[RADIOCARBON, VOL. 14, NO. 2, 1972, P. 380-400]

UNIVERSITY OF LUND RADIOCARBON DATES V

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

INTRODUCTION

The C^{14} measurements reported here were made in this laboratory between October 1970 and September 1971. Equipment, measurement and treatment of samples are the same as reported previously (R., 1968, v. 10, p. 36-37; 1970, v. 12, p. 534).

Age calculations are based on a contemporary value equal to 0.950 of activity of NBS oxalic acid standard and on a half-life for C^{14} of 5568 yr. Results are reported in years before 1950 (years B.P.), and in the A.D./B.C. scale. Errors quoted ($\pm 1\sigma$) include standard deviations of count rates for the unknown sample, contemporary standard, and background. Corrections for deviations from the "normal" C^{13}/C^{12} ratio for terrestrial plants ($\delta C^{13} = -25.0‰$ in the P.D.B. scale) are applied for all samples. δC^{13} values quoted are relative to the P.D.B. 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. Organic carbon content reported for bone samples is calculated from yield of CO_2 by combustion of pretreated collagen.

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

ACKNOWLEDGMENTS

The author thanks Kerstin Lundahl for sample preparations and routine operation of the dating equipment, and R. Ryhage and his staff at the mass-spectrometric laboratory of Karolinska Inst., Stockholm, for the C^{13} analyses. Special thanks are due Christian Cavallin for assistance with the electronic equipment.

SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

A. Sweden

Stenberget series

Wood and peat from intramoraine sequence in tectonic fissure of Romeleåsen, Scania (55° 33′ N Lat, 13° 31′ E Long). Coll. and subm. by B. E. Berglund and collaborators, Dept. Quaternary Geol., Univ. Lund. Pretreated with HCl and NaOH.

Lu-526. Stenberget, wood **>43,500**
$\delta C^{13} = -27.1‰$

Wood (*Salix*) from swamp peat.

Lu-527. Stenberget, peat **>41,000**
$\delta C^{13} = -29.5‰$

Swamp peat.

General Comments (B.E.B.): these dates, together with preliminary pollen analyses, indicate interglacial age, probably Eem interglacial. (S.H.): (4 1-day counts for each sample and 3σ criterion.)

Färskesjön, pine stump series

Wood (outer annual rings) from drowned pine stumps on bottom of bay in NW part of Lake Färskesjön, Jämjö, Blekinge (56° 09′ N Lat, 15° 51′ E Long). From 6 stumps at different water depths to date low-water period. Cf. St-313 (R., 1959, v. 1, p. 38) and discussion by Berglund (1966). Coll. 1969 and subm. by B. E. Berglund. Pretreated with HCl and NaOH.

Lu-400. Färskesjön, *Pinus* No. 1 **3690 ± 60**
1740 B.C.
$\delta C^{13} = -23.0‰$

Wood from pine stump at 80 cm water depth.

Lu-401. Färskesjön, *Pinus* No. 2 **3840 ± 65**
1890 B.C.
$\delta C^{13} = -24.6‰$

Wood from pine stump at 80 cm water depth.

Lu-402. Färskesjön, *Pinus* No. 3 **3910 ± 65**
1960 B.C.
$\delta C^{13} = -23.3‰$

Wood from pine stump at 75 cm water depth.

Lu-403. Färskesjön, *Pinus* No. 4 **3960 ± 65**
2010 B.C.
$\delta C^{13} = -24.0‰$

Wood from pine stump at 70 cm water depth.

Lu-404. Färskesjön, *Pinus* No. 5 **5420 ± 70**
3470 B.C.
$\delta C^{13} = -23.6‰$

Wood from pine stump at 30 cm water depth.

Lu-405. Färskesjön, *Pinus* No. 6 **5790 ± 70**
3840 B.C.
$\delta C^{13} = -24.0‰$

Wood from pine stump at 40 cm water depth.

General Comment (B.E.B.): dates indicate stumps are from 2 different periods; near-shore stumps from end of Atlantic time; off-shore stumps from middle of Sub-Boreal time.

Siretorp series

Samples from new sec. on distal side of complex Littorina beach ridge with brackish lagoon sediments at Siretorp, Sölvesborg, Blekinge (56° 01′ N Lat, 14° 37′ E Long). Earlier investigation in 1968 described by Berglund (1971, p. 629-642). For other dates from this site see R., 1970,

v. 12, p. 539-541, v. 13, p. 343-344, and this list (Lu-562, -563, and -577). Samples derive from 2 secs. dug out in beach ridge to date gyttja layer of highest Littorina transgression. Height figures given are above sea level. Coll. 1971 and subm. by B. E. Berglund. Pretreated with HCl and NaOH.

Lu-564. Siretorp 16 — **3900 ± 65**, **1950 B.C.**, $\delta C^{13} = -25.0‰$

Silty gyttja, Sec. I, 4.40 to 4.42 m. *Comment*: sample undersized; diluted; 62% sample. (3 1-day counts.)

Lu-565. Siretorp 17 — **4080 ± 65**, **2130 B.C.**, $\delta C^{13} = -23.5‰$

Silty gyttja, Sec. I, 4.420 to 4.445 m.

Lu-565 A. Siretorp 17, humic acid — **4360 ± 60**, **2410 B.C.**, $\delta C^{13} = -22.9‰$

Acid-precipitated part of NaOH-soluble fraction from material used for Lu-565. *Comment*: sample undersized; diluted; 72% sample. (3 1-day counts.)

Lu-566. Siretorp 18 — **4070 ± 70**, **2120 B.C.**, $\delta C^{13} = -26.3‰$

Muddy sand with charcoal, Sec. I, 4.445 to 4.460 m. *Comment*: sample undersized; diluted; 55% sample. (3 1-day counts.)

Lu-567. Siretorp 19 — **4780 ± 65**, **2830 B.C.**, $\delta C^{13} = -23.5‰$

Silty gyttja, Sec. II, 4.300 to 4.335 m.

Lu-568. Siretorp 20 — **4480 ± 70**, **2530 B.C.**, $\delta C^{13} = -25.3‰$

Muddy sand with charcoal, Sec. II, 4.335 to 4.350 m. *Comment*: sample undersized; diluted; 84% sample.

General Comment (B.E.B., S.H.): transgression layer is pollen-analytically dated to transition Atlantic/Sub-Boreal time but radiocarbon dates are all too young. This may be due to down-growing roots also indicated by age difference between Lu-565 and Lu-565 A. According to earlier dates (R., 1970, v. 12, p. 539-541, Lu-302 A, Lu-306 A, etc.) NaOH-pretreated samples should have older ages than corresponding NaOH-soluble fractions.

Bysjön series

Sediment and peat from Lake Bysjön near coast of central Blekinge (56° 11′ N Lat, 15° 08′ E Long). Site and samples of main sec. Bysjön I described earlier (R., 1971, v. 13, p. 344-345). New series is derived from

Bysjön III, a dug sec. of overgrown woody shore. Depths given are below surface. All samples are from Late Sub-Atlantic time according to pollen analysis. Coll. 1970 by C. E. Nylander; subm. by B. E. Berglund. Pretreated with 0.1% NaOH (80°C) overnight.

Lu-540. Bysjön 13, 68 to 70 cm — **820 ± 50**, **A.D. 1130**, $\delta C^{13} = -26.1‰$

Magnocaricetum peat formed immediately after overgrowth. *Plantago* increase.

Lu-596. Bysjön 14, 48 to 50 cm — **750 ± 65**, **A.D. 1200**, $\delta C^{13} = -24.4‰$

Magnocaricetum peat. *Plantago* decrease. *Comment*: sample undersized; diluted; 58% sample. Pretreated with 1% NaOH (80°C) overnight.

Lu-541. Bysjön 15, 38 to 40 cm — **640 ± 50**, **A.D. 1310**, $\delta C^{13} = -25.8‰$

Magnocaricetum peat. *Plantago* and *Fagus* maximum.

Lu-542. Bysjön 16, 30 to 32 cm — **500 ± 50**, **A.D. 1450**, $\delta C^{13} = -25.5‰$

Magnocaricetum peat. *Juniperus* increase and *Fagus* decrease.

Lu-543. Bysjön 17, 12 to 14 cm — **280 ± 50**, **A.D. 1670**, $\delta C^{13} = -25.2‰$

Swamp peat. Decrease of *Fagus* and *Carpinus*, increase of *Pinus*.

Lu-597. Bysjön 18, 6 to 8 cm — **130 ± 50**, **A.D. 1820**, $\delta C^{13} = -26.5‰$

Swamp peat. Rational *Picea* limit.

Höganäs series

Samples from open sec. with Littorina sediments at Höganäs, NW Scania (56° 12′ N Lat, 12° 34′ E Long). Stratigraphy discussed earlier by Halden (1929), von Post (1929), and Nilsson (1935, p. 541-544). Samples from pollen-analytically investigated profile. Pollen zones according to Nilsson (1935, 1961). Coll. 1969 by H. Bruch; subm. by B. E. Berglund. Wood and sediment samples pretreated with HCl and NaOH. Sample level figures are related to sea level.

Lu-493. Höganäs 1 — **7780 ± 85**, **5830 B.C.**, $\delta C^{13} = -24.6‰$

Brackish gyttja, AT 1, −38 to −36 cm.

Lu-494. Höganäs 2 — **7770 ± 80**, **5820 B.C.**, $\delta C^{13} = -22.4‰$

Brackish gyttja, AT 1, −33 to −31 cm.

Lu-500. Höganäs 8 — **7570 ± 80**, **5620 B.C.**, $\delta C^{13} = -27.2‰$

Oak wood within shell layer (Höganäs 9), −30 cm.

Lu-501. Höganäs 9, inner fraction — **6520 ± 70**, **4570 B.C.**, $\delta C^{13} = -1.2‰$

Shells from shell layer with *Cardium edule* dominating (and used for dating), −30 to −20 cm, at transition AT 1/2. *Comment*: inner fraction (44% of shells) was used.

Lu-504. Höganäs 9, outer fraction — **6590 ± 80**, **4640 B.C.**, $\delta C^{13} = -1.8‰$

Outer fraction of shells used for Lu-501. *Comment*: outer fraction corresponds to 38% of shells; outermost 18% removed by acid leaching.

Lu-495. Höganäs 3 — **5440 ± 65**, **3490 B.C.**, $\delta C^{13} = -15.7‰$

Marine gyttja, upper part of AT 2 at *Ulmus* decline, +9 to 11 cm.

Lu-498. Höganäs 6 — **5200 ± 65**, **3250 B.C.**, $\delta C^{13} = -14.3‰$

Marine gyttja, lower part of SB 1, +24 to 26 cm.

Lu-496. Höganäs 4 — **5110 ± 65**, **3160 B.C.**, $\delta C^{13} = -15.1‰$

Marine gyttja, lower part of SB 1, +29 to 31 cm.

Lu-497. Höganäs 5 — **4670 ± 65**, **2720 B.C.**, $\delta C^{13} = -14.6‰$

Marine gyttja, middle part of SB 1, +54 to 56 cm.

Lu-499. Höganäs 7 — **4680 ± 65**, **2730 B.C.**, $\delta C^{13} = -16.0‰$

Marine gyttja, middle part of SB 1, +84 to 86 cm. *Comment*: sample undersized; diluted; 89% sample.

General Comments (H.B.): dates prove that even Sub-Boreal transgressions are represented in this profile. Old pollen diagrams registered only Atlantic transgressions in this area. (S.H.): corrections for deviation from "normal" C^{13}/C^{12} ratio for terrestrial plants ($\delta C^{13} = -25.0‰$ in P.D.B. scale) are applied also for shell samples. No corrections are made for

apparent age of shells of living marine mollusks (cf. Lu-234-236: R., 1969, v. 11, p. 441 and Lu-237, 1970, v. 12, p. 543).

Färsksjön series

Continuation of samples dated from profile with brackish lagoon sediments from Lake Färsksjön at Eriksberg, Åryd parish, Blekinge (56° 11′ N Lat, 15° 00′ E Long). Depths are below water level. Water depth 150 cm. Coll. 1969 and subm. by R. Liljegren and B. E. Berglund. Other dates from site were reported previously (R., 1971, v. 13, p. 348-349). Pretreated with HCl only.

Lu-469. Färsksjön 9 — **4930 ± 65**, **2980 B.C.**, $\delta C^{13} = -28.2‰$

Lacustrine fine detritus gyttja, 560 to 564 cm.

Lu-470. Färsksjön 10 — **5170 ± 65**, **3220 B.C.**, $\delta C^{13} = -25.5‰$

Slightly brackish gyttja, 570 to 574 cm.

Lu-425. Grevie, *Bos primigenius* — **8380 ± 90**, **6430 B.C.**, $\delta C^{13} = -21.3‰$

Collagen from well-preserved rib of *Bos primigenius* among material from small ancient lake (ca. 50 × 100 m), 1 km SW of Nevishög church, Grevie, Staffanstorp parish, Scania (55° 37′ N Lat, 13° 12′ E Long). Pollen investigation by Liljegren and Welinder (1971). Coll. 1970 by G. Rudebeck; subm. by S. Welinder, Dept. Quat. Geol., Univ. Lund. Collagen extracted as described previously (R., 1970, v. 12, p. 534); organic-carbon content: 6.8%. *Comment* (R.L. and S.W.): date agrees very well with pollen date.

Lu-446. Malmesjaure — **170 ± 50**, **A.D. 1780**, $\delta C^{13} = -23.4‰$

Wood from 1 of 3 pine stumps, *in situ* in fossil soil covered by ca. 2.5 m eolian sand on N shore of Lake Malmesjaure, Norrbotten (65° 55′ N Lat, 19° 11′ E Long). Coll. 1970 and subm. by E. Daniel, Dept. Quat. Geol., Univ. Lund. Pretreated with HCl and NaOH. *Comment*: after correction for known variations in C^{14} activity (Suess, 1970) estimated historical date is A.D. 1670.

Lu-481. Lake Vån — **10,680 ± 145**, **8730 B.C.**, $\delta C^{13} = -26.9‰$

Sediment, 445 to 454 cm below sediment-water interface, from Lake Vån, 6.3 km SE of Brokind R.R. Sta., Östergötland (58° 11′ N Lat, 15° 47′ E Long). Alt. of sediment surface ca. 89 m. Coll. 1969 and subm. by H. Göransson, Dept. Quat. Geol., Univ. Lund. Pollen analyses by submitter. Sample from immediately above clay of Dryas III age. It consists

of muddy clay with increasing organic content upwards. HCl pretreatment. *Comment* (H.G.): date is ca. 700 yr too old as compared to pollen dating, probably due to influence of hard-water effect on bottom sediment of this lake to (cf. Lake Striern series, R., 1970, v. 12, p. 541-543). Sample undersized; diluted; 58% sample.

Lu-507. Bläsebo, Sample 2

12,890 ± 130
10,940 B.C.
$\delta C^{13} = -1.5‰$

Marine shells (*Balanus balanus, Balanus crenatus*), id. by G. Digerfeldt, from Bläsebo, Lärjedalen, 7 km NNE of Göteborg center (57° 46′ N Lat, 12° 02′ E Long). From varved clay underlain by glaciofluvial gravel. Alt. ca. 24 m. Same stratigraphic position as Lu-281 (R., 1970, v. 12, p. 545). Coll. 1955 and subm. by Å. Hillefors, Dept. Geog., Univ. Lund. *Comment*: dated to check Lu-281, which was earlier than expected (12,880 ± 145 B.P.). New date confirms previous one. Outermost 23% of shells removed by acid leaching. Correction for deviation from "normal" C^{13}/C^{12} ratio for terrestrial plants ($\delta C^{13} = -25.0‰$ in P.D.B. scale) is applied also for this sample. No correction is made for apparent age of shells of living marine mollusks (cf. Lu-234-236, R., 1969, v. 11, p. 441 and Lu-237, 1970, v. 12, p. 543).

Lu-551. Stenshuvud

9330 ± 95
7380 B.C.
$\delta C^{13} = -27.0‰$

Wood from pine stump dredged from bottom of S Baltic Sea at water depth 35 to 40 m by fishermen ENE of Stenshuvud, Scania (55° 42′ N Lat, 14° 24′ E Long). Coll. 1970 by H. Berntsson; subm. by T. Nilsson, Dept. Quat. Geol., Univ. Lund. Pretreated with HCl and NaOH. *Comment* (T.N.): other submerged pine stumps from bottom of Baltic have given similar ages from 9100 ± 120 B.P. (St-120, Östlund, 1957, p. 494) to 9420 ± 100 B.P. (Lu-16, R., 1968, v. 10, p. 39). Some doubt exists regarding original *in situ* depth of stumps (cf. comment to Lu-16). Dated pine stump is from very limited area with many similar stumps. The collector, a very experienced fisherman, stated that stumps at this locality are firmly rooted. Some of them were so strongly attached to bottom that vessels were stopped.

Lu-595. Ranviken Bay, 590 to 595 cm

6820 ± 60
4870 B.C.
$\delta C^{13} = -28.9‰$

Detritus gyttja from Ranviken Bay of Lake Immeln, ca. 30 km N of Kristianstad. NE Scania (56° 17′ N Lat, 14° 18′ E Long). Coll. 1966 and subm. by G. Digerfeldt, Dept. Quaternary Geol., Univ. Lund. Sample is from main profile in central part of bay, and represents Pollen-Zone Boundary AT 1/2. Depth 590 to 595 cm below water surface. Water depth 110 cm. Dated as complement to Ranviken Bay series (R., 1969, v. 11, p. 431-434). Pretreated with HCl.

B. Norway

Falkefjeldet series

Peat from palsa-like mound at Falkefjeldet, Varanger Peninsula, N Norway (70° 15′ N Lat, 29° 50′ E Long), part of study of permafrost forms in N Norway (Svensson, 1961, 1964, 1969). Coll. 1970 and subm. by H. Svensson, Swedish Nat. Sci. Res. Council, Stockholm. HCl and NaOH pretreatment.

Lu-483. Falkefjeldet, 62 cm, peat — **3810 ± 60** / **1860 B.C.** / $\delta C^{13} = -26.4‰$

Highly humified peat just above mineral substratum, 62 cm below surface of palsa-like mound.

Lu-483 A. Falkefjeldet, 62 cm, humic acid — **3590 ± 60** / **1640 B.C.** / $\delta C^{13} = -26.1‰$

Acid-precipitated part of NaOH-soluble fraction from Lu-483.

Lu-484. Falkefjeldet, 30 cm, peat — **1910 ± 55** / **A.D. 40** / $\delta C^{13} = -26.1‰$

Moderately humified peat, depth 30 cm.

Lu-484 A. Falkefjeldet, 30 cm, humic acid — **1970 ± 55** / **20 B.C.** / $\delta C^{13} = -26.1‰$

Acid-precipitated part of NaOH-soluble fraction from Lu-484.

C. Iceland

Granunes series

Peat from palsa, *i.e.*, permafrost mound, at Granunes, Iceland (64° 44′ N Lat, 19° 26′ W Long), part of study of permafrost forms. Coll. 1970 and subm. by H. Svensson. HCl and NaOH pretreatment.

Lu-505. Granunes, Sample 1, peat — **8200 ± 85** / **6250 B.C.** / $\delta C^{13} = -27.7‰$

Slightly to moderately humified peat from layer covered by eolian sand, 75 cm below top surface of palsa.

Lu-505 A. Granunes, Sample 1, humic acid — **8080 ± 85** / **6130 B.C.** / $\delta C^{13} = -27.7‰$

Acid-precipitated part of NaOH-soluble fraction from Lu-505.

Lu-506. Granunes, Sample 2, peat — **8240 ± 85** / **6290 B.C.** / $\delta C^{13} = -26.9‰$

Slightly to moderately humified peat from layer covered by eolian sand, 85 cm below top surface of palsa.

Lu-506 A. Granunes, Sample 2, humic acid — **8170 ± 85**, **6220 B.C.**, $\delta C^{13} = -27.5‰$

Acid-precipitated part of NaOH-soluble fraction from Lu-506.

D. Greenland

East Greenland series (I)

Marine shells from emerged marine sediments from central part of Kong Oscars Fjord area, NE Greenland. Coll. 1970 and subm. by C. Hjort, Dept. Quat. Geol., Univ. Lund; part of 3-yr program for study of ice oscillations and shoreline displacement in Kong Oscars Fjord-Vega Sund dist. Some samples complement dates from Mestersvig and Skeldal (Washburn and Stuiver, 1962; Lasca, 1969).

Lu-485. Antarctic Dal, inner fraction — **9120 ± 90**, **7170 B.C.**, $\delta C^{13} = +0.8‰$

Shells (*Mya truncata, Hiatella* [*Saxicava*] *arctica,* and *Macoma calcarea*) from terrace of marine clay, +40 m, Antarctic Dal (72° 00′ N Lat, 23° 20′ W Long), Kong Oscars Fjord (Scoresby Land), NE Greenland. *Comment*: inner fraction (30% of shells) was used.

Lu-486. Antarctic Dal, outer fraction — **9010 ± 85**, **7060 B.C.**, $\delta C^{13} = +1.1‰$

Outer fraction of shells used for Lu-485. *Comment*: outer fraction corresponds to 37% of shells; outermost 33% removed by acid leaching.

Lu-487. Skeldal, inner fraction — **7760 ± 80**, **5810 B.C.**, $\delta C^{13} = \pm 0.0‰$

Shells (*Mya truncata, Hiatella* [*Saxicava*] *arctica, Macoma calcarea,* and *Tridonta* [*Astarte*] *borealis*) from marine clay, +12 m in lower Skeldal (72° 17′ N Lat, 24° 10′ W Long), Kong Oscars Fjord (Scoresby Land). Clay is underlain by silty sand and overlain by sandy gravelly material connected with sea level ca. 20 m above today's. Silty sand was probably deposited in connection with well marked ice margin in the valley synchronous with sea level ca. 100 m above today's. *Comment*: inner fraction (29% of shells) was used.

Lu-488. Skeldal, outer fraction — **7890 ± 80**, **5940 B.C.**, $\delta C^{13} = +1.2‰$

Outer fraction of shells used for Lu-487. *Comment*: outer fraction corresponds to 38% of shells; outermost 33% removed by acid leaching.

Lu-489. Holms Bugt, 33 m, inner fraction — **8680 ± 85**, **6730 B.C.**, $\delta C^{13} = +0.3‰$

Shells (*Mya truncata, Hiatella* [*Saxicava*] *arctica,* and *Macoma cal-*

carea) from marine clay, +33 m at Holms Bugt (72° 31′ N Lat, 23° 58′ W Long), Kong Oscars Fjord (Trail Ö). Clay directly underlies delta sediments built up to sea level 50 m above today's. Shell date should be maximum for these sediments, probably rather close to actual age of 50 m horizon. *Comment*: inner fraction (33% of shells) was used.

Lu-490. Holms Bugt, 33 m, outer fraction **8710 ± 85** **6760 B.C.** $\delta C^{13} = -0.2‰$

Outer fraction of shells used for Lu-489. *Comment*: outer fraction corresponds to 34% of shells; outermost 33% removed by acid leaching.

Lu-491. Polhems Dal, inner fraction **8060 ± 80** **6110 B.C.** $\delta C^{13} = +0.6‰$

Shells (*Mya truncata*) from terrace of marine clay, +40 m, Polhelms Dal South (72° 27′ N Lat, 25° 25′ W Long), Forsblads Fjord (Lyells Land). *Comment*: inner fraction (33% of shells) was used.

Lu-492. Polhems Dal, outer fraction **8070 ± 80** **6120 B.C.** $\delta C^{13} = +1.2‰$

Outer fraction of shells used for Lu-491. *Comment*: outer fraction corresponds to 37% of shells; outermost 30% removed by acid leaching.

Lu-528. Jaegerdalselv **9590 ± 75** **7640 B.C.** $\delta C^{13} = \pm 0.0‰$

Shells (*Hiatella* [*Saxicava*] *arctica*) from marine clay, +55 m, Jaegerdalselv (72° 08′ N Lat, 23° 38′ W Long), Kong Oscars Fjord (Scoresby Land). Age is minimum for outermost of 3 comparatively old terminal moraines in valley Jaegerdal. *Comment*: outer 62% of shells removed by acid leaching.

Lu-529. Holms Bugt, 68 m **9320 ± 90** **7370 B.C.** $\delta C^{13} = -0.9‰$

Shells (*Mya truncata, Hiatella* [*Saxicava*] *arctica,* and *Portlandia arctica*) from marine clay, +68 m, Holms Bugt (72° 31′ N Lat, 23° 58′ W Long), Kong Oscars Fjord (Traill Ö). *Comment*: outer 26% of shells removed by acid leaching.

Lu-530. Linnédalen **8170 ± 80** **6220 B.C.** $\delta C^{13} = +0.6‰$

Small shell fragments (probably *Mya truncata*) from marine clay, +41 m, Linnédalen (72° 23′ N Lat, 25° 00′ W Long), Segelsällskapets Fjord (Scoresby Land). Clay overlies sand and silt and is eroded to +41 m; same as level of large delta surface close by. Consequently, clay is older than delta. Underlying sand and silt probably represent more

advanced ice margin than during clay deposition. *Comment*: outer 47% of shells removed by acid leaching.

Lu-531. Segldalselv — **8940 ± 85**, **6990 B.C.**, $\delta C^{13} = +0.2‰$

Shells (*Mya truncata, Hiatella* [*Saxicava*] *arctica,* and *Macoma calcarea*) from marine clay, +35 m, Segldalselv (72° 08′ N Lat, 23° 35′ W Long), Kong Oscars Fjord (Scoresby Land). *Comment*: outer 46% of shells removed by acid leaching.

General Comment: corrections for deviations from "normal" C^{13}/C^{12} ratio for terrestrial plants ($\delta C^{13} = -25.0‰$ in P.D.B. scale) are applied also for shell samples. No corrections are made for apparent age of shells of living marine mollusks. Samples of recent "pre-bomb" mollusks from Greenland will be measured in the near future.

E. Norwegian Sea

Lu-482. Norwegian Sea 1, Station 5 — **10,720 ± 140**, **8770 B.C.**, $\delta C^{13} = -0.9‰$

Foraminifera tests from deep-sea core from Sta. 5 (66° 15′ N Lat, 02° 13′ E Long), Norwegian sea; depth 1970 m, depth in core 6 to 8 cm. Coll. 1970 and subm. by E. Olausson, Marine Geol. Lab., Univ. Göteborg. Sample from just above stratum indicating great change in hydrography of Norwegian Sea, estimated by subm. to have been ca. 11,000 B.P. *Comment*: sample ultrasonically washed in distilled acidified water (pH ca. 4), and sieved by subm. Fraction $>185\mu$ was used. Outermost 10% removed by acid leaching. Sample undersized; diluted; 58% sample. (3 1-day counts). Correction for deviation from "normal" C^{13}/C^{12} ratio for terrestrial plants ($\delta C^{13} = -25.0‰$ in P.D.B. scale) is applied also for this sample.

II. ARCHAEOLOGIC SAMPLES

A. Sweden

Vä series

Charcoal and resin from excavation at Vä 147[1], Vä parish, Scania (55° 58′ 52″ N Lat, 14° 04′ 54″ E Long; Swed. Grid Ref. VC 425046). Coll. 1963 and subm. by R. Petré, Hist. Mus., Univ. Lund. Charcoal pretreated with HCl and NaOH. Resin pretreated with HCl only.

Lu-438. Vä 147[1], Feature 77 — **6350 ± 75**, **4400 B.C.**, $\delta C^{13} = -21.8‰$

Charcoal from base of fire pit, ca. 40 cm below surface.

Lu-439. Vä 147[1], Feature 95 — **2580 ± 55**, **630 B.C.**, $\delta C^{13} = -23.6‰$

Charcoal from base of cremation pit, ca. 40 cm below surface.

Lu-440. Vä 147[1], Feature 104 A **2550 ± 55**
600 B.C.
$\delta C^{13} = -26.9‰$

Resin fragments found among burnt bones in cremation urn, ca. 30 cm below surface. Assoc. with iron bracelet and 2 iron needles.

Lu-441. Vä 147[1], Feature 109 B **5360 ± 65**
3410 B.C.
$\delta C^{13} = -24.6‰$

Charcoal from base of cremation pit, ca. 40 cm below surface. *Comment* (R.P.): indicates charcoal is probably from older settlement and does not date cremation.

General Comment (R.P.): apart from Lu-441, dates agree with estimates based on archaeologic material and type of graves in area.

Nymölla series

Birch-bark from excavation of Bronze age burial mound at Snickarebacken, Nymölla 1:1, Ivetofta parish, Scania (56° 02′ 32″ N Lat, 14° 28′ 19″ E Long; Swed. Grid Ref. VC 670111). Coll. 1959 and subm. by R. Petré. Results of excavation pub. by submitter (Petré, 1961). Pretreated with HCl and NaOH.

Lu-442. Nymölla 1:1, Grave 1 **3160 ± 60**
1210 B.C.
$\delta C^{13} = -25.2‰$

Birch-bark from envelope around oak chest containing cremated remains, Grave 1, ca. 400 cm below surface of mound. Assoc. with bronze fibula.

Lu-443. Nymölla 1:1, Grave 2 **3160 ± 60**
1210 B.C.
$\delta C^{13} = -26.6‰$

Birch-bark from envelope around oak chest with inhumation, Grave 2, ca. 200 cm below surface of mound. Assoc. with sword and spearhead of bronze.

Lu-444. Nymölla 1:1, Grave 4 **3070 ± 60**
1120 B.C.
$\delta C^{13} = -27.5‰$

Birch-bark from envelope around oak chest containing cremated remains, Grave 4, ca. 200 cm below surface of mound. Assoc. with bronze objects (sword, knife, razor, and 2 double-buttons).

General Comment (R.P.): date Lu-444 ca. 100 yr older than expected; other dates agree with archaeologic date based on artifact assembly.

Siretorp archaeologic series

Charcoal from Early and Middle Neolithic settlement site at Siretorp, Mjällby parish, Blekinge (56° 01′ N Lat, 14° 37′ E Long). Site described by Bagge and Kjellman (1939). For results of new studies, see Berglund (1971) and Berglund and Welinder (1972). Coll. 1971 by S.

Welinder (Lu-562, Lu-563) and S. Håkansson (Lu-577). For other dates from this site, see R., 1970, v. 12, p. 539-541, 1971, v. 13, p. 343-344, and this list (Lu-564-568).

Lu-562. Siretorp, Layer 6 **5930 ± 70**
3980 B.C.
$\delta C^{13} = -24.4‰$

Charcoal from Layer 6, Sq. 6-7. *Comment*: pretreated with HCl and NaOH.

Lu-563. Siretorp, Layer 7 **4360 ± 75**
2410 B.C.
$\delta C^{13} = -24.7‰$

Charcoal (incompletely charred) from Layer 7, Sq. 10-11. *Comment*: only HCl pretreatment due to small sample; diluted; 80% sample.

Lu-577. Siretorp, Layer 5 **4610 ± 65**
2660 B.C.
$\delta C^{13} = -25.0‰$

Finely dispersed charcoal and ash from Layer 5, Sq. 0-1. *Comment*: dating material separated from ca. 1 kg dark sand by repeated washing with distilled water. After centrifugation and drying charcoal "powder" was treated with NaOH for elimination of humic acid. Sample represents upper part (ca. 10 cm) of Layer 5.

General Comment (S.W.): all samples should date Early Neolithic Funnel-beaker culture settlement. Only Lu-577 corresponds to supposed age.

Gårdlösa series

Charcoal and resin samples from Gårdlösa, Smedstorp parish, SE Scania (55° 34′ N Lat, 14° 08′ E Long). Coll. 1963 to 1970 and subm. by B. Stjernquist, Hist. Mus., Univ. Lund. Dated for study of continuity of Iron Age settlement in Gårdlösa area (Stjernquist, 1964, 1965, 1967). For other dates from area, see R., 1969, v. 11, p. 445-447; 1971, v. 13, p. 352-353.

Lu-457. Gårdlösa No. 3, House XXIV **1290 ± 50**
A.D. 660
$\delta C^{13} = -24.0‰$

Charcoal from hearth, Gårdlösa No. 3, House XXIV. Rim sherds from simple pottery without characteristic features were found in cultural layer in house foundation. Coll. 1965. *Comment*: pretreated with HCl and NaOH.

Lu-458. Gårdlösa No. 3, House XXV **1300 ± 70**
A.D. 650
$\delta C^{13} = -25.2‰$

Charcoal from cultural layer in house foundation, Gårdlösa No. 3, House XXV. Assoc. with iron knife. Coll. 1965. *Comment*: no pretreatment due to small sample; diluted; 60% sample.

Lu-459. Gårdlösa No. 3, House XXXI **1300 ± 55**
A.D. 650
$\delta C^{13} = -24.3‰$

Charcoal from cultural layer in house foundation, Gårdlösa No. 3, House XXXI. Assoc. with fragment of bronze bracelet. Coll. 1970. *Comment*: due to small sample pretreated with HCl only; diluted; 91% sample.

Lu-460. Gårdlösa No. 3, House LVI **1060 ± 50**
A.D. 890
$\delta C^{13} = -24.6‰$

Charcoal from cultural layer in house foundation, Gårdlösa No. 3, House LVI. Assoc. with pottery of so-called Slavonic type. Coll. 1970. *Comment*: pretreated with HCl and NaOH.

Lu-461. Gårdlösa No. 3, Grave 5 **1940 ± 55**
A.D. 10
$\delta C^{13} = -26.9‰$

Resin, used for tightening of wooden coffin, from Grave 5, Gårdlösa No. 3. Coll. 1963. *Comment*: pretreated with HCl.

Lu-462. Gårdlösa No. 3, Grave 64 D **1330 ± 55**
A.D. 620
$\delta C^{13} = -24.9‰$

Charcoal from hearth on fringe of round stone setting with central grave (No. 64), Gårdlösa No. 3. Sherds of pottery and bronze fragments in central grave. Coll. 1969. *Comment*: dated to determine contemporaneity of hearth with central grave, which, archaeologically, is dated to A.D. 300 to A.D. 600. Pretreated with HCl and NaOH.

Lu-463. Gårdlösa No. 3, Grave 64 F **1440 ± 50**
A.D. 510
$\delta C^{13} = -24.9‰$

Charcoal from hearth with position similar to Lu-462 above. Coll. 1969. *Comment*: same as to Lu-462.

Lu-464. Gårdlösa No. 3, Grave 72 **2550 ± 55**
600 B.C.
$\delta C^{13} = -23.3‰$

Charcoal from stone-paved offering pit in cairn above Grave 72, Gårdlösa No. 3. Grave contained several bronze objects, among other things, a fibula, typical of Bornholm's Migration period, with transverse ribbing of the foot. Coll. 1969. *Comment*: pretreated with HCl and NaOH.

Lu-465. Gårdlösa No. 3, Pit 27 **2000 ± 55**
50 B.C.
$\delta C^{13} = -24.6‰$

Charcoal from cultural layer in Pit 27, Gårdlösa No. 3. Assoc. with

sherds of pottery and spindle whorl. Coll. 1964. *Comment*: pretreated with HCl and NaOH.

General Comment (B.S.): dates agree well with archaeol. estimates.

Tågarp series

Charcoal and bone from excavation of passage grave at Tågarp No. 5, Ö. Tommarp parish, Scania (55° 32′ N Lat, 14° 14′ E Long). Coll. 1970 and subm. by M. Strömberg, Hist. Mus., Univ. Lund. Results of study pub. by submitter (Strömberg, 1971). Charcoal samples pretreated with HCl and NaOH. Bone samples treated as described previously (R., 1970, v. 12, p. 534).

Lu-436. Tågarp No. 5, Sample 1 **3390 ± 60**
1440 B.C.
$\delta C^{13} = -19.1‰$

Collagen from poorly preserved bone fragments from level with Late Neolithic objects in W part of passage grave chamber. *Comment*: organic carbon content: 3.6%.

Lu-472. Tågarp No. 5, Sample 3 **3720 ± 60**
1770 B.C.
$\delta C^{13} = -19.7‰$

Collagen from well preserved human bone fragments from floor level in W part of passage grave chamber. *Comment*: organic carbon content: 6.1%.

Lu-473. Tågarp No. 5, Sample 4 **4230 ± 80**
2280 B.C.
$\delta C^{13} = -18.5‰$

Collagen from poorly preserved human bone fragments from "blocking" in passage, just inside entrance to passage grave. Assoc. with Middle Neolithic pottery and flint artifacts, indicating that "blocking" material comes from low level inside grave chamber. *Comment*: organic carbon content: 1.9%. Sample undersized; diluted; 70% sample.

Lu-471. Tågarp No. 5, Sample 2 **2870 ± 55**
920 B.C.
$\delta C^{13} = -23.6‰$

Charcoal from hearth outside entrance to passage grave. Assoc. with Middle Neolithic pottery. *Comment* (M.S.): date indicates hearth is assoc. with burials and ritual ceremonies during Bronze age (cf. Strömberg, 1971, p. 75-77).

General Comment (M.S.): dates provide information on primary use of grave chamber and also give time limits for Late Neolithic burials (cf. Strömberg, 1971, p. 40-43).

Hagestad series

Charcoal and bone from Hagestad, Löderup parish, Scania. Coll. 1961 to 1971 and subm. by M. Strömberg. Several samples were dated previously (R., 1968, v. 10, p. 48-50; 1969, v. 11, p. 447-448; 1970, v. 12,

p. 550-552; 1971, v. 13, p. 350-351). Charcoal pretreated with HCl and NaOH. Bone treated as described previously (R., 1970, v. 12, p. 534).

Lu-546. Hagestad 6[4] **2950 ± 60**
1000 B.C.
$\delta C^{13} = -29.2‰$

Charcoal from hearth in Littorina beach ridge, S of bog, at Hagestad 6[4] (55° 24′ N Lat, 14° 11′ E Long). Assoc. with both Mesolithic and Neolithic finds. Coll. 1963. *Comment* (M.S.): date much later than expected, indicating that dated charcoal was not assoc. with other finds of site.

Lu-547. Hagestad 19[3] A, Feature IV **1260 ± 50**
A.D. 690
$\delta C^{13} = -23.5‰$

Charcoal from Feature IV (hearth), Trench 1:1961, Hagestad 19[3] A (55° 24′ N Lat, 14° 10′ E Long). Coll. 1961.

Lu-548. Hagestad 19[3] A, Feature V **1210 ± 50**
A.D. 740
$\delta C^{13} = -24.8‰$

Charcoal from Feature V (hearth), Trench 1:1961, Hagestad 19[3] A. Coll. 1961.

Lu-549. Hagestad 22[8] **1300 ± 50**
A.D. 650
$\delta C^{13} = -28.0‰$

Charcoal from hearth in Neolithic site, Trench 1:1971, S of bog, Hagestad 22[8] (55° 24′ N Lat, 14° 11′ E Long). Coll. 1971. *Comment* (M.S.): same as Lu-546.

Lu-550. Hagestad 38[6], House 1 **1750 ± 55**
A.D. 200
$\delta C^{13} = -24.1‰$

Charcoal from hearth in house foundation, Hagestad 38[6] (55° 24′ N Lat, 14° 11′ E Long). Coll. 1971. *Comment* (M.S.): site archaeologically dated to Viking period (9th century A.D.). Charcoal is apparently from old wood.

Lu-524. Hagestad 48[3], Feature 1:71 **830 ± 50**
A.D. 1120
$\delta C^{13} = -20.7‰$

Collagen from fairly well preserved cattle bone from Feature 1:71, Hagestad 48[3] (55° 25′ N Lat, 14° 07′ E Long). Coll. 1971. *Comment*: organic carbon content: 4.0%.

Lu-525. Hagestad 48[3], Feature 2:71 **900 ± 50**
A.D. 1050
$\delta C^{13} = -21.3‰$

Collagen from fairly well preserved horse bone from Feature 2:71, Hagestad 48[3]. Coll. 1971. *Comment*: organic carbon content: 3.8%.

General Comment (M.S.): apart from Lu-546, -549, and -550, dates are most satisfactory and consistent with archaeologic results.

Lu-437. Skillinge, Block Jupiter **3930 ± 65**
1980 B.C.
$\delta C^{13} = -24.3‰$

Charcoal from upper layer with Pitted-ware culture pottery on Stone-age site, Property No. 3, Block Jupiter, Skillinge, Scania (55° 28′ N Lat, 14° 16′ E Long). Coll. 1965 and subm. by M. Strömberg. Pretreated with HCl and NaOH. *Comment* (M.S.): date agrees with age estimate based on type of pottery.

Bare Mosse series

Charcoal from Maglemose settlement at Bare Mosse, Halmstad parish, Scania (55° 57′ N Lat, 13° 05′ E Long). Coll. 1970 and subm. by S. Welinder, Lab. Quaternary Biol., Univ. Lund. For other dates in same series, see R., 1970, v. 12, p. 549-550. Pretreated with HCl and NaOH.

Lu-453. Bare Mosse IV **9430 ± 95**
7480 B.C.
$\delta C^{13} = -23.4‰$

Charcoal from base of 15 cm thick gyttja layer, underlain by washed till and overlain by *Cladium* peat, 252 cm below present surface.

Bare Mosse V

Stratigraphic sequence from bottom to top: till, gravelly sand, drift mud, clay mud, stony sand, clay mud, detritus mud, and carr peat. Pollen-analytic date shows sediments belong to Pre-Boreal and Early-Boreal time.

Lu-454. Bare Mosse V:1 **5170 ± 70**
3220 B.C.
$\delta C^{13} = -25.5‰$

Charcoal from upper clay mud layer. *Comment*: weaker pretreatment than usual due to small sample; diluted; 62% sample.

Lu-455. Bare Mosse V:2 **7860 ± 90**
5910 B.C.
$\delta C^{13} = -24.9‰$

Charcoal from detritus mud layer.

General Comment (S.W.): dates from Bare Mosse V do not agree with pollen-analytic date of corresponding sediments.

Christinelund series

Charcoal from settlement at Christinelund 2[1], Allerum parish, NW coast of Scania (56° 08′ 10″ N Lat, 12° 35′ 40″ E Long). Coll. 1971 by B. Hulthén and B. Hårdh; subm. by B. Hulthén, Hist. Mus., Univ. Lund. Dated as part of study of Late Coastal culture settlement connected with Littorina beach ridge in area.

Lu-587. Christinelund 2[1], Feature 1, Layer 1 **4190 ± 60**
2240 B.C.
$\delta C^{13} = -25.6‰$

Charcoal from hearth pit, overlain by flints abraded by wave action, in Littorina beach ridge. Feature 1, Layer 1, +7.57 m. *Comment*: due to small sample, only weak pretreatment with HCl and NaOH.

Lu-545. Christinelund 2[1], Feature 2, Layer 1 **2660 ± 65**
710 B.C.
$\delta C^{13} = -27.4‰$

Charcoal from hearth pit, overlain by flints abraded by wave action, in Littorina beach ridge. Feature 2, Layer 1, +7.78 m. *Comment*: due to small sample, only weak pretreatment with HCl and NaOH; diluted; 67% sample.

Lu-544. Christinelund 2[1], Feature 2, Layer 2 **2740 ± 55**
790 B.C.
$\delta C^{13} = -25.9‰$

Charcoal from hearth pit, overlain by flints abraded by wave action, in Littorina beach ridge. Feature 2, Layer 2, +7.67 m. *Comment*: normal treatment with HCl and NaOH.

General Comment (B.H.): Lu-587 is somewhat younger than expected but still acceptable for Late Coastal culture. Other 2 hearths were probably re-used temporarily by Bronze-age people.

Lu-474. Block Bronsyxan, Malmö **3920 ± 80**
1980 B.C.
$\delta C^{13} = -19.7‰$

Collagen from poorly preserved human bone fragments from Battle axe culture grave with stone construction, Feature 14, Block Bronsyxan, Fosie, Malmö, S Scania (55° 34′ N Lat, 13° 03′ E Long). Assoc. with battle axe, polished flint adze, flint blades and scrapers, boar tooth pendant, and pottery. Coll. 1970 and subm. by B. Salomonsson, Hist. Dept., Malmö Mus. *Comments* (B.S.): date agrees with archaeologic date based on artifact assembly and grave construction. (S.H.): sample undersized; diluted; 48% sample. Organic carbon content: 1.5%.

Västra Skällön series, submarine blocking

Wood from artificial blocking at ca. 3 m depth in strait between Västra and Östra Skällön Is., Ramdala, Blekinge (56° 07′ N Lat, 15° 44′ E Long). Coll. 1970 by Blekinge Mus.; subm. by B. E. Berglund. Other dates from similar blockings reported previously (R., 1968, v. 10, p. 50; 1969, v. 11, p. 448-449). Pretreated with HCl and NaOH.

Lu-451. Västra Skällön 1 **960 ± 50**
A.D. 990
$\delta C^{13} = -26.1‰$

Wood from oak pile, from 10 youngest annual rings of 30-yr-old trunk.

Lu-475. Västra Skällön 2 **990 ± 50**
A.D. 960
$\delta C^{13} = -25.5‰$

Wood from oak pile, from 10 youngest annual rings of 20-yr-old trunk.

Lu-476. Västra Skällön 6 **910 ± 50**
A.D. 1040
$\delta C^{13} = -26.7‰$

Wood from oak pile, from 10 youngest annual rings of 30-yr-old trunk.

Lu-477. Västra Skällön 7 **810 ± 50**
A.D. 1140
$\delta C^{13} = -24.9‰$

Wood from oak pile, from 10 youngest annual rings of 25-yr-old trunk.

General Comment (B.E.B.): new dates confirm older ones of similar blockings, *i.e.*, they seem to be built ca. A.D. 1000 and used during 11th century.

Tomtö series, submarine blocking

Wood from artificial blocking at 6 to 7 m depth in strait W of Tomtö I., Torhamn, Blekinge (56° 08′ N Lat, 15° 49′ E Long). Coll. 1970 by Blekinge Mus.; subm. by B. E. Berglund. Cf. Västra Skällön series, above, and comment. Pretreated with HCl and NaOH.

Lu-452. Tomtö 2 **980 ± 50**
A.D. 970
$\delta C^{13} = -25.8‰$

Wood from oak pile, from 10 youngest annual rings of 60-yr-old trunk.

Lu-478. Tomtö 3 **950 ± 50**
A.D. 1000
$\delta C^{13} = -25.2‰$

Wood from oak pile, from 10 youngest annual rings of 35-yr-old trunk.

Lu-479. Tomtö 4 **820 ± 50**
A.D. 1130
$\delta C^{13} = -24.3‰$

Wood from oak pile, from 20 youngest annual rings of 100-yr-old trunk.

B. Asia Minor

Lu-502. Caunus **2220 ± 55**
270 B.C.
$\delta C^{13} = -20.0‰$

Wood (*Cupressus sempervirens*) id. by E. Åberg, Uppsala, from chamber grave cut out in vertical wall of rock, 12 m above foot of rock,

at Caunus, SW Asia Minor (36° 50′ N Lat, 28° 40′ E Long). Alt. ca. 50 m. Coll. 1969 and subm. by P. Roos, Classical Dept., Univ. Lund. Sample probably part of sarcophagus cover. Description by submitter (Roos, 1968). *Comment*: due to small sample, only mild HCl pretreatment; diluted; 78% sample. Archaeologic estimate: 350 B.C.

III. MODERN PLANT SAMPLES

Rogen series

Samples from thick carpets of lichen (*Cladonia alpestris*) growing in open mountain region above tree line, alt 900 m, at Lake Rogen, Härjedalen (62° 30′ N Lat, 12° 30′ E Long). Part of extensive study of influence of radioactive fall-out from nuclear weapon tests (Svensson and Lidén, 1965; Lidén and Gustafsson, 1966; Persson, 1970). Coll. 1962 (Lu-516), 1966 (Lu-517), and 1970 by Svensson, Lidén, Persson, and Mattsson; subm. by S. Mattsson, Radiation Phys. Dept., Univ. Lund. All samples pretreated with HCl.

Results are given as a difference, Δ, from our radiocarbon standard (95% of activity of NBS oxalic acid standard, age corrected to 1950):

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

where δC^{14} is observed deviation from radiocarbon standard in per mil and δC^{13} deviation from P.D.B. standard in per mil.

Lu-516. Rogen, V 230, 1962 $\Delta = \mathbf{33 \pm 6}‰$, $\delta C^{13} = -22.1‰$

Unfractionated sample (*Cladonia alpestris*). Coll. Sept. 4, 1962.

Lu-517. Rogen, V 672, 1966 $\Delta = \mathbf{220 \pm 6}‰$, $\delta C^{13} = -21.8‰$

Unfractionated sample (*Cladonia alpestris*). Coll. Sept. 24, 1966.

Lu-518. Rogen, V 920 A, 1970 $\Delta = \mathbf{569 \pm 7}‰$, $\delta C^{13} = -23.6‰$

Top fraction, 0 to 3 cm (*Cladonia alpestris*). Coll. Sept. 28, 1970.

Lu-519. Rogen, V 920 B, 1970 $\Delta = \mathbf{259 \pm 6}‰$, $\delta C^{13} = -21.8‰$

Middle fraction, 3 to 6 cm from top (*Cladonia alpestris*).

Lu-520. Rogen, V 920 C, 1970 $\Delta = \mathbf{45 \pm 6}‰$, $\delta C^{13} = -21.6‰$

Lower fraction, 6 to 12 cm from top (*Cladonia alpestris*).

Lu-521. Rogen, V 920 D, 1970 $\Delta = \mathbf{9 \pm 6}‰$, $\delta C^{13} = -21.9‰$

Bottom fraction, 12 to 15 cm from top (*Cladonia alpestris*).

REFERENCES

Bagge, A. and Kjellman, K., 1939, Stenåldersboplatserna vid Siretorp i Blekinge (summ. in German): Stockholm, Wahlström & Widstrands Förlag.

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

———— 1971, Littorina transgressions in Blekinge, South Sweden. A preliminary survey: Geol. Fören Stockholm Förh., v. 93, p. 625-652.

Berglund, B. E. and Welinder, S., 1972, Stratigrafin i Siretorp (summ. in English): Fornvännen (Stockholm), 1972, p. 73-93.

Halden, B., 1929, Kvartärgeologiska diatomacéstudier belysande den postglaciala transgressionen å svenska Västkusten. I. Höganästrakten: Geol. Fören. Stockholm Förh., v. 51, p. 311-366.

Lasca, N. P., 1969, The surficial geology of Skeldal, Mesters Vig, Northeast Greenland: Grönland Medd., v. 176, no. 3, 56 p.

Lidén, K. and Gustafsson, M., 1966, Relationships and seasonal variation of ^{137}Cs in lichen, reindeer and man in northern Sweden 1961-1965, *in*: Åberg and Hungate (eds.), Radioecological concentration processes. Internatl. symposium proc., Stockholm, April 1966: Pergamon Press, p. 193-208.

Liljegren, R. and Welinder, S., 1971, Pollen analytical dating of the skeleton of an aurochs: Geol. Fören. Stockholm Förh., v. 93, p. 662-672.

Nilsson, Tage, 1935, Die pollenanalytische Zonengliederung der spät- und postglazialen Bildungen Schonens: Geol. Fören. Stockholm Förh., v. 57, p. 385-562.

———— 1961, Ein neues Standardpollendiagramm aus Bjärsjöholmssjön in Schonen: Lunds Univ. Årssk., N.F. avd. 2, v. 56, no. 18, p. 1-34.

Östlund, H. G., 1957, Stockholm natural radiocarbon measurements I: Science, v. 126, p. 493-497.

Persson, R. B. R., 1970, ^{55}Fe, ^{90}Sr, ^{134}Cs and ^{210}Pb in the biosphere. Radiological health aspects of the environmental contamination from radioactive materials in northern Sweden: Studentlitt., Lund, 81 p.

Petré, Rolf, 1961, Ein Bronzezeitlicher Grabhügel bei Nymölla, Ksp. Ivetofta, Schonen: Lunds Univ. Hist. Mus. Medd., p. 33-79.

von Post, L., 1929, Pollenanalytisk undersökning, *in*: Rydbeck, O. and von Post, L., Ornerad skafthålsyxa av hjorthorn funnen i Höganäs: Fornvännen (Stockholm), 1929, p. 141-154.

Roos, Paavo, 1968, Research at Caunus: Opuscula Atheniensia (Lund), v. VIII, p. 149-166.

Stjernquist, Berta, 1964, New light on spring-cults in Scandinavian prehistory: Archaeology, v. 17, no. 3, p. 180-184.

———— 1965, Gårdlösaundersökningen. En presentation: Ale, Hist. Tidskr. Skåneland, no. 2, 1965, p. 12-23.

———— 1967, Das Problem der Grubenhäuser in Südschweden: Jahrb. des Römisch-Germanischen Zentralmus. Mainz, Jahrg. 14, p. 144-152.

Strömberg, Märta, 1971, Om gånggriften i Tågarp, Ö. Tommarp och andra stenkammargravar på Österlen: Småskrifter, no. 11, Fören. Fornminnes- och Hembygdsvård i Sydöstra Skåne, Simrishamn, 86 p.

Suess, H. E., 1970, Bristlecone-pine calibration of the radiocarbon time-scale 5200 B.C. to the present, *in*: Olsson, I. U. (ed.), Radiocarbon variations and absolute chronology, 12th Nobel symposium proc., Uppsala: Stockholm, Almqvist & Wiksells Förlag, p. 303-311, pl. I.

Svensson, G. K. and Lidén, K., 1965, The transport of ^{137}Cs from lichen to animal and man: Health Phys., v. 11, p. 1393-1400.

Svensson, Harald, 1961, Några iakttagelser från palsområden. Flygbildsanalys och fältstudier i Nordnorska frostmarksområden: Norsk geog. tidsskr., v. 18, p. 212-227.

———— 1964, Traces of pingo-like frost mounds: Svensk geog. årsbok, v. 40, p. 93-106.

———— 1969, A type of circular lakes in northernmost Norway: Geog. Ann. (Stockholm), v. 51 A, p. 1-12.

Washburn, A. L. and Stuiver, Minze, 1962, Radiocarbon-dated postglacial delevelling in northeast Greenland and its implications: Arctic, v. 15, p. 66-73.