lu-2527. Hammarmossen 2, Core I2, 105–110cm $\delta^{13}C = -27.4‰$

Basal *Sphagnum* peat, slightly more humified than Lu-2526, above. Core taken 25m from S boundary of nature preserve.

2320 ± 50

Lu-2528. Hammarmossen 3, Core I3, 215–220cm $\delta^{13}C = -26.4‰$

Basal *Sphagnum* peat, moderately humified, taken ca 200m from S edge of mire.

3140 ± 50

Lu-2529. Hammarmossen 4, Core I4, 300–305cm $\delta^{13}C = -25.8‰$

Basal *Sphagnum* peat, moderately humified, taken ca 300m from S edge of mire.

3950 ± 60

Lu-2530. Hammarmossen 5, Core I5, 300–309cm $\delta^{13}C = -24.8‰$

Basal *Sphagnum* peat, highly humified, taken ca 350m from S edge of mire. Core from largest drained pool.

5190 ± 60

Lu-2531. Hammarmossen 6, Core I6, 375–385cm $\delta^{13}C = -25.0‰$

Basal *Sphagnum* peat, highly humified, from approx center of mire.

5240 ± 60

Lu-2532. Hammarmossen 7, Core I8, 365–375cm $\delta^{13}C = -25.9‰$

Basal *Sphagnum* peat, highly humified, from approx crest of N lobe of mire.

2130 ± 50

Lu-2533. Hammarmossen 8, Core I9, 170–180cm $\delta^{13}C = -27.4‰$

Basal *Sphagnum* peat, highly humified, taken ca 100m from N margin of mire.

5820 ± 60

Lu-2534. Hammarmossen 9, Core II b, 335–345cm $\delta^{13}C = -26.6‰$

Basal *Sphagnum* peat, highly humified.

2390 ± 50

Lu-2535. Hammarmossen 10, Core II c, 235–245cm $\delta^{13}C = -26.4‰$

Basal *Sphagnum* peat, moderately humified, taken ca 200m from E margin of mire along transect II.

1450 ± 45

Lu-2536. Hammarmossen 11, Core II d, 130–140cm $\delta^{13}C = -26.6‰$

Basal *Sphagnum* peat, moderately humified, taken at E margin of mire at forest border.

1300 ± 45

Lu-2537. Hammarmossen 12, Core DP 1b, 90–100cm $\delta^{13}C = -25.2‰$

Algal gyttja from drained pool.

1940 ± 50

Lu-2538. Hammarmossen 13, Core DP 1b, 110–120cm $\delta^{13}C = -25.9‰$

Sphagnum peat from drained pool.

2040 ± 50

Lu-2539. Hammarmossen 14, Core DP E, 210–220cm $\delta^{13}C = -26.7‰$

Algal gyttja from E drained pool.

Lu-2540. Hammarmossen 15, Core DP E, 225–230cm **2390 ± 50** $\delta^{13}C = -26.1‰$

Sphagnum peat from E drained pool.

Lu-2541. Hammarmossen 16, Pool 2, 305–310cm **3770 ± 60** $\delta^{13}C = -26.7‰$

Algal gyttja from pool. Water depth 1.9m at coring point. *Comment:* sample undersized; diluted; 88% sample.

Lu-2542. Hammarmossen 17, Pool 2, 315–320cm **4200 ± 60** $\delta^{13}C = -26.9‰$

Sphagnum peat from same pool as Lu-2541, above.

Lu-2543. Hammarmossen 18, Pool 1, 285–290cm **2580 ± 50** $\delta^{13}C = -27.3‰$

Algal gyttja from pool. Water depth 1.9m at coring point.

Lu-2544. Hammarmossen 19, Pool 1, 300–310cm **4010 ± 60** $\delta^{13}C = -25.9‰$

Sphagnum peat from same pool as Lu-2543, above.

Lu-2545. Hammarmossen 20, Pool 1, 310–315cm **4130 ± 60** $\delta^{13}C = -26.7‰$

Sphagnum peat from same pool as Lu-2543, above.

Bjäresjö series (II)

Peat from lake S of Bjäresjö village, 5km NW of Ystad, S Scania (55° 27.5′ N, 13° 45.3′ E). Coll 1985 and subm by M-J Gaillard, Dept Quaternary Geol, Univ Lund. Dated as complement to Bjäresjö series (R, 1986, v 28, no. 3, p 1119–1120). Samples are from Cores C1 and C3, taken with 5cm Russian-type corer. Depths (m) refer to sediment surface. Pretreated with HCl.

Lu-2561. Bjäresjö 7:85, 5.05–5.11m **6200 ± 70** $\delta^{13}C = -28.4‰$

Carr peat with remains of *Carex* and wood. Core C1. Water depth 1.75m at coring point. Pollen zone AT 1 or AT 2 (Nilsson, 1961).

Lu-2562. Bjäresjö 8:85, 8.93–9.03m **9690 ± 90** $\delta^{13}C = -29.7‰$

Carr peat with remains of *Carex* and wood (*Pinus*). Core C3. Water depth 1.7m at coring point. Pollen zone PB (Nilsson, 1961).

Subfossil Pine Series II

Subfossil wood (*Pinus silvestris*) from lakes Tjåutjanjarka (68° 20.3′ N, 19° 8.2′ E) and Pulsojärvi (68° 25′ N, 21° 07′ E), N Lappland. Coll 1985 and subm by T Bartholin, Lab Wood Anatomy and Dendrochronol, Dept Qua-

ternary Geol, Univ Lund. Dated as complement to Subfossil Pine Series I (R, 1986, v 28, no. 3, p 1111–1113). All samples pretreated with HCl and NaOH. Lu-2577 and -2578 were charred in nitrogen atmosphere before burning.

Lu-2576. Tjåutjanjarka, Sample 25075 **5440 ± 60** $\delta^{13}C = -27.8‰$

Wood from tree rings No. 1 to 60 (from center).

Lu-2577. Pulsojärvi, Sample 19006 **4750 ± 70** $\delta^{13}C = -28.0‰$

Wood from tree rings No. 1 to 60 (from center). *Comment:* sample undersized; diluted; 85% sample.

Lu-2578. Pulsojärvi, Sample 19007 **4400 ± 60** $\delta^{13}C = -26.3‰$

Wood from tree rings No. 1 to 45 (from center). *Comment:* sample undersized; diluted; 89% sample.

Årshultsmyren series

Peat from raised bog, SW Småland (56° 47′ N, 13° 25.5′ E), alt ca 155m. Coll 1985 and subm by M Thelaus, Dept Quaternary Geol, Univ Lund. Dated as part of study of palaeohydrol changes in raised bogs and lake basins in S and central Småland. Samples taken with 10cm Russian-type corer. Depths (m) refer to bog surface. Humification is given in H1–10 scale (Magnusson, Lundqvist & Regnell, 1963, p 567). All samples pretreated with HCl and charred in nitrogen atmosphere before burning.

Lu-2582. Årshultsmyren 1, 4.79–4.83m **4860 ± 60** $\delta^{13}C = -24.0‰$

Sphagnum peat, H8, Coring Point BP 5, Sec D.

Lu-2583. Årshultsmyren 2, 4.71–4.76m. **4770 ± 60** $\delta^{13}C = -25.8‰$

Sphagnum peat, H3, Coring Point BP 5, Sec D.

Lu-2584. Årshultsmyren 3, 4.42–4.46m **5020 ± 60** $\delta^{13}C = -26.8‰$

Sphagnum-Eriophorum peat, H8, Coring Point BP 12, Sec D.

Lu-2585. Årshultsmyren 4, 4.37–4.42m **4860 ± 60** $\delta^{13}C = -27.4‰$

Sphagnum peat, H4, Coring Point BP 12, Sec D.

Björkeröds Mosse series

Coarse organic matter, mainly brown mosses, washed from sediment from fen basin (ca 400x40m) on hill ridge Kullaberg at Björkeröd, NW Scania (56° 17′ N, 12° 30′ E), alt 70 to 80m. Coll 1985 and subm by G Lem-

dahl, Dept Quaternary Geol, Univ Lund. For other dates from area, see Mt Kullen biostratigraphy series (R, 1971, v 13, p 346–347) and Håkulls Mosse series (I–IV) (R, 1978, v 20, p 416–417; 1980, v 22, p 1049–1050; 1984, v 26, p 394–395; 1986, v 28, no. 3, p 1113). Samples taken with 10cm piston corer. Depths (m) refer to fen surface. No pretreatment. All samples undersized; diluted. Amount of CO_2 from sample is given in *Comments* below as "% sample."

Lu-2589. Björkeröds Mosse A6:1, 3.94–4.15m **13,500 ± 550** $\delta^{13}C = -28.5‰$

Coarse organic matter, mainly brown mosses, from gray calcareous clay with thin silt layers. Pollen zone DR 1 (Berglund, 1971). *Comment:* 19% sample. (3 1-day counts.)

Lu-2590. Björkeröds Mosse A6:2, 3.74–3.94m **14,000 ± 140** $\delta^{13}C = -29.8‰$

Coarse organic matter, mainly brown mosses, from gray calcareous silty clay. Pollen zone DR 1. *Comment:* 57% sample. (4 1-day counts.)

Lu-2591. Björkeröds Mosse A6:4, 3.30–3.42m **14,130 ± 450** $\delta^{13}C = -26.8‰$

Coarse organic matter, mainly brown mosses, from gray calcareous clay with thin silt layers. Pollen zone DR 1. *Comment:* 28% sample. (3 1-day counts.)

General Comment: hard-water error possible because of carbonate content in sediment due to calcareous till in catchment.

Lu-2651. Håkulls Mosse B8:9, 3.80–3.88m **11,220 ± 100** $\delta^{13}C = -27.4‰$

Wood fragments from small fen on hill ridge Kullaberg, NW Scania (56° 17′ N, 12° 31′ E), alt ca 125m. Coll 1983 and subm by G Lemdahl. Wood washed from sediment sample (j-k) taken with 10cm Livingstone piston corer. Allerød pollen zone. Depth refers to fen surface. For previous dates from Håkulls Mosse, see Björkeröds Mosse series, above, for refs. *Comment:* no pretreatment; sample undersized; diluted; 79% sample. (3 1-day counts.)

Stensjön series

Sediment from Stensjön, Kalmar län, E Småland (57° 12′ N, 16° 17′ E). Coll March 1983 and subm by N-O Svensson, Dept Quaternary Geol, Univ Lund. Dated as part of study of Late Weichselian and Early Holocene shore displacement on Gotland and in E Småland, mainly based on bio- and lithostratigraphic studies of lake sediments (Svensson, 1985). For other dates from area, see Eastern Småland series (R, 1986, v 28, p 141–143). Samples taken with 10cm and 7cm (Lu-2634) Russian-type corer. Depths (cm) refer to sediment surface. Water depth ca 2.2m at coring point. All samples pretreated with HCl. Lu-2632 received additional treatment with NaOH and soluble fraction was precipitated with HCl and dated separately.

9720 ± 150

Lu-2632. Stensjön 4, insoluble, 524.25–529.75cm $\delta^{13}C = -31.4‰$

Insoluble fraction of gyttja. Pollen zone boundary Preboreal/Boreal. Estimated age 9700 BP, based on pollen stratigraphy. *Comment:* sample undersized; diluted; 38% sample. (3 1-day counts.)

9450 ± 100

Lu-2632A. Stensjön 4, soluble, 524.25–529.75cm $\delta^{13}C = -31.1‰$

Acid-precipitated part of NaOH-soluble fraction. *Comment:* sample undersized; diluted; 77% sample.

9500 ± 90

Lu-2633. Stensjön 5, 505.5–511.5cm $\delta^{13}C = -30.6‰$

Gyttja. Boreal pollen zone. Estimated age 9500 BP, based on pollen stratigraphy.

8740 ± 80

Lu-2634. Stensjön 6, 467.25–479.75cm $\delta^{13}C = -31.3‰$

Gyttja. Pollen zone boundary BO 1/BO 2. Estimated age 8900, based on pollen stratigraphy.

Iceland

11,520 ± 100

Lu-2524. Urridaá $\delta^{13}C = -1.3‰$

Marine bivalve shells (*Chlamys islandica*), *in situ* at contact between lodgement till (below) and glacial-marine silt (above) at Leirárvogur, Borgarfjördur, W Iceland (64° 22.5′ N, 21° 52′ W). Coll Sept 1985 and subm by Ó Ingólfsson, Dept Quaternary Geol, Univ Lund.

Akranes series (II)

Humic acid fraction of sandy peat from 295 to 320cm below present high-tide marks at Höfdavik, just N of Akranes (64° 20′ N, 22° 04′ W). Coll 1983 and subm by Ó Ingólfsson. Dated to gain information about peat growth rate. For date on insoluble fraction, see R, 1986, v 28, no. 3, p 1121–1122.

6300 ± 120

Lu-2395AI. Akranes 1, 310–320cm $\delta^{13}C = -27.7‰$

Acid-precipitated part of NaOH-soluble fraction of peat from 310 to 320cm below present high-tide marks. *Comment:* sample undersized: diluted; 42% sample.

6060 ± 80

Lu-2395AII. Akranes 1, 295–310cm $\delta^{13}C = -27.9‰$

Acid-precipitated part of NaOH-soluble fraction of peat from 295 to 310cm below present high-tide marks. *Comments:* sample undersized; diluted; 78% sample.

Southern Iceland Series II

Marine mollusk and balanid shells and charcoal from S Iceland. Coll 1983–1985 and subm by A Hjartarson, Natl Energy Authority, Reykjavík. Dated as complement to Southern Iceland Series I (R, 1986, v 28, no. 3, p 1122–1123). Mollusks and charcoal id by submitter.

Lu-2596. Oddgeirshólar, Árnessysla **10,440 ± 90** $\delta^{13}C = +1.0‰$

Shells (*Pecten islandicus, Spisula solida, Mya truncata, Zirphaea crispata*) from silt and sand layers (basal sediments) 18km S of Buđi end moraines at bank of Hvitá R (64° 00′ N, 20° 48′ W), alt 25m. *Comment:* outer 39% removed by acid leaching.

Lu-2597. Vatnsendi, Árnessysla **9840 ± 90** $\delta^{13}C = +0.9‰$

Unid. thin shells of bivalves, balanids, and one gastropod from southernmost fossil-bearing site, Árnessysla, at Villingaholtshreppur gravel pit (63° 53′ N, 20° 47′ W), alt 30m. *Comment:* outer 9% removed by acid leaching.

Lu-2598. Syđri-Rauđalaekur, Rangarvallasysla **9870 ± 90** $\delta^{13}C = -0.4‰$

Unid. fragments of gastropods, balanids, and bivalves from silt and sand layers in lower part of raised delta of Rangarvellir at Holtahreppur (63° 51′ N, 20° 28′ W), alt 10m. *Comment:* outer 8% removed by acid leaching. Sample undersized; diluted; 92% sample.

Lu-2599. Nauthólsvík, Reykjavík **11,530 ± 100** $\delta^{13}C = +3.7‰$

Large shell fragments (*Mya truncata*) from Fossvogur fossil-bearing layers (Einarsson, 1968) at Nauthólsvík, W of harbor (64° 07′ N, 21° 56′ W). *Comment:* outer parts of shell fragments could not be completely removed by acid leaching since they were partly covered by lava remains. Lava showed no reaction for 10% HCl.

Lu-2600. Hròarsholtslaekur **10,060 ± 70** $\delta^{13}C = +1.5‰$

Thick fragments (*Arctica islandica*) from loose sand beds at Hròarsholtslaekur, Laekur, Árnessysla (63° 53′ N, 20° 53′ W), alt 35m. *Comment:* outer 54% removed by acid leaching. (3 1-day counts.)

Lu-2601. Buđi, Árnes, Árnessysla **7800 ± 60** $\delta^{13}C = -25.6‰$

Charcoal of *Salix* or *Cytisus* from top of subfossil soil just below Thjórsá lava near Buđi waterfall (64° 01′ N, 20° 17′ W), alt 70m. *Comment:* pretreated with HCl. (3 1-day counts.)

General Comment: corrections for deviations from $\delta^{13}C = -25‰$ PDB are applied. No corrections are made for reservoir age of living marine mollusks. Reservoir age for waters of Iceland pub by Håkansson (1983).

Greenland

Kilen series

Marine bivalves and terrestrial moss from Kilen, N Greenland (ca 81° 10′ N, 14° 00′ W). Coll Aug 1985 and subm by C Hjort, Dept Quaternary Geol, Univ Lund. Dated as part of study of glacial and interglacial chronology and paleoclimatology and occurrence of biological refuges in NE and N Greenland. Bivalves id by submitter.

Lu-2569. Kilen CHT 1 **11,350 ± 100**
$\delta^{13}C = +0.9‰$

Shells and fragments (*Hiatella arctica, Mya truncata*) from silt in frost-boils from +15 to +22m. *Comment:* outer 36% removed by acid leaching.

Lu-2570. Kilen CHT 2a **8870 ± 80**
$\delta^{13}C = +0.9‰$

Shell fragments (*Hiatella arctica, Mya truncata*) from free-melted area at +22m within glacier. Sample supposed to give max age of readvance. *Comment:* outer 28% removed by acid leaching.

Lu-2571. Kilen CHT 4a **270 ± 50**
$\delta^{13}C = -31.4‰$

Terrestrial moss exposed by melting of glacier. Sample supposed to give max age of readvance. *Comment:* pretreated with HCl and NaOH. Sample undersized; diluted; 68% sample.

Lu-2572. Kilen CHT 12 **8890 ± 80**
$\delta^{13}C = +1.1‰$

Shells and fragments (*Hiatella arctica, Mya truncata*) from free-melted area at ca +15m within glacier. Sample supposed to give max age of readvance. *Comment:* outer 33% removed by acid leaching.

Lu-2605. Kilen CHT 15 **8380 ± 80**
$\delta^{13}C = +0.8‰$

Shells (*Mya truncata*) from top till in "Ymer-sequence." *Comment:* outer 53% removed by acid leaching.

Lu-2573. Kilen CHT 23 **>41,000**
$\delta^{13}C = +0.8‰$

Shells (*Hiatella arctica, Mya truncata*) from highest marine sediments on Kilen (sand and gravel) overlying till at ca +70m. *Comment:* outer 33% removed by acid leaching. (3 1-day counts.)

Lu-2574. Kilen CHT 24a **10,100 ± 90**
$\delta^{13}C = +0.5‰$

Shells (*Hiatella arctica, Mya truncata*) from sand at ca +34m overlain by gravel beds. Date of importance for shore-line displacement curve. *Comment:* outer 39% removed by acid leaching.

Lu-2575. Kilen CHT 25 **>39,000** $\delta^{13}C = +1.0‰$

Dislocated shell fragments (*Hiatella arctica*) from ca +60m. *Comment:* outer 32% removed by acid leaching.

General Comment: corrections for deviations from $\delta^{13}C = -25‰$ PDB are applied. No corrections are made for reservoir age of living marine mollusks. Revised reservoir age for E Greenland based on 4 dates on 3 shell samples coll 1899 and 1900 (Hjort, 1973; Olsson, 1980) is 515 ± 25 yr. No recent dates available for N Greenland coast.

Crete

Lu-2525. Tylisos **2230 ± 70** $\delta^{13}C = -9.8‰$

Small calcareous concretions from 2m below surface in loess deposits at Tylisos, Crete (35° 18′ N, 25° 01′ E), alt ca 200m. Coll June 1985 and subm by T Nihlén, Dept Phys Geog, Univ Lund. Dated as part of study of eolian deposits in N Africa and Mediterranean (Nihlén, 1985; Rapp & Nihlén, 1986).

United States

Minnesota

Northern Minnesota series

Sediment from Heikkilla Lake (47° 39′ 16″ N, 92° 10′ 24″ W), S Lempia Lake I (47° 43′ 22″ N, 92° 15′ W), S Lempia Lake II (47° 43′ 24″ N, 92° 15′ 07″ W), Swamp Lake (47° 37′ 52″ N, 92° 18′ W), Sabin Lake I (47° 35′ 23″ N, 92° 18′ 05″ W), and Sabin Lake II (47° 34′ 40″ N, 92° 17′ 30″ W), Iron Range, N Minnesota. Coll Sept 1984 and subm by S Björck. Dated to gain information about chronology of deglaciation and revegetation during Laurentide ice retreat in N Minnesota, as complement to previous study in NW Ontario (Björck, 1985). Samples taken with 5cm Livingstone corer. Depths (m) refer to sediment surface or peat surface (Swamp Lake). All samples pretreated with HCl. All samples except Lu-2500, -2504, and -2505 undersized; diluted. Amount of CO_2 from sample is given in *Comments* as "% sample." Organic carbon content given in *Comments* is calculated from final yield of CO_2 and based on amount of material remaining after pretreatment. Loss of organic carbon during processing of sample and non-proportional loss during pretreatment may result in somewhat lower values than original ones.

Heikkilla Lake

Alt 442m. Water depth 1m at coring point.

Lu-2556. Heikkilla Lake, 1.68–1.72m **12,100 ± 150** $\delta^{13}C = -22.8‰$

Silty organic clay. *Comment:* 50% sample. Organic carbon content: ca 0.8%. (3 1-day counts.)

12,070 ± 170

Lu-2496. Heikkilla Lake, 1.53–1.57m $\delta^{13}C = -23.7‰$

Silty organic clay. *Comment:* 55% sample. Organic carbon content: ca 1%.

11,320 ± 130

Lu-2497. Heikkilla Lake, 1.38–1.42m $\delta^{13}C = -22.8‰$

Silty organic clay. *Comment:* 72% sample. Organic carbon content: ca 1.5%.

10,690 ± 120

Lu-2498. Heikkilla Lake, 1.235–1.27m $\delta^{13}C = -19.8‰$

Clayey algal gyttja. *Comment:* 56% sample. Organic carbon content: ca 11%. (3 1-day counts.)

10,110 ± 150

Lu-2499. Heikkilla Lake, 1.15–1.19m $\delta^{13}C = -16.2‰$

Algal gyttja. *Comment:* 62% sample. Organic carbon content: ca 19%.

S Lempia Lake

Alt 446.5m. Lake has 2 separate basins. Water depth at coring points: 3m in Basin I and 7m in Basin II.

12,050 ± 240

Lu-2555. S Lempia Lake I, 6.46–6.51m $\delta^{13}C = -25.4‰$

Silty organic clay. *Comment:* 25% sample. Organic carbon content: ca 0.7%. (4 1-day counts.)

11,380 ± 100

Lu-2500. S Lempia Lake I, 6.32–6.42m $\delta^{13}C = -26.7‰$

Sandy, gravelly, organic clay with mosses. *Comment:* organic carbon content: ca 2%.

10,660 ± 160

Lu-2501. S Lempia Lake I, 6.18–6.23m $\delta^{13}C = -22.7‰$

Clay gyttja. *Comment:* 38% sample. Organic carbon content: ca 1.5%. (3 1-day counts.)

11,500 ± 550

Lu-2502. S Lempia Lake II, 2.90–2.96m $\delta^{13}C = -25.3‰$

Slightly organic clay. *Comment:* 17% sample. Organic carbon content: ca 0.5%. (4 1-day counts.)

7580 ± 90

Lu-2503. S Lempia Lake II, 2.70–2.75m $\delta^{13}C = -29.2‰$

Clayey algal gyttja. *Comment:* 79% sample. Organic carbon content: ca 15%.

Swamp Lake

Alt 438m. Coring made in peat at lake shore.

Lu-2504. Swamp Lake, 5.12–5.19m **9510 ± 90** $\delta^{13}C = -24.3‰$

Organic sand. *Comment:* organic carbon content: ca 2.5%.

Lu-2505. Swamp Lake, 5.0–5.05m **8890 ± 80** $\delta^{13}C = -26.8‰$

Sandy, muddy, peat. *Comment:* organic carbon content: ca 15%.

Sabin Lake

Alt 416m. Lake has 2 separate basins. Water depth at coring points: 5.2m in Basin I and 5.3m in Basin II.

Lu-2506. Sabin Lake I, 3.97–4.05m **10,230 ± 120** $\delta^{13}C = -28.4‰$

Clayey, silty, gyttja. *Comment:* 70% sample. Organic carbon content: ca 4%.

Lu-2507. Sabin Lake II, 3.25–3.31m **10,320 ± 170** $\delta^{13}C = -29.1‰$

Clay gyttja. *Comment:* 65% sample. Organic carbon content: ca 5%.

RESERVOIR AGE SAMPLES

Kristineberg series

Shells and soft organic parts of bivalves coll alive in 1946 by Å Hillefors in Gunnarsfjärden, outside Kristineberg (58° 15′ N, 11° 26′ E), Swedish W coast. Subm 1976 by collector. Dated to gain more information about reservoir effects in coastal waters of W Sweden. $\delta^{13}C$ value of bivalve meat is of special interest for research on influence of marine food on ^{14}C age of humans who lived in coastal areas (see *eg*, Tauber, 1981a,b; Chisholm, Nelson & Schwarz, 1982).

Lu-1782. Kristineberg, shells **450 ± 45** $\delta^{13}C = +2.3‰$

Shells (*Cyprina islandica*) from one comparatively young specimen. *Comment:* expected ^{14}C age of mollusks living in 1946 is 110 ± 20 BP, corrected for reservoir effects (see Olsson, 1980, p 670). Thus, reservoir age is 340 ± 50 yr.

Lu-1781. Kristineberg, organic parts **420 ± 45** $\delta^{13}C = -20.1‰$

Organic parts of 2 bivalves (*Cyprina islandica*); one used for Lu-1782, above, and one larger specimen. *Comment:* expected reservoir-corrected ^{14}C age: 110 ± 20 BP. Reservoir age: 310 ± 50 yr.

General Comment: mean value for reservoir age for Swedish W coast based on previous measurements of 4 samples in this lab is 340 ± 30 yr (Olsson,

1980, fig 6, p 673). Corrections for deviations from $\delta^{13}C = -25‰$ PDB are applied also for these samples.

Långören series

Seaweed and terrestrial moss coll ca AD 1900 for insulation in house built on Långören I., Torhamn archipelago, SE Blekinge, S Sweden (56° 04′ N, 15° 50′ E). Subm by B Berglund. Dated to gain more information about reservoir effects in S Baltic Sea. Moss was intended as ref sample for atmospheric ^{14}C level in area at time of colln. Material pretreated with HCl.

Lu-1867. Långören 1900, *Zostera* **340 ± 40**
$\delta^{13}C = -9.5‰$

Seaweed (*Zostera marina*). *Comment:* expected ^{14}C age of marine plants living in AD 1900 is 110 ± 20 BP corrected for reservoir effects (Olsson, 1980, fig 4, p 670 and table 3, p 671). Thus, reservoir age is 230 ± 45 yr. Previous measurements on marine plants from S Baltic Sea (St-1468, -1469, -1474, -1517) yielded values between 210 ± 75 and 250 ± 65 yr for reservoir age (Olsson, 1980, p 671), in good agreement with our value. (3 1-day counts.)

Lu-1868I. Långören 1900, *Hylocomium* 1 **160 ± 40**
$\delta^{13}C = -27.0‰$

Terrestrial moss (*Hylocomium splendens*). *Comment:* expected ^{14}C age of terrestrial plants living in AD 1900 is 85 ± 15 BP (see Stuiver, 1982, p 8). Thus, reservoir age is 75 ± 45 yr. (3 1-day counts.)

Lu-1868II. Långören 1900, *Hylocomium* 2 **140 ± 45**
$\delta^{13}C = -27.5‰$

Other portion of same moss as used for Lu-1868I, above. *Comment:* dated to try to confirm reservoir age of terrestrial moss. Reservoir age: 55 ± 50 yr. Olsson (1980, p 668) found reservoir age of 115 ± 95 yr for terrestrial animal (*Alces alces*) from SE Sweden.

General Comment: corrections for deviations from $\delta^{13}C = -25‰$ PDB are applied also for these samples.

RECENT PLANT SAMPLES

Results are given as difference, Δ, from our ^{14}C standard (95% activity of NBS oxalic acid standard No. 4990A, age corrected to 1950):

$$\Delta = \delta^{14}C - (2\delta^{13}C + 50)\left(1 + \frac{\delta^{14}C}{1000}\right)$$

where $\delta^{14}C$ is observed deviation from ^{14}C standard in per mil and $\delta^{13}C$ deviation from PDB standard in per mil.

Terrestrial plant series (II)

Various plant materials coll to determine atmospheric ^{14}C activity. Measured as complement to previous series (R, 1977, v 19, p 439). All samples coll by S Håkansson.

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$\Delta = \mathbf{356 \pm 6.0‰}$
Lu-1783. Skrylle 1977, *Picea* $\delta^{13}C = -23.2‰$

Wood from outermost tree ring from stump of *Picea abies* cut down Dec 1977, ca 400m E of Recreation Center Skryllegården (55° 41′ 40″ N, 13° 22′ E). *Comment:* pretreated with HCl and NaOH. Clean air ref value for German Federal Republic is Δ = 338 ± 3‰ for growing season of 1977 (Levin, Münnich & Weiss, 1980, p 386; Segl *et al,* 1983, p 583, footnote 1).

$\Delta = \mathbf{352 \pm 5.9‰}$
Lu-1784. Åmossen 1977, *Carex* $\delta^{13}C = -25.7‰$

Sedge (*Carex* sp) coll Oct 23, 1977 at shore of lake at Åmossen, S Scania (55° 27′ 10″ N, 13° 15′ 30″ E). *Comment:* pretreated with HCl.

$\Delta = \mathbf{305 \pm 6.0‰}$
Lu-1978. Måryd 1978, *Juncus* $\delta^{13}C = -27.2‰$

Juncus sp coll July 7, 1978 at shore of pond at Måryd, S Scania (55° 42′ 05″ N, 13° 22′ 25″ E). *Comment:* no pretreatment.

$\Delta = \mathbf{284 \pm 4.9‰}$
Lu-1889. Mästermyr 1980, *Sesleria* $\delta^{13}C = -25.0‰$

Grass (*Sesleria caerulea*) growing on marl from newly dried wet area on calcareous bedrock at Mästermyr, SW Gotland (57° 13′ 45″ N, 18° 18′ 15″ E). Coll May 20, 1980. *Comment:* pretreated with HCl. (3 1-day counts.) No indication of carbon uptake from marl (*cf* Lu-1938, below).

$\Delta = \mathbf{287 \pm 4.8‰}$
Lu-1938. Skrylle 1980, *Luzula* $\delta^{13}C = -28.2‰$

Rush (*Luzula pilosa*) growing on noncalcareous soil on quartzite bedrock, 600m E of Recreation Center Skryllegården (55° 41′ 40″ N, 13° 22′ 25″ E). Coll May 31, 1980. Measured as ref for atmospheric ^{14}C activity close to ground during spring of 1980 for comparison with Lu-1889, above. *Comment:* pretreated with HCl. (3 1-day counts.)

$\Delta = \mathbf{286 \pm 6.2‰}$
Lu-1946. Måryd 1980, *Juncus* $\delta^{13}C = -27.0‰$

Juncus sp coll Sept 14, 1980 at same loc as Lu-1978, above. *Comment:* no pretreatment.

$\Delta = \mathbf{269 \pm 5.9‰}$
Lu-1980. Måryd 1981, *Juncus* $\delta^{13}C = -27.6‰$

Juncus sp coll Oct 4, 1981 at same loc as Lu-1978 and -1946, above. *Comment:* no pretreatment.

Submerged plant series (II)

Recent submerged plants from 2 Scanian lakes; coll by S Håkansson. Measured as complement to previous series (R, 1977, v 19, p 437).

$\Delta = \mathbf{321 \pm 6.0‰}$

Lu-2016. Bysjön 1976, *Enteromorpha* $\delta^{13}C = -12.7‰$

Green tubeformed algae (*Enteromorpha intestinalis*) from Lake Bysjön, S Scania (55° 40′ 30″ N, 13° 33′ E). Coll Sept 29, 1976. *Comment:* pretreated with HCl.

$\Delta = \mathbf{71 \pm 5.2‰}$

Lu-1844. Odensjön 1979, algae $\delta^{13}C = -27.8‰$

Various algae washed from *Myriophyllum* coll Sept 30, 1979 in Lake Odensjön, NW Scania (56° 00′ 15″ N, 13° 16′ 45″ E). *Comment:* no pretreatment.

$\Delta = \mathbf{73 \pm 5.4‰}$

Lu-1986. Odensjön 1980, *Myriophyllum* $\delta^{13}C = -19.3‰$

Myriophyllum alterniflorum from Lake Odensjön. Coll Oct 5, 1980. *Comment:* pretreated with HCl.

ARCHAEOLOGIC SAMPLES

Sweden

Ängdala series (III)

Charcoal and wood from flint mines (Olausson, Rudebeck & Säfvestad, 1980; Ringberg & Rudebeck, 1982) at Ängdala, S Sallerup parish, S Scania. Coll 1981 and 1983 and subm by E Rudebeck, Inst Archaeol, Univ Lund. For other dates from area, see R, 1980, v 22, p 1058; 1981, v 23, p 398; 1984, v 26, p 408. Lu-2508 and -2509 pretreated with HCl and NaOH. Lu-2510 with HCl only.

2800 ± 50

Lu-2508. Ängdala 1981, MHM 6434 $\delta^{13}C = -26.5‰$

Charcoal from fill layer in flint mine, depth ca 1.6m, Structure 62 (55° 35′ 30″ N, 13° 07′ 30″ E), alt 27.5m. Assoc with flint waste, bone, antler, and pottery indicating Early Neolithic culture. *Comment:* no explanation for too late ^{14}C date.

4990 ± 60

Lu-2510. Ängdala 1983:2 $\delta^{13}C = -26.5‰$

Charcoal from fill layer in flint mine (No. 24, Area C), depth ca 3.1m, alt ca 24m. Close to site for Lu-2508, above. Assoc with flint waste. Estimated to be of Early Neolithic Age since wood from nearby flint mine (No. 25) was dated at 4960 ± 70 BP (Lu-2212: R, 1984, v 26, p 408).

4140 ± 60

Lu-2509. Ängdala 1983, MHM 6655 $\delta^{13}C = -27.6‰$

Wood (No. 6) from Structure 220, Tr 4, in Neolithic flint mine (55° 35′ 25″ N, 13° 07′ 10″ E), depth ca 2m, alt ca 21.5m. Assoc with flint waste.

Fosie Series II

Charcoal from settlement area (Settlement I) with traces (*eg,* posthole marks) of houses with assoc artifacts indicating Late Bronze Age (Björhem & Säfvestad, 1983; Björhem, ms, 1983) at Fosie, Lockarp parish, S Scania (55° 33′ 15″ N, 13° 03′ 20″ E). Coll 1979 and subm by N Björhem, Inst Archaeol, Univ Lund. For other dates from area, see Fosie Series I (R, 1984, v 26, p 408).

Lu-2519. Fosie IV, MHM 6185:331a **2870 ± 50** $\delta^{13}C = -25.6‰$

Charcoal from Pit A, Level IV, depth 0.6 to 0.8m. Assoc with pottery, flint, bone, and crucible. *Comment:* normal pretreatment with HCl and NaOH.

Lu-2520. Fosie IV, MHM 6185:84 **2520 ± 70** $\delta^{13}C = -25.7‰$

Charcoal from basal layer in large pit, Sq 52/63, Level V. Assoc with bronze object, pottery, flint, and bone. *Comment:* mild pretreatment with HCl and NaOH. Sample undersized; diluted; 54% sample.

Lu-2521. Fosie IV, MHM 6185:80 **2560 ± 70** $\delta^{13}C = -26.7‰$

Charcoal from Pit E, Level IV, depth ca 0.5 to 0.7m. Assoc with pottery, flint, and bone. *Comment:* mild pretreatment with HCl and NaOH. Sample undersized; diluted; 62% sample.

Lu-2522. Fosie IV, MHM 6185:109 **2530 ± 70** $\delta^{13}C = -25.5‰$

Charcoal from pit, Sq D, Level III, depth ca 0.3m. Assoc with bronze object, pottery, flint, and bone. *Comment:* mild pretreatment with HCl and NaOH. Sample undersized; diluted; 55% sample.

Lu-2523. Fosie IV, MHM 6185:180 **2620 ± 50** $\delta^{13}C = -25.4‰$

Charcoal from Pit I, Sq C, Level IV, depth ca 0.5 to 0.7m. Assoc with pottery, flint, and bone. *Comment:* normal pretreatment with HCl and NaOH.

Jonstorp series

Charcoal from Middle Neolithic settlement area (Pitted Ware culture?) at Jonstorp, NW Scania (56° 13′ N, 12° 40′ E). Coll by A Wihlborg; subm by A Carlie, Inst Archaeol, Univ Lund. Dated as part of study of cultural characteristics and chronologic relations between different sites in area.

Lu-2592. Jonstorp M3, x = 10, y = 12 **4120 ± 60** $\delta^{13}C = -24.3‰$

Charcoal from x = 10, y = 12, Layer 4. *Comment:* mild HCl pretreatment.

4130 ± 70

Lu-2593. Jonstorp M3, x = 15.4, y = 10 $\delta^{13}C = -25.3‰$

Charcoal from x = 15.4, y = 10, Layer 4. *Comment:* no pretreatment; sample undersized; diluted; 66% sample.

Battle Axe culture series

Charcoal and hazelnut hulls from settlement areas (Battle Axe culture) at Kabusa (55° 25′ N, 13° 57′ E) and Ullstorp (55° 31.5′ N, 13° 58′ E), S Scania. Coll 1960 by R Petré (Lu-2554) and 1986 by M Larsson; subm by L Larsson, Inst Archaeol, Univ Lund. Human bone collagen from Battle Axe culture grave at St Beddinge dated at 3740 ± 60 BP (Lu-2464: R, 1986, v 28, no. 3, p 1128). Lu-2630 received mild pretreatment with NaOH and HCl; normal pretreatment with HCl and NaOH for other samples.

3850 ± 60

Lu-2554. Ullstorp $\delta^{13}C = -25.8‰$

Charcoal from post hole, Grave 1, Ullstorp 11, Ullstorp parish. Assoc with pottery and flint tools.

3960 ± 70

Lu-2630. Kabusa, Anl 21 $\delta^{13}C = -28.1‰$

Charcoal and few hazelnut hull fragments from Structure 21 at Kabusa, St Köpinge parish. *Comment:* sample undersized; diluted; 74% sample.

3920 ± 60

Lu-2631. Kabusa, Anl 22 $\delta^{13}C = -25.5‰$

Hazelnut hulls and few charcoal fragments from Structure 22 at Kabusa. Assoc with pottery.

Fairyhill series

Charcoal from settlement area with artifacts indicating Late Mesolithic to Late Neolithic culture at Fairyhill 12:3, Stehag parish, central Scania (55° 55′ N, 13° 26′ E). Coll 1985 by L Carlie; subm by L Larsson. Lu-2628 received mild pretreatment with NaOH and HCl. Normal pretreatment with HCl and NaOH for other samples.

4810 ± 60

Lu-2546. Fairyhill 12:3, Anl 117A $\delta^{13}C = -27.0‰$

Charcoal from Structure 117A. Assoc with pottery and flint tools.

2190 ± 50

Lu-2547. Fairyhill 12:3 $\delta^{13}C = -25.9‰$

Charcoal from x = 96, y = 136. Assoc with flint tools. *Comment:* Mesolithic date expected, but flint tools or charcoal apparently reworked.

5480 ± 60

Lu-2627. Fairyhill 12:3, Anl 3 $\delta^{13}C = -26.6‰$

Charcoal from Structure 3, x = 95, y = 197. Assoc with pottery and flint artifacts. *Comment:* somewhat earlier than expected but reasonable.

5900 ± 100

Lu-2628. Fairyhill 12:3, Anl 10A $\delta^{13}C = -27.1‰$

Charcoal from Structure 10A, Sect VI. Assoc with flint tools. *Comment:* sample undersized; diluted; 51% sample.

5710 ± 70

Lu-2629. Fairyhill 12:3, Anl 61 $\delta^{13}C = -25.9‰$

Charcoal from Structure 61, Sect III:E. Assoc with flint tools and pottery.

5920 ± 90

Lu-2553. Skateholm IX $\delta^{13}C = -26.2‰$

Charcoal from x = 906, y = 904 to 905, Layer 2, at Ö Vemmenhög 1:11, S Scania (55° 23′ 20″ N, 13° 29′ 30″ E). Skateholm IX is Ertebølle culture settlement in E part of Skateholm settlement area (R, 1986, v 28, p 155). Assoc with flint tools. *Comment:* mild pretreatment with NaOH and HCl. Sample undersized; diluted; 66% sample.

Ystad project series

Charcoal from various sites in area around Ystad. Archaeol study is part of interdisciplinary proj on dynamics of human influence on landscape in Ystad area, S Scania (Larsson, 1986; Olausson, 1986). Coll 1985 by M Larsson and M Regnell; subm by M Larsson, Inst Archaeol, Univ Lund.

2750 ± 50

Lu-2548. St Herrestad $\delta^{13}C = -25.3‰$

Charcoal from hearth (Structure 7) at St Herrestad 68:103, St Herrestad parish (55° 27′ 30″ N, 13° 52′ 40″ E). Assoc with flint and pottery indicating Middle Neolithic Age. *Comment:* normal pretreatment with HCl and NaOH. Date unexpectedly late for unknown reason.

680 ± 45

Lu-2549. Trunnerup $\delta^{13}C = -27.2‰$

Charcoal from hearth at Trunnerup 4:3, Villie parish (55° 30′ N, 13° 38′ E). Assoc with flint and pottery indicating Early Neolithic Age. *Comment:* normal pretreatment with HCl and NaOH. Apparently no connection between charcoal and artifact assemblage.

1210 ± 60

Lu-2550. Mossby 27:1, Anl 131 $\delta^{13}C = -25.7‰$

Charcoal from Structure 131 near clay wall of Early Neolithic Age at Mossby 27:1, W Nöbbelöv parish (55° 25′ N, 13° 37′ E). Assoc with flint and

pottery from older part of Early Neolithic Age. *Comment:* no pretreatment; sample undersized; diluted; 72% sample. Date unexpectedly late for unknown reason. In nearby part of Mossby area Iron Age settlement was excavated in Aug 1985 (D Olausson, pers commun, 1986).

6480 ± 70

Lu-2552. Mossby 27:1, Anl 84 and 85 $\delta^{13}C = -25.7‰$

Charcoal from 2 pits (Structures 84 and 85) at same site as Lu-2550, above. Same artifact assemblage as Lu-2550. *Comment:* mild pretreatment with NaOH and HCl. Somewhat earlier than expected, but reasonable.

2940 ± 60

Lu-2551. Gånarp $\delta^{13}C = -25.6‰$

Charcoal from fill in remainder of kiln, depth ca 0.4m, at Gånarp 6:1, Tostarp parish, NW Scania (56° 17′ 10″ N, 12° 56′ 20″ E). Coll Oct 1985 and subm by A Löfgren, Riksantikvarieämbetet, UV-Syd, Lund. Assoc with slag indicating Early Iron Age. *Comment:* mild pretreatment with NaOH and HCl.

Hässlehult series

Charcoal from settlement area (Ertebølle culture) at Hässlehult 1:1, Ryssby parish, W Småland (56° 49.5′ N, 16° 22′ E). Coll 1984 by E Westergren and M Rasch; subm by E Westergren, Inst Archaeol, Univ Lund.

7040 ± 70

Lu-2563. Hässlehult, Sample 1 $\delta^{13}C = -25.8‰$

Charcoal from soot-mixed sand, Sq 113/110, depth 0.4m. Assoc with flint waste. *Comment:* normal pretreatment with HCl and NaOH.

5670 ± 90

Lu-2564. Hässlehult, Sample 2 $\delta^{13}C = -26.0‰$

Charcoal particles from soot-mixed sand layer below ploughed surface layer. Assoc with micro-chips and flint waste. *Comment:* mild HCl pretreatment. Sample undersized; diluted; 62% sample.

Nymölla series (IV)

Charcoal from coastal settlement area (Middle Neolithic—Pitted Ware culture and Battle Axe culture) at Nymölla, Gualöv parish, NE Scania (56° 02′ N, 14° 28′ E). Coll May 1985 and subm by B Wyszomirska, Inst Archaeol, Univ Lund. For previous dates from area, see R, 1982, v 24, p 210; 1984, v 26, p 407; 1986, v 28, no. 3, p 1130. Normal pretreatment with HCl and NaOH.

5930 ± 60

Lu-2557. Nymölla III, XIV/14 $\delta^{13}C = -25.1‰$

Charcoal from occupation layer, Sq XIV/14, +7.5 to 7.62m. Assoc with pottery and flint implements.

Lu-2558. Nymölla III, XV/15 **3300 ± 60** $\delta^{13}C = -25.8‰$

Charcoal from occupation layer, Sq XV/15, +7.34m. Assoc with pottery and flint implements.

Lu-2559. Nymölla III, XVI/15 **3470 ± 60** $\delta^{13}C = -25.5‰$

Charcoal from occupation layer, Sq XVI/15, +7.6m. Assoc with pottery, flint implements, and animal bones.

General Comment: estimated date ca 4600 to 4000 BP, based on artifact assemblage. No explanation for deviating dates.

Lu-2567. Jägershill, MHM 6206 **4440 ± 70** $\delta^{13}C = -21.9‰$

Collagen from animal bone (*Bos*) from occupation layer, Structure 1, Sq 15/10, at Jägershill, S Malmö, SW Scania (55° 34′ N, 13° 03′ E). Coll 1979 and subm by M Svensson, Inst Archaeol, Univ Lund. Assoc with flint implements and Middle Neolithic Funnelbeaker pottery of early type. *Comment:* organic carbon content: 1.6%. Collagen extracted as described previously (R, 1976, v 18, p 290), without NaOH treatment. Sample undersized; diluted; 69% sample.

Lu-2568. Hindbymosse, MHM 1505 **4430 ± 70** $\delta^{13}C = -22.8‰$

Collagen from animal bone (*Bos*) from occupation layer, x-39, y-6, at Hindbymosse, S Malmö, S Scania (55° 34′ N, 13° 02′ E). Coll 1968 by unknown; subm by M Svensson. Assoc with flint implements and Funnelbeaker pottery from middle part of Middle Neolithic Age. *Comment:* collagen extracted as for Lu-2567, above. Organic carbon content: 1.4%. Sample undersized; diluted; 74% sample.

Skanör—Falsterbo series

Charcoal from settlement areas at Skanör and Falsterbo, SW Scania. Coll Aug 1985 and subm by L Ersgård, Inst Archaeol, Univ Lund. Dating is part of study of chronology and structural changes of settlement in area during Early and High Medieval time. Normal pretreatment with HCl and NaOH.

Lu-2579. Skanör 1985:1 **930 ± 50** $\delta^{13}C = -26.8‰$

Charcoal from Layer 4, Tr D, Strandvallen, Skanör (55° 23′ 05″ N, 12° 50′ E).

Lu-2580. Skanör 1985:2 **1030 ± 45** $\delta^{13}C = -25.9‰$

Charcoal from Layer 11, Tr D. Same site as Lu-2579, above.

550 ± 45

Lu-2581. Falsterbo 1985 $\delta^{13}C = -26.7‰$

Charcoal from Layer E, Tr A, Grumbodarna, Falsterbo (55° 23′ 21″ N, 12° 49′ 11″ E). *Comment:* date somewhat later than expected.

Käglinge Gravel Pit series

Charcoal from settlement area (Late Neolithic to Bronze Age) at Glostorp 10:7, ca 1.5km WNW of Käglinge, SW Scania (55° 32.2′ N, 13° 3.5′ E). Excavation of area necessitated by industrial exploitation. Subm by R Thörn and B Nielsen, Malmö Mus, Malmö.

2630 ± 50

Lu-2606. Käglinge Grustäkt 1 $\delta^{13}C = -22.7‰$

Finely disseminated powdery charcoal in sand and silt from hearth (Structure 25), +33.45 to +33.85m. Coll Aug 1982 by G Persson. *Comment:* pretreated with HCl.

2840 ± 50

Lu-2607. Käglinge Grustäkt 2 $\delta^{13}C = -21.4‰$

Charcoal and soot in sand from hearth (Structure 27), +33.15 to +33.40m. Coll Aug 1982 by B Nielsen. Assoc with bone. *Comment:* pretreated with HCl and NaOH.

2900 ± 50

Lu-2608. Käglinge Grustäkt 3 $\delta^{13}C = -26.0‰$

Charcoal from cooking pit (Structure 69), +33.14 to +34.05m. Coll Sept 1982 by B Nielsen. Assoc with flint. *Comment:* pretreated with HCl.

2820 ± 50

Lu-2609. Käglinge Grustäkt 4 $\delta^{13}C = -26.1‰$

Charcoal from long hearth (Structure 128) in E part of settlement, +35.01 to +35.32m. Coll July 1982 by E Jonsson. Assoc with pottery. *Comment:* pretreated with HCl and NaOH.

2970 ± 60

Lu-2611. Käglinge Grustäkt 5 $\delta^{13}C = -26.2‰$

Charcoal from cooking pit (Structure 323), +33.13 to +33.83m. Coll Aug 1982 by B Nielsen. Assoc with flint. *Comment:* pretreated with HCl. Sample undersized; diluted; 85% sample.

2850 ± 50

Lu-2612. Käglinge Grustäkt 6 $\delta^{13}C = -25.8‰$

Charcoal from cooking pit (Structure 352), +33.36 to +33.96m. Assoc with flint. *Comment:* pretreated with HCl and NaOH.

2940 ± 50

Lu-2613. Käglinge Grustäkt 7 $\delta^{13}C = -27.0‰$

Charcoal from cooking pit (Structure 374), +33.83 to +34.75m. Coll

Sept 1982 by B Lindahl. Assoc with pottery and flint. *Comment:* pretreated with HCl and NaOH.

1590 ± 50

Lu-2614. Käglinge Grustäkt 8 $\delta^{13}C = -24.4‰$

Charcoal from long hearth (Structure 558) at NW boundary of used area, +34.48 to +34.66m. Coll Dec 1983 by R Thörn. *Comment:* pretreated with HCl and NaOH.

2930 ± 50

Lu-2615. Käglinge Grustäkt 9 $\delta^{13}C = -26.5‰$

Charcoal from cooking pit (Structure 643), +35.20 to +36.26m. Coll July 1982 by S Siech. Assoc with flint. *Comment:* mild pretreatment with HCl and NaOH.

2260 ± 60

Lu-2616. Käglinge Grustäkt 10 $\delta^{13}C = -26.4‰$

Charcoal from pit (Structure 661), +32.87 to +33.29m. Coll Aug 1982 by G Persson. Assoc with flint and bone. *Comment:* pretreated with HCl and NaOH. Sample undersized; diluted; 83% sample.

2090 ± 80

Lu-2610. Fosie, RAÄ No. 93, MHM 6688 $\delta^{13}C = -26.3‰$

Small fragments and powder of charcoal from post holes (Long-House I) at Lot No. 4, Block Bronsdolken, Fosie parish, SW Scania (55° 33.4′ N, 13° 2.4′ E). Coll Oct 1983 and subm by B-Å Samuelsson, Malmö Mus, Malmö. House type indicates Early Iron Age. *Comment:* pretreated with HCl. Sample undersized; diluted; 34% sample. (3 1-day counts.)

940 ± 50

Lu-2617. Tygelsjö, MHM 6718 $\delta^{13}C = -21.7‰$

Collagen from ill-preserved bone fragments of domestic animals from Structure 5, Tygelsjö, S Scania (55° 31′ N, 13° 0.3′ E). Coll April 1984 and subm by J Kling, Malmö Mus, Malmö. Assoc with posthole marks of long house indicating Late Iron Age. *Comment:* organic carbon content: 1.8%. Collagen extracted as described previously (R, 1976, v 18, p 290) without NaOH treatment. Sample undersized; diluted; 84% sample.

Elisedal series

Charcoal from Viking Age settlement area at Block Tränsbettet and Stångbettet, Elisedal industrial area, S Scania (55° 34.1′ N, 13° 4.6′ E). Coll April 1983 and subm by J Kling. Pretreated with HCl and NaOH.

1610 ± 45

Lu-2618. Elisedal, MHM 6553, Sample 1 $\delta^{13}C = -26.2‰$

Charcoal from basal layer of kiln (Structure 10:I).

Lu-2619. Elisedal, MHM 6553, Sample 2 **1960 ± 50** $\delta^{13}C = -26.7‰$

Charcoal from Structure 10:IV. *Comment:* sample undersized; diluted; 91% sample.

General Comment: both dates earlier than expected from artifact assemblage on site.

Verkeån series

Wood (*Fagus silvatica*), id by A Bråthen, Lab Dendrochronol, Trollhättan, from series of posts visible at low water N of mouth of Verkeån, Ravlunda parish, E Scania (55° 43.4′ N, 14° 12′ E). Coll March 1984 and May 1986 and subm by L Hansen, Malmö. Dating is part of interdisciplinary proj dealing with archaeol and Quaternary geol of Hanö Bay region (Hansen, 1986). Pretreated with HCl and NaOH, and charred in nitrogen atmosphere before burning.

Lu-2586. Verkeån 3 **410 ± 45** $\delta^{13}C = -27.5‰$

Lu-2622. Verkeån 6 **320 ± 45** $\delta^{13}C = -26.5‰$

Lu-2623. Verkeån 29 **350 ± 45** $\delta^{13}C = -26.6‰$

Lu-2624. Verkeån 58 **330 ± 45** $\delta^{13}C = -28.8‰$

Lu-2625. Verkeån 114 **310 ± 60** $\delta^{13}C = -28.2‰$

Comment: sample undersized; diluted; 68% sample.

Lu-2626. Verkeån, kasun, södra **350 ± 45** $\delta^{13}C = -26.6‰$

Ca 2.8m below sea level.

Åland

Otterböte series (II)

Peat from Tellmossen, ca 200m from Otterböte settlement area, Kökar I., Åland (59° 56′ N, 20° 52′ E). Coll Nov 1985 by I Påhlsson; subm by B Hulthén, Lab Ceramic & Clay Mineralogy, Dept Quaternary Geol, Univ Lund. For previous dates from Otterböte, see R, 1984, v 26, p 409. Assoc pottery indicates Bronze Age. Pretreated with HCl and charred in nitrogen atmosphere before burning. Depths (cm) refer to bog surface.

Lu-2602.	**Otterböte, 165 to 175cm**	**2570 ± 50** $\delta^{13}C = -24.5‰$
Lu-2603.	**Otterböte, 155 to 165cm**	**2430 ± 50** $\delta^{13}C = -24.7‰$
Lu-2604.	**Otterböte, 145 to 155cm**	**2330 ± 50** $\delta^{13}C = -27.7‰$

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