

## HARWELL RADIOCARBON MEASUREMENTS II

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Since publication of Harwell I (R, 1974, v 16, p 178-191) the laboratory has been officially set up to operate a commercial radiocarbon dating service. To accommodate an increased number of samples the combustion and benzene synthesis rigs have been rebuilt as simultaneously-operated twin-line systems.

Detail modifications in the techniques of combustion and benzene synthesis have enabled a faster throughput while maintaining reliable yields. On the combustion rig, platinized catalyst pellets, Engelhard type 'M', are now used in the after-burner in place of copper oxide wire. The catalyst is particularly efficient in the oxidation of volatile hydrocarbons (Griffen *et al*, 1973). Improved combustion is demonstrated by the absence of deposit in the glass outlet lines and by the reproducibility of  $\delta^{13}\text{C}$  test samples from product  $\text{CO}_2$ . Examination of the  $\delta^{13}\text{C}$  results from 16 sets of paired replicate burns on a variety of wood/charcoal samples showed an average difference of less than 0.3‰ between attempts. In dry combustion of NBS oxalic acid the mean of all samples to date (15) is  $19.25 \pm 0.19\text{‰}$  ( $1\sigma$ , standard deviation).

The acquisition of a VG Micromass model 602C has enabled  $\delta^{13}\text{C}$  measurements to be made on all samples dated in this laboratory.

Since Sept 1973 we have also been using a new catalyst base material, obtained from J A Heslop, Petrochemicals Division, ICI, England, for the benzene synthesis. The catalyst, activated with  $\text{V}_2\text{O}_5$ , can be used in the trimerization stage exactly as before. Apart from giving a slightly higher and more reliable yield, ca 96%, two important advantages are:

(a) the acetylene can be applied very quickly (125g catalyst at  $0^\circ\text{C}$  will take 5L  $\text{C}_2\text{H}_2$  down to less than 1 torr in ca 20 mins) and

(b) it can be used repeatedly with no apparent fall-off in yield even after 12 months of daily use. Memory effects are minimized by treating the catalyst to ca  $300^\circ\text{C}$  under vacuum, overnight, between samples. Care is also taken to remove any signs of visible aromatic deposit (Coleman *et al*, 1972, p 165) which appears around the neck of the containing vessel after repeated usage. Polach *et al* (1972, p 150), although not mentioning this deposit, have reported similarly for repetitive use of their catalyst.

Sample make up, using the proprietary benzene based scintillator (NE231A) and the method of sealing using specially ground vial tops with an indium washer, as described in HAR I, has continued to be employed.

As before, ages are calculated using the Libby half-life of 5568 years and 0.95 NBS oxalic modern standard with AD 1950 as reference year.

Errors quoted are the  $1\sigma$  estimate of the accuracy of the full laboratory measurement, *ie*, based on the expected replicate sample reproduci-

bility — not merely counting statistics. The procedure by which the estimates are assessed will be described elsewhere (Otlet, 1977, mss in preparation).

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#### I. ARCHAEOLOGIC SAMPLES

##### *A. British Isles*

**HAR-233. WC 1970, Pit 8, H2** **5680 ± 120**  
 $\delta^{13}C = -26.1\%$

Charcoal from upper of 2 hearths within basal filling of Mesolithic pit at Wakefords Copse, Havant, Hampshire, England (50° 52' 38" N, 0° 58' 10" W, NGR: SU72780914). Coll 1970 by E Lewis; subm 1972 by R J Bradley, History Dept, Univ Reading, England (Bradley & Lewis, 1974). *Comment* (RJB): dates lower filling of 1 of at least 9 Mesolithic pits recorded in salvage excavation and interpreted as bases of winter shelters. Pit 8 produced a few flints fitting a later Mesolithic date.

**HAR-234. Hog Cliff Hill, E 105 & E 121** **2490 ± 70**  
 $\delta^{13}C = -25.0\%$

Charcoal, from pit ca 45cm deep containing black soil and charcoal (E 105, AML 60471) and from base of posthole ca 30cm deep, below soil and flints (E 121, AML 60472), from Hog Cliff Hill, Maiden Newton, Dorset, England (50° 44' 58" N, 2° 31' 47" W, NGR: SY625966). Coll June 1960 by P A Rahtz; subm Dec 1972 by S Limbrey, Ancient Monuments Lab, London. *Comment* (PAR): date confirms relationship of site to others in Dorset, notably Maiden Castle sequence, and supports generally 'early' date assigned to pottery which includes classic haematite wares.

**HAR-235. Woodbury Castle WDC 71 58-35** **1930 ± 200**  
 $\delta^{13}C = -24.0\%$

Charcoal, AML 710069, from pit in old land surface beneath hillfort rampart at Woodbury, Devon, England (50° 40' 33" N, 3° 21' 52" W, NGR: SY033875). Pit was apparently cut immediately before rampart construction and was sealed by rampart material to ca 45cm. Coll Sept 1971 by H Miles; subm Dec 1972 by S Limbrey. *Comments*: small sample

accounts for large error term. (HM): on evidence from pottery and nature of earthwork, a construction date ca 200 BC was expected. Further dates may fix true date more precisely but this result is not inconsistent with expected age.

### Carn Euny series

Charcoal samples from Carn Euny site, Sancreed Parish, West Penwith, Cornwall, England (50° 6' N, 5° 38' W, NGR: SW403288) (Christie, 1965-70, 1973). Coll Aug 1970 & Aug 1972 by P M Christie; subm Dec 1972 by S Limbrey.

#### HAR-237. F122

**1740 ± 70**

$\delta^{13}C = -25.3\text{‰}$

Charcoal (*Quercus* sp) AML 700191, from base of thick charcoal layer below soil and stones. Pit ca 53cm deep cut into subsoil, sealed by ca 50cm accumulation of soil. *Comment* (PMC): younger than expected but acceptable, confirms suspected late date of pit from which sample came.

#### HAR-238. F140

**2370 ± 70**

$\delta^{13}C = -26.2\text{‰}$

Charcoal (*Quercus* sp) AML 725418, from trench cut into subsoil, above ash layer, sealed by ca 45cm of humic soil beneath paving stones, with further accumulation of soil above pavings. *Comment* (PMC): sample, which comes from a pre-courtyard house phase, is surprisingly early. In view of context and its assoc with decorated potsherds of a type so far unknown on site, there is good reason for accepting it as earliest Iron age occupation.

### Grindale Barrow series

Grindale Barrow I (54° 07' 0" N, 0° 14' 31" W, NGR: TA151707) is 1 of 3, plough-levelled, round barrow sites in Grindale parish and adjoining Boynton parish, Bridlington, Humberside, England (Manby, 1977). Dating was to confirm 2 phases of construction indicated by ditch system surrounding a central pit feature. Phase I ditch, a deep oval enclosure, had apparently silted up almost to its top before burnt timber structure collapsed into hollow Phase II ditch. Samples subm 1972 by T G Manby, Doncaster Mus & Art Gallery.

#### HAR-266. Grindale Barrow I, Sample 1

**4510 ± 90**

$\delta^{13}C = -26.5\text{‰}$

#### HAR-267. Grindale Barrow II, Sample 2

**4470 ± 120**

$\delta^{13}C = -22.5\text{‰}$

Charcoal samples from burnt and fallen timber feature resting on silted up inner ditch, Phase II of site.

**HAR-269. Grindale Barrow I, Sample 3****4910 ± 120** $\delta^{13}C = -25.0\text{‰}$ 

Antler of red deer resting on floor of inner ditch, probably contemporary with digging. *Comment*: attempt was made to remove all traces of PVA with which antler had been painted before submission for dating. *General Comment* (TGM): date for Phase I (Sample 3) compares well with previous date of Willerby Wold A, long barrow 2950 ± 150 BC (BM-188, R, 1969, v 11, p 287). Phase II dates (Samples 1 & 2) are closely contemporary and place monument in Neolithic period. Depth of Phase I ditch silting supports considerable duration before Phase II event.

**HAR-268. Boynton Barrow I, High Easton Farm****4840 ± 80** $\delta^{13}C = -27.2\text{‰}$ 

Charcoal from in-filling of a central 'henge' type feature with opposed entrances at above site, Boynton, Nr Bridlington, Humberside, England (54° 07' 02" N, 0° 13' 50" W, NGR: TA159708). Coll & subm 1973 by T G Manby (1977). *Comment* (TGM): site is round barrow levelled by cultivation, early date indicated by fragments of Peterborough Ware vessels high up in silting of surrounding quarry ditch. Unweathered state of sides of trench shows it could not have stood open for more than a few weeks. Date of inner trench comparable with dating from Kilham long barrow, 2880 ± 125 BC (BM-293, R, 1971, v 13, p 293) if not as old as Grindale Barrow I, Phase I, ditch.

**Milton Keynes series**

Samples from several sites excavated under aegis of Milton Keynes Development Corp at Milton Keynes, Buckinghamshire, England (Green, 1974a, b). Unless otherwise noted, all samples coll 1972; subm 1973 by H S Green.

**HAR-339. Pit 1 (MK23)****2790 ± 70** $\delta^{13}C = -23.3\text{‰}$ 

Charcoal from Pit 1, N W quad of Hartigans Gravel Pit (52° 02' 18" N, 0° 43' 05" W, NGR: SP88183864). *Comment* (HSG): satisfactorily dates assoc Late Bronze age pottery.

**HAR-340. Primary Burial (MK24)****3670 ± 80** $\delta^{13}C = -24.0\text{‰}$ 

Human bone, crouched inhumation of elderly female from grave pit centrally placed in ring ditch at Little Pond Ground, Wolverton (52° 03' 18" N, 0° 50' 10" W, NGR: SP80124053). *Comment* (HSG): satisfactorily dates grave group consisting of Step 3 beaker and 1 double pointed copper awl.

**HAR-341. Secondary burial (MK13)****2990 ± 80** $\delta^{13}C = -21.2\text{‰}$ 

Human bone from secondary crouched inhumation of female placed on ditch silt under cairn at Warren Farm, Wolverton (52° 03' 23" N,

0° 49' 55" W, NGR: SP80334074). *Comment* (HSG): post-dates clearance horizon represented by charcoal spread 10cm below skeleton and dated to 1500 ± 90 BC (1-7148 not pub in *Radiocarbon* up to 1976). Date is acceptable.

**HAR-471. (MK21-39)**

**3290 ± 160**

$\delta^{13}C = -26.8\%$

Charcoal from Cotton Valley Farm (52° 03' 30" N, 0° 42' 45" W, NGR: SP88504091). Samples taken from possible clearance horizon, or hearth, represented by a charcoal spread at depth 0.90m, 0.07m above floor of ring ditch. Coll 1971 by A Sandford. *Comment* (HSG): stratigraphy of sample suggests it is virtually contemporary with construction of ring ditch. Provides *terminus ante quem* for central (primary) cremation in a Collared Urn of Longworth's Primary series. Date is acceptable.

**Rackham series**

Rackham Common, Rackham, West Sussex, England (50° 55' 30" N, 0° 30' 10" W, NGR: TQ04901520) (Holden & Bradley, 1975, Dimbleby & Bradley, 1975). Coll by E W Holden; subm 1973 by R J Bradley.

**HAR-359. Rackham 1970 Area I**

**2300 ± 100**

$\delta^{13}C = -24.6\%$

Charcoal. Bulk sample from charcoal spread assoc with flint industry of late Neolithic (Beaker) character. Included contents of one small hearth.

**HAR-360. Area II**

**3950 ± 140**

$\delta^{13}C = -22.1\%$

Charcoal. Bulk sample from hearths assoc with flint industry of late Neolithic character.

*General Comment*: both samples should date a flint industry of late Neolithic character apparently in a forest clearing assoc with sub-Boreal pollen. HAR-359 appears substantially too young, not compatible with HAR-360 which conforms well with expected date. HAR-359 was probably contaminated, in fact both samples contained large quantities of modern rootlets. The hearth might also reflect later re-occupation in Iron age.

**Crickley Hill series**

Samples from Crickley Hill, Gloucestershire, England (51° 50' 33" N, 2° 6' 20" W). Coll 1973 by C Anderson unless otherwise stated; subm Sept 1973 by P W Dixon, Classical Archaeol Studies Dept, Univ Nottingham, England (Dixon, 1976).

**HAR-391. C1-366**

**2520 ± 90**

Charcoal from Posthole 10: Oak gate post, 20 to 25cm diam originally, from final entrance to hillfort, Period 3B (Dixon, 1972).

**HAR-392. C2-A1X9** **2590 ± 60**  
 $\delta^{13}C = -24.6\text{‰}$

Charcoal from lowest tier, small brushwood sample (raft in timber lacing) of timber-laced ramparts, of 1st hillfort, Period 2.

**HAR-393. C3A1X9** **2310 ± 70**  
 $\delta^{13}C = -23.4\text{‰}$

Charcoal adjacent to HAR-392 and of identical character.

**HAR-394. C4AXIV15** **2350 ± 80**  
 $\delta^{13}C = -23.1\text{‰}$

Charcoal from same layer as HAR-392 and -393. Coll Aug 1973 by A Pandrich.

### Fengate 1973 series

Samples from an extensive Neolithic/BA site at Fengate, Peterborough, England (52° 34' 58" N, 0° 13' 12" W, NGR: TL212987). Coll and subm by F M M Pryor, Field Dir, Royal Ontario Mus/Nene Valley Research Comm Fengate excavations.

**HAR-397. B24(1)** **3980 ± 100**  
 $\delta^{13}C = -25.4\text{‰}$

Carbonized wood from small pit filled with domestic refuse, directly beneath top soil, cut into C soil horizon; contained many sherds of later Neolithic Grooved Ware and flint work.

**HAR-399. B61(1)** **3970 ± 70**  
 $\delta^{13}C = -24.4\text{‰}$

Carbonized wood from small domestic refuse pit, stratigraphically as HAR-397, above; contained many sherds of Grooved Ware and contemporary flint work.

**HAR-404. Y12(1)** **3880 ± 80**  
 $\delta^{13}C = -24.9\text{‰}$

Carbonized wood from another small refuse pit, stratigraphically as HAR-399, above, and containing similar finds.

**HAR-409. W32(1)** **3810 ± 150**  
 $\delta^{13}C = -24.6\text{‰}$

As HAR-399 above, but different pit.

**HAR-401. Y4(1)** **3960 ± 90**  
 $\delta^{13}C = -21.9\text{‰}$

Carbonized wood from large back-filled pit containing domestic refuse; sherds of Grooved Ware and numerous flint scrapers and waste flakes, together with leg bones of *Bos taurus* and *Bos primigenius*.

**HAR-406. 1VW17(5)****3290 ± 80**  
 $\delta^{13}C = -21.3\text{‰}$ 

Waterlogged wood, dried before submission, from part of a stake from base of large pit assoc with ring ditch.

**HAR-400. W2****3410 ± 120**  
 $\delta^{13}C = -19.6\text{‰}$ 

Carbonized/burnt wood sample taken from charcoal separated from calcined bone fragments found inside a plain Secondary Series Collared Urn within a secondary turf mound in the center of a ring-ditch.

**HAR-398. 11B3(5)****3000 ± 70**  
 $\delta^{13}C = -28.4\text{‰}$ 

Waterlogged wood twigs, dried before submission, taken from wattle lining at bottom of a well.

*General Comment* (FMMP): dates for carbonized wood samples, HAR-397, -399, -401 and -409 fall well within age range expected and are consistent with other dates for this ceramic style in Great Britain. HAR-400, together with HAR-406 provides dating for latest phase of late Neolithic/BA settlement. Since wells probably remained in use after main settlement had moved elsewhere, HAR-398 result should provide a sound *terminus ante quem* for settlement dated by other samples in this series.

**HAR-395. Shelford****3480 ± 70**  
 $\delta^{13}C = -25.9\text{‰}$ 

Charcoal from Shelford, Nottinghamshire, England (52° 58' 5" N, 1° 1' 35" W, NGR: SK658419) from an unurned cremation at center of a ring ditch in a pit dug into gravel sub-soil with no trace of barrow mound (Revill, 1974). Coll and subm by S Revill, Archaeol Sec, Thoroton Soc Nottinghamshire. *Comment* (SR): date agrees with interpretation of assoc flint artifacts and is important because of absence of pottery.

**Hereford Castle series**

Charcoal and human bone from Saxon burial ground underneath Hereford Castle Bailey, Hereford, England (52° 03' N, 2° 42' 30" W, NGR: SO512395). Coll and subm by R Shoesmith.

**HAR-413. Sample A****960 ± 70**  
 $\delta^{13}C = -25.6\text{‰}$ 

Charcoal from Burial S80.

**HAR-414. Sample B****1030 ± 80**  
 $\delta^{13}C = -26.0\text{‰}$ 

*Comment* (RS): two charcoal samples taken from charcoal bed underlying burials — similar types of burial from Winchester, York, Exeter and Oxford.

**HAR-985. S85** **1250 ± 70**

$$\delta^{13}C = -20.1\text{‰}$$

Human bone from E-W burial underneath charcoal burial S80.  
*Comment* (RS): possibly earliest burial on site.

**HAR-986. S46** **890 ± 80**

$$\delta^{13}C = -19.8\text{‰}$$

Human bone from E-W burial on bed of charcoal sealing foundations of E-W building with stone footings which could be St Guthlac's Church.

**HAR-988. S10** **820 ± 70**

$$\delta^{13}C = -19.5\text{‰}$$

Human bone from E-W burial in stone cist. *Comment* (RS): one of latest burials on site but burial ground possibly still in use within Castle.  
*General Comment* (RS): stratigraphic and historic sequence fits well with measured dates of this series.

**All Saints series**

Samples from All Saints Church, Oxford, England (51° 44' 43" N, 1° 15' 22" W, NGR: SP51500625) (Hassall & Durham, 1974). Coll and subm by B G Durham.

**HAR-418. Sample 196** **920 ± 70**

$$\delta^{13}C = -27.2\text{‰}$$

Human bone, long bones, of earlier burial related to medieval church; found laid across a back-filled domestic cellar pit which was still actively subsiding. *Comment* (BGD): burial was thought to be stratigraphically later than an Edward the Confessor coin (1042-66).

**HAR-419. Sample 184** **980 ± 70**

$$\delta^{13}C = -27.2\text{‰}$$

Charcoal from charred wattle fence, from layer which sealed HAR-466, and was itself sealed by further Saxon domestic layers and by the medieval church. *Comment* (BGD): result agrees well with provisional dating of site.

**HAR-466-I. Sample 205** **1060 ± 70**

$$\delta^{13}C = -21.9\text{‰}$$

**HAR-466-II.** **1070 ± 80**

$$\delta^{13}C = -22.1\text{‰}$$

Charred grain (largely wheat, *Triticum aestivum*) mixed with loam overlying original top soil. Sealed by Saxon domestic layers and medieval church. *Comments*: HAR-466-II analyzed as completely separate replicate sample check. (BGD): results agrees well with provisional date of site.



**Balksbury Camp series**

Site of Iron age hillfort, Balksbury Camp, Andover, Hampshire, England (51° 11' 55" N, 1° 30' W, NGR: SU351446). Coll by G J Wainwright; subm Oct 1973 by H Keeley, Ancient Monuments Lab, London.

**HAR-442. BCI-10** **2740 ± 170**  
 $\delta^{13}C = -22.9\%$

Antler pick, AML 736655, from base of Phase 1 rampart which should relate to construction of defenses.

**HAR-443. 500-5/8** **1310 ± 100**  
 $\delta^{13}C = -25.3\%$

Charcoal, AML 736656, bulked sample from bell-shaped storage pit. *Comment* (GJW): age was expected to compare with HAR-442; contamination of bulked sample is suspected.

**HAR-444. 36/6** **2140 ± 80**  
 $\delta^{13}C = -25.2\%$

Charcoal, AML 736657, from a bell-shaped storage pit assoc with pottery of Middle Iron age type.

**HAR-445. 182/4** **2000 ± 80**  
 $\delta^{13}C = -24.1\%$

Charcoal, with mud, AML 736657, from storage pit as HAR-444.

**HAR-446. 106/4** **2180 ± 150**  
 $\delta^{13}C = -25.1\%$

Charcoal, with mud, AML 736657, from storage pit as HAR-444.

**HAR-461. RH 1973 (on base of 1.25)** **2980 ± 70**  
 $\delta^{13}C = -24.6\%$

Charcoal immediately sealed by large chalk rubble in filling (interpreted as demolished facing of earlier rampart) of the BA enclosure ditch at Rams Hill, Kingston Lisle, Oxfordshire, England (51° 34' 23" N, 1° 32' 55" W, NGR: SU315864). Coll by R J Bradley and A Ellison; subm 1973 by R J Bradley (Bradley & Ellison, 1975). *Comment* (RJB): this is the 6th date for Rams Hill sequence (*cf* R, 1974, v 16, p 181-82). It provides a *terminus ante quem* for digging and early silting of 1st BA enclosure ditch and may be correlated with reconstruction of rubble rampart to site in timber. It agrees well with HAR-232: 3010 ± 70 BP (R, 1974, v 16, p 182) for charcoal assoc with material packing posts of this rebuilt rampart.

**Breiddin hillfort series**

Samples from Breiddin hillfort, Montgomery, Powys, Wales (52° 43' 15" N, 3° 2' 45" W, NGR: SJ292144). Coll and subm by C R Musson, Clwyd-Powys Archaeol Trust (Musson, 1970, 1972).

**HAR-467. H1****2410 ± 100** $\delta^{13}C = -24.4\text{‰}$ 

Charcoal throughout postholes of Roundhouse B37 porch inside hillfort, from collapsed packing and post-pipes.

**HAR-468. H2****2190 ± 80** $\delta^{13}C = -25.1\text{‰}$ 

Charcoal from combination of small samples from 13 postholes belonging to the 4-posted Bldgs B31, B36, B37 and B50 inside hillfort. Samples were drawn from collapsed packing and post-pipes. *Comment* (CRM): probably attributable to same occupation phase as HAR-469.

**HAR-469. H3****2120 ± 70** $\delta^{13}C = -26.0\text{‰}$ 

Charcoal from post-pipe of posthole belonging to a 'pair' of posts in B36 inside hillfort.

**HAR-474. Sample 3****3260 ± 70** $\delta^{13}C = -25.4\text{‰}$ 

Wood, tree roots (*Pinus sylvestris*) probably corresponds to sub-Boreal or late Atlantic pine woodland from Shieldaig, Wester Ross, Scotland (57° 30' 50" N, 5° 39' 50" W, NGR: NG81625231). Roots occur in superficial peat unit (Layer 2) and underlying sand unit (Layer 3). Coll and subm Oct 1973 by M J Walker, Dept Anthropol, Univ Sydney, New South Wales, Australia. *Comment* (MJW): date required to give better age estimate for layer in which prehistoric lithic artifacts were found. Previous results (R, 1974, v 16, p 185). HAR-163, 3720 ± 525 BP, from same stratigraphic unit, had excessive error margin and HAR-157, 4030 ± 120 BP from a surface wood sample was less securely stratified. Over-all, dates are acceptable for period of pine forest cover at site, they are later than underlying battered-back quartz microliths among a unit characterized by river pebbles in dunar sand corresponding to maximal marine transgression of post glacial times, perhaps ca 6500 BP or slightly later.

**Llanstephan Castle series**

Llanstephan Castle, Carmarthen, Dyfed, Wales (51° 45' 45" N, 4° 22' 40" W, NGR: SN351101) stands on a promontory cut off by a complex series of earth-works thought to be of prehistoric origin. Samples coll 1971-73; subm Nov 1973 by G Guilbert, Clwyd-Powys Archaeol Trust (Guilbert & Schweiso, 1972; Guilbert, 1974).

**HAR-475. L1042****2450 ± 90** $\delta^{13}C = -25.3\text{‰}$ 

Charcoal from shallow trench/ditch at front of Bank C probably relating to original timber-revetted construction of that bank.

**HAR-476. L1068**

**2460 ± 70**  
 $\delta^{13}C = -25.0\text{‰}$

Charcoal from primary silt in deep U-shaped Ditch X, which possibly antedated timber-fronted rampart assoc with HAR-475.

**HAR-477. L7115**

**2470 ± 70**  
 $\delta^{13}C = -25.8\text{‰}$

Sample from charcoal-laden occupation soil with postholes sealed beneath primary earthwork of 12th century AD ring and bailey Castle.

*General Comment* (GG): dates for 3 charcoal samples, HAR-475-477, demonstrate that castle stands within Iron age hillfort and are invaluable to excavation in view of total absence of dateable artifacts in these levels. 6th to 5th century BC dates of HAR-475 and -476 are consistent with assoc Iron age timber-fronted form of rampart.

**HAR-478. Ascot 1973, Sample I**

**3430 ± 70**  
 $\delta^{13}C = -27.8\text{‰}$

Charcoal of scattered ash from surface of turf line, under a bell barrow, sealing a series of possible furrows in buried soil and assoc with a phase of high cereal pollen. From Heatherwood Hospital, Ascot, Berkshire, England (51° 24' 30" N, 0° 41' 30" W, NGR: SU914687). Coll and subm 1973 by R J Bradley (Bradley & Keith-Lucas, 1975). Comment (RJB): gives *terminus post quem* for bldg of EBA-type bell barrow. *Terminus ante quem* for episodes of clearance and cultivation beneath or close to mound.

**Brixworth series**

Samples from excavations at Brixworth vicarage garden, some 70m W of church, Brixworth, Northamptonshire, England (52° 20' 8" N, 0° 54' 17" W, NGR: SP74607125). Coll July 1972 by P Everson; subm by H Keeley (Everson, 1973).

**HAR-483. Major Ditch,****Samples BX72JB and BX72JT**

**1250 ± 80**  
 $\delta^{13}C = -21.5\text{‰}$

Animal bone from primary fill. *Comment* (PE): date, even as corrected to AD 700-720 on MASCA recalibration (Ralph *et al*, 1973), confirms excavator's opinion that feature was Saxon rather than pre-Roman and was boundary ditch of Saxon monastic precinct. Date also tends to support traditional late 7th century date for foundation of monastery.

**HAR-484. Skeleton 10, BX72JF**

**1150 ± 70**  
 $\delta^{13}C = -19.8\text{‰}$

Human bone buried in natural sub-soil, W-E orientation, with no grave goods, stratified below 12th century and later medieval deposits. *Comment* (PE): corrects on MASCA recalibration (Ralph *et al*, 1973) to AD 830-850. Significance same as HAR-485, below.

**HAR-485. Skeleton 1, BX72BM** **1200 ± 80**  
 $\delta^{13}C = -20.0\%$

Human bone buried in natural sub-soil, W-E orientation with no grave goods. *Comment* (PE): date corrected on MASCA recalibration (Ralph *et al*, 1973) to AD 770-790, confirms relationship of burials to boundary ditch and establishes that they belong to a monastic period rather than later parochial burial ground.

**HAR-486. Samples 1 & 2** **3720 ± 90**  
 $\delta^{13}C = -26.2\%$

Result of combination of 2 charcoal samples, a few cm apart, from original ground surface beneath remains of mound of round barrow at Harpley, Norfolk, England (52° 49' 30" N, 0° 36' 10" E, NGR: TF762279). Coll Oct 1973 by A J Lawson; subm Nov 1973 by H Keeley. *Comment* (AJL): charcoal found in same horizon as Collared Urn sherds and both offer a *terminus post quem* for construction of barrow.

**Brenig series**

Samples from a principally Bronze age site at Brenig, Glyndwr, Clwyd, Wales (53° 05' N, 3° 30' W, NGR: SH983572), threatened by construction of a new reservoir (Lynch *et al*, 1974). Coll 1973 by F Lynch & F A Hibbert; subm Jan 1974 by F A Hibbert.

*General Comment* (FAH): samples were from Ring Cairn, Brenig 44, believed to have had 3 periods of major activity lasting about 400 yr. Its use for burials may have been secondary.

**HAR-500. 295** **3490 ± 70**  
 $\delta^{13}C = -25.6\%$

Charcoal from central cremation. *Comment* (FAH): burial dated here appears later than the first phase of construction, HAR-501, suggesting its secondary use for burial. Second phase of activity.

**HAR-501. 328** **3630 ± 100**  
 $\delta^{13}C = -25.8\%$

Charcoal from F47. *Comment* (FAH): dates charcoal spread on original pared ground surface. Dates 1st of charcoal pits dug against face of ring in 1st phase of major activity.

**HAR-502. 314** **3470 ± 70**  
 $\delta^{13}C = -25.7\%$

Charcoal from plank incorporated in outer bank. *Comment* (FAH): 2nd phase of activity.

**HAR-503. 234 Brenig 44** **3230 ± 70**  
 $\delta^{13}C = -25.9\%$

Charcoal from F20 surrounding urns.

**HAR-504. 154** **3290 ± 80**  
 $\delta^{13}C = -26.2\text{‰}$

Charcoal from F6; dug into top of inner bank. *Comment* (FAH): dates last burial at close of major activity at site. Third phase of activity.

**HAR-505. 162** **3470 ± 80**  
 $\delta^{13}C = -25.8\text{‰}$

Charcoal from Layer 2 of inner bank. *Comment* (FAH): sample dates 2nd period of activity on outer bank.

#### **Beacon Hill series**

Human bone taken from Beacon Hill Cemetery, M40, Site 12, Beacon Hill, Nr Lewknor, Oxfordshire, England (51° 40' 13" N, 0° 57' 14" W, NGR: SU722972) from grave pits cut into chalk ca 0.8m from top soil (Chambers, 1973). Coll May 1972 & subm 1974 by R A Chambers.

**HAR-506. Grave 14** **1130 ± 70**  
 $\delta^{13}C = -19.9\text{‰}$

**HAR-507. Grave 33** **1090 ± 90**  
 $\delta^{13}C = -20.7\text{‰}$

#### **Wicken Bonhunt series**

Anglo-Saxon settlement (Wade, 1974) at Wicken Bonhunt, near Newport, Essex, England (51° 58' 55" N, 0° 12' E, NGR: TL511335). Planks, up to 2.7m long and 0.3 wide, from lining of shaft, which contained Middle Saxon pottery, of Well 2/Phase 1. Samples coll 1972 by R Carr and S Dunmore; subm Oct 1973 and Jan 1974 by J M Fletcher, Research Lab for Archaeol & Hist Art, Oxford Univ. Growth allowances estimated from tree-ring examination by JMF.

**HAR-512. Sample 1** **1195 ± 63**  
 $\delta^{13}C = -25.8\text{‰}$

Wet heartwood oak covering 15 annual rings from plank East 1, growth allowance  $65 \pm 10$  yr.

**HAR-513. Sample 2** **1200 ± 70**  
 $\delta^{13}C = -26.7\text{‰}$

Heartwood oak, dried before submission, covering 15 annual rings from plank East 2, growth allowance  $40 \pm 10$  yr.

*General Comment* (JMF): after calibration (Damon *et al*, 1972) and application of growth allowance, corrected values are AD  $845 \pm 70$  and AD  $815 \pm 75$ , respectively. The mean, AD  $830 \pm 50$ , places construction of well in Middle Saxon period. The planks, having been cut 'through and through', had insufficient growth rings for dating by dendrochronology.

#### **Coed-y-Bwnydd series**

Samples from excavations at the hillfort Coed-y-Bwnydd, Bettws Newydd, Gwent, Wales (51° 45' 30" N, 2° 55' 10" W, NGR: SO365068).

Two samples are charcoal from carbonized remains of wattle wall framework, wattle and daub structure, of 2nd phase of same Roundhouse L15 (Babbidge, 1970-71). Coll Aug 1971 & subm March 1974 by A V Babbidge.

**HAR-546. Sample 1** **2390 ± 70**  
 $\delta^{13}C = -25.9\text{‰}$

**HAR-547. Sample 2** **2350 ± 90**  
 $\delta^{13}C = -25.8\text{‰}$

#### Lloyds Bank site, Pavement, series

Three samples, from 50-yr intervals of 180-yr tree-ring sequence based on 3 oak (*Quercus* sp) planks, from early Medieval site beneath Lloyds Bank extension at Pavement, York (53° 57' 30" N, 1° 4' 30" W, NGR: SE604518). Site has also been studied for its fauna and flora (Anon, 1973; Buckland *et al*, 1974). All samples coll by York Archaeol Trust, winter 1972/73, and subm by R A Morgan, March 1974.

**HAR-548. Sample 1** **1090 ± 60**  
 $\delta^{13}C = -26.2\text{‰}$

From planks at Level 23, Rings 40 to 60 (AML 740628).

**HAR-549. Sample 2** **1170 ± 80**  
 $\delta^{13}C = -26.2\text{‰}$

From planks at Level 23, Rings 90-110 (AML 740629).

**HAR-550. Sample 3** **1130 ± 80**  
 $\delta^{13}C = -26.4\text{‰}$

From 3 planks at Levels 23(2) and 21(1), Rings 140-160 (AML 740630).

*General Comment:* R A Morgan accepts that all 3 dates fit expected site chronology. Originally, possible reversal of Samples 1 and 3 was suggested but was considered unlikely. Such an explanation is unnecessary since extreme values are not inconsistent with dendrochronology when quoted standard deviations are properly analyzed.

#### Colwick Hall series

Wood from excavations of medieval weir (Salisbury, 1974) at gravel pit at Colwick Hall, Colwick, Nottingham, England (52° 56' 40" N, 1° 06' 20" W, NGR: SK604388). Coll and subm 1974 by C R Salisbury, Nottingham Historical Arts Soc.

**HAR-552. Sample 1** **820 ± 70**  
 $\delta^{13}C = -26.8\text{‰}$

Wood (oak), AML 741282, from one of several hundred posts averaging 2m long and 10 to 15cm diam from 5m below gravel pit surface.

**HAR-846. Sample 2** **860 ± 60**  
 $\delta^{13}C = -28.6\text{‰}$

Wood, AML 748280, probably willow (wattle) from ca 3m below gravel pit surface.

*General Comment* (CRS): v-shaped alignment of posts and wicker work in buried water course of River Trent was possibly a weir and/or fish trap.

**HAR-560. Pile Sample**

**860 ± 80**

$\delta^{13}C = -26.8\text{‰}$

Wood (*Fagus sylvatica*) from piles adjacent to Bramber Medieval Bridge, West Sussex, England (50° 53' 55" N, 0° 18' 5" W, NGR: TQ18971062) found 3m below surface of alluvium (Holden, 1975). Coll & subm by E W Holden. *Comment* (EWH): archaeologically, piles should be late Saxon or early Norman. Radiocarbon date very satisfactory.

*General Comment*: timber sample dendrochronologically examined by J M F Fletcher. No growth allowance was deemed necessary for actual sample analyzed for Carbon-14.

**Moel-y-Gaer series**

Samples from excavations on Iron age hillfort site Moel-y-Gaer, Rhosesmor, Clwyd, North Wales (53° 12' 45" N, 3° 11' W, NGR: SJ212691). Coll June 1973; subm May 1974 by G Guilbert.

**HAR-603. MO476**

**2190 ± 80**

$\delta^{13}C = -27.2\text{‰}$

Soil, brown silt containing charcoal, from deposit of twigs sealed beneath tail of 2nd rampart.

**HAR-604. MO3 Front Gully**

**2530 ± 90**

$\delta^{13}C = -26.3\text{‰}$

Charcoal from packing of foundation trench for front revetment timbers of 1st timber-framed rampart of hillfort.

**HAR-605. MO467**

**3590 ± 80**

$\delta^{13}C = -25.6\text{‰}$

Charcoal from occupation dirt within rectilinear area sealed beneath Iron age rampart.

**HAR-606. MO468**

**2570 ± 70**

$\delta^{13}C = -26.0\text{‰}$

Charcoal from occupation soil of Post-Ring Round-House sealed under 1st rampart.

*General Comment* (GG): taking dates in order, HAR-605, 1640 bc, is no surprise, since there is a scatter of late Neolithic to EBA artifacts (notably flint arrow heads) across the whole ~6000 sq m area excavated. HAR-604, 580 bc, and HAR-606, 620 bc, are compatible within themselves and with dates from similar rampart excavations. HAR-603 provides *terminus post quem* for construction of 2nd rampart and is acceptable stratigraphically.

**Somerset Levels series**

The Somerset Levels comprises an area of low-lying land between Quantock Hills and Mendips in Somerset, England. Archaeol area, described by Coles (1975), covers  $14 \times 5$  km where Levels comprise stratified peats resting upon a more or less uniformly marine clay. Peat deposits began ca 3500 BC and continued throughout ca 4000 yr. Man's presence during this period has been successively discovered in recent yr from workings of commercial peat companies, with whose cooperation, comprehensive investigations in archaeol, palaeobot, and dendrochronol have been possible. The 10 dates fit into a set of 70 dates listed by Coles & Coles (1975) and refer principally to wood from newly discovered trackways. Unless otherwise stated, samples were coll during 1969-1974 and subm 1974 by J M Coles, Dept Archaeol, Cambridge.

**HAR-649. SLP74.4 (Chilton I-2)  $4760 \pm 80$**   
 $\delta^{13}C = -28.2\text{‰}$

Wood (*Betula*), AML 744082, from horizontal timbers under 0.5m peat in large series of trackways leading to important Neolithic settlement at Chilton Moor ( $51^{\circ} 11' N$ ,  $2^{\circ} 53' 30'' W$ , NGR: ST387428) (Coles *et al*, 1970). Coll 1969 by J M Coles and F A Hibbert. *Comment* (JMC): sample from adjacent trackway dated BP  $4760 \pm 65$  refers to unusual bifurcation in trackway construction.

**HAR-650. SLP74.5 (Skinners Wood)  $2630 \pm 70$**   
 $\delta^{13}C = -25.9\text{‰}$

Wood (*Fraxinus*), AML 744084, from vertical peg under ~1m peat at Skinners Wood, Shapwick Heath ( $51^{\circ} 09' 40'' N$ ,  $2^{\circ} 50' W$ , NGR: ST415404). *Comment* (JMC): Skinners Wood contains a series of trackways built during flooding conditions and assoc with unique wooden objects. Site now totally destroyed.

**HAR-651. SLP74.2 (Honeydew G VII.1)  $4460 \pm 90$**   
 $\delta^{13}C = -26.9\text{‰}$

Wood (*Betula*), AML 744083, from trackway under ~1m peat at Westhay Level ( $51^{\circ} 11' N$ ,  $2^{\circ} 50' W$ , NGR: ST416428). *Comment* (JMC): date exactly fits peat stratigraphy.

**HAR-652. SLP74.3 (Honeycat G VI.5)  $4370 \pm 80$**   
 $\delta^{13}C = -28.5\text{‰}$

Wood (*Corylus*), AML 744081, from horizontal timbers under ~2m peat in track complex at Westhay Level. *Comment* (JMC): date suitable for stratigraphic position and matches HAR-653.

**HAR-653. SLP74.1 (Honeycat G V.I)  $4440 \pm 70$**   
 $\delta^{13}C = -29.1\text{‰}$

Wood (*Betula*), AML 744080, from trackway under 1.5m peat at Westhay Level. *Comment* (JMC): date helps resolve horizontal and vertical stratigraphic problems of multiple trackways in this area of Levels.



**HAR-680. SLP74.7 (Eclipse 1)** **3460 ± 60**  
 $\delta^{13}C = -29.0\text{‰}$

Wood, AML 744086, from trackway under 0.4m, sphagnum peat at Meare Heath (51° 09' 45" N, 2° 47' 10" W, NGR: ST449406). *Comment* (JMC): date earlier than presumed, early 1st millennium BC, but agrees with detailed pollen analyses subsequently made.

**HAR-681. SLP74.9 (Tinney's 18.7)** **3040 ± 70**  
 $\delta^{13}C = -27.7\text{‰}$

Wood, AML 744088, from trackway under 0.75m *Eriophorum sphagnum* peat at Sharpham (51° 08' 30" N, 2° 45' 20" W, NGR: ST470382). *Comment* (JMC): sample from area where multiple tracks were built leading from promontory settlement towards Glastonbury Tor.

**HAR-682. SLP74.8 (Garvin's)** **4380 ± 70**  
 $\delta^{13}C = -28.3\text{‰}$

Wood, AML 744086, from trackway in terminal position under 0.4m peat at Walton Heath (51° 08' 40" N, 2° 46' 50" W, NGR: ST453385). *Comment* (JMC): date exactly suits peat stratigraphy.

**HAR-683. SLP74.6 (Meare Lake 1-3)** **3290 ± 70**  
 $\delta^{13}C = -27.0\text{‰}$

Wood, AML 744085, from trackway under 1m peat at Meare Heath (51° 09' 45" N, 2° 47' 30" W, NGR: ST444406). *Comment* (JMC): sample from area hitherto without traces of human activity. Trackway is multiple-layered in construction and contains wooden equipment and materials from another site yet to be discovered. Sample from large timber possibly 1 or 2 centuries old when incorporated in track.

**HAR-684. SLP74.10 (Tinney's 17.7)** **3020 ± 70**  
 $\delta^{13}C = -28.9\text{‰}$

Wood, AML 744089, from a complex of multiple structures beneath 0.75m *Eriophorum sphagnum* peat at Sharpham (51° 68' 30" N, 2° 45' 20" W, NGR: ST470382).

#### Watch Hill Barrow series

Charcoal from Watch Hill Barrow, St Austell, Cornwall, England (50° 21' 40" N, 4° 51' 0" W, NGR: SW974544). Coll & subm Aug 1973 by H Miles, Dept Extra-mural Studies, Univ Exeter, England (Miles, 1973). Samples are from pit dug in base of barrow ditch, carefully re-packed with clay and charcoal, and thus relate to primary use of site, which was added to over a long period.

**HAR-654. 162-29** **3470 ± 70**  
 $\delta^{13}C = -26.5\text{‰}$

**HAR-655. 149-60** **3420 ± 70**  
 $\delta^{13}C = -27.2\text{‰}$

*General Comment* (HM): Watch Hill Barrow has been placed, on palynologic evidence, 2nd in series of recently excavated on St Austell granite.

It produced Food Vessel sherds likely to be some years later than primary,  $^{14}\text{C}$ , context. On grounds of general similarities to other Cornish barrows, Watch Hill was expected to fall fairly early within Cornish EBA and dates provide good confirmation.

**HAR-674. NEII Sample****4970  $\pm$  80** $\delta^{13}\text{C} = -21.5\text{‰}$ 

Human bone from Pen-y-Wyrlod (Talgarth) Long Cairn, Brecknock, Powys, Wales (51° 58' 30" N, 3° 14' 20" W, NGR: SO151316) in charnel deposit in chamber NEII (Savory, 1973). Coll & subm by H N Savory, Keeper, Natl Mus Wales, Cardiff. *Comment* (HNS): date is well within range established for long barrows and cairns in England and Scotland, but is 1st pub for a Welsh laterally-chambered long cairn. This particular group may have originated earlier than usually observed on purely archaeological grounds.

**HAR-744. Cefn Glas Hut floor****4110  $\pm$  70** $\delta^{13}\text{C} = -26.1\text{‰}$ 

Charcoal, from floor make up material in NE corner of hut at Cefn Glas Hut site (Craig-y-Llyn), Blaenrhondda, Mid-Glamorgan, Wales (51° 42' 45" N, 3° 32' 45" W, NGR: SN932024). Coll June & July 1974 by D Clayton; subm Aug 1974 by H N Savory. *Comment* (HNS): this date for construction of hut is consistent with late Neolithic character of flints also found on hut floor.

**HAR-715. CC73V Stake 13****1450  $\pm$  70** $\delta^{13}\text{C} = -26.6\text{‰}$ 

Wooden stake, AML 744070, probably part of animal pen, from Cainhoe Castle, Bedfordshire, England (52° 1' 30" N, 0° 24' 15" W, NGR: TL098373) (Taylor & Woodward, 1976). Coll & subm 1974 by P J Woodward, Bedfordshire Co Council. *Comment* (PJW): date acceptable although early since stake was assoc with motte and bailey castle. Occupation material found with stakes, however, comprised Roman pot, Early Medieval pot and flint tools.

**North Elmham Park 1969 series**

Bone samples from North Elmham Park, Norfolk, England (52° 45' 15" N, 0° 56' 15" E, NGR: TF987215). Subm Sept 1974 by P Wade-Martins (1969-1972).

**HAR-759. 966****1310  $\pm$  70** $\delta^{13}\text{C} = -24\text{‰}$ 

Animal bones, AML 748126, from Middle Saxon ditch (Period I), Ditch A, Feature 950.

**HAR-760. 216****1080  $\pm$  70** $\delta^{13}\text{C} = -22.7\text{‰}$ 

Animal bones, AML 748128, from Late Saxon cesspit (Period II), Pit Feature 44a.

**HAR-763. 820****1210 ± 80** $\delta^{13}C = -23.4\%$ 

Animal bones, AML 748127, from Middle Saxon ditch (Period I, Ditch D, Feature 1018 (1).

*B. Spain***HAR-358. Sample 7****3600 ± 80** $\delta^{13}C = -21.6\%$ 

Burnt bone from Copper age burial in cave at Cueva de los Tiestos, Murcia, Jumilla (38° 29' 48" N, 1° 22' 13" W). Coll Aug 1969 by Molina; subm Oct 1973 by M J Walker. *Comment* (MJW): date agrees well with Sample 7, HAR-160, 3790 ± 115 (R, 1974, v 16, p 187) on burnt barley from same burial cave and is acceptable in terms of Chalcolithic burial assemblage containing painted as well as 'Argaric' pottery and a copper point. Bristlecone pine corrected date (eg, Suess, 1970) for HAR-160 of ca 2100 BC seems correct for earliest manifestations of 'Argaric' cultural phenomenon in SE Spain.

**HAR-520. Sample 1****12,220 ± 130** $\delta^{13}C = -4.2\%$ 

Shells (*Otala alonensis*, *Spincterochila candidissima*) id by D Heppel, Royal Scottish Mus, surface material from river terrace by water course at Rambla del Agua, Amarga, Murcia (38° 06' 0" N, 1° 7' 22" W). *Comment* (MJW): material was from surface of river terrace that also yielded fresh flint artifacts of generalized Upper Palaeolithic type. Terrace can probably be correlated to erosional stage of fluvial geomorphology observable downstream in terms of a gravel zone in a terrace sequence, that in the latter situation corresponds well to similar zones of other river terraces in the region and which pre-dates a layer of aeolian sand carbon-dated at other sites to 9000 to 7000 BP. Date therefore is acceptable.

**HAR-521. Sample 1****4350 ± 80** $\delta^{13}C = +2.5\%$ 

Shells, id by D Heppel, from wide area of ground surface (also pre-historic pottery and samples of copper slag) near Ramonete, Lorca, Murcia (37° 31' 52" N, 1° 26' 12" W). *Comments* (MJW): corresponding to an absolute date of ca 3000 BC, this is a most interesting result in light of 19th century excavation of site, incorrectly called "Parazuelos", of flat-based, flared rim vessels of composite shape similar to Egyptian forms, and in light of copper slag at site from nearby copper vein. The site, now a few km inland, was formerly an island, as traces of estuarine sediments with marine sea-shells demonstrate, with a sea-level some 15m higher than today.

*C. Sudan***Sudan series**

Charcoal from domestic refuse in 1 of mounds at ancient site of Meroe, Sudan (16° 52' N, 33° 41' E). Coll Dec 1967-Mar 1968, Dec 1969-

Mar 1970 and subm May 1973 by P L Shinnie, Dept Archaeol, Univ Calgary, Canada.

**HAR-346/I. MR10**

**2410 ± 100**  
 $\delta^{13}C = -21.9\text{‰}$

**HAR-346/II. MR10**

**2590 ± 100**  
 $\delta^{13}C = -21.9\text{‰}$

**HAR-346/III. MR10**

**2480 ± 80**  
 $\delta^{13}C = -23.3\text{‰}$

Charcoal, treated separately, from J.50, Level 9.

**HAR-347/I. MR11**

**2020 ± 80**  
 $\delta^{13}C = -22.3\text{‰}$

**HAR-347/II. MR11**

**2090 ± 90**  
 $\delta^{13}C = -22.3\text{‰}$

Charcoal, treated separately from J/K50 Spit 11.

**HAR-348/I. MR-1-120**

**1670 ± 70**  
 $\delta^{13}C = -24.6\text{‰}$

**HAR-348/II.**

**1740 ± 80**  
 $\delta^{13}C = -24.6\text{‰}$

Charcoal, treated separately from slag heap, Trench 1, Level 7a.  
*Comment* (PLS): in every case, date agrees with archaeol evidence.

## II. GEOLOGIC SAMPLES

*A. Sweden***HAR-390. PW-STR1/1**

**2710 ± 70**  
 $\delta^{13}C = -22.0\text{‰}$

*In situ* stump (*Pinus* sp) exposed by peat digging at Strumasund, Vasterbottenlän, N Sweden (66° 05' N, 14° 55' E) (Lundqvist 1962, Worsley 1974a). Coll & subm July-Aug 1973 by P Worsley, Dept Geog, Univ Reading. *Comment* (PW): welcome confirmation that pine survived later than 3000 BP in this part of S Lapland. Previous dates (BP) from site: 4485 ± 80 (St-541), 2690 ± 80 (St-621), 3660 ± 80 (St-1454).

*B. Norway***Engabreen series**

Samples from Engabreen, Holandsfjord, Nordland, N Norway (66° 42' N, 13° 45' E) (Liestol, 1962; Worsley & Alexander, 1976). Coll & subm July-Aug 1973 by P Worsley.

*General Comment* (PW): dates HAR-385-389 are internally consistent. Time span is expected for fluvio-glacial environment. Helga Sand Member subsequently buried by advance of Engabreen.

**HAR-385. PW/ENGA/1****1060 ± 80**  
 $\delta^{13}C = -26.8\text{‰}$ 

*In situ* root (*Alnus* sp) at present-day land surface Sta 27.7m. *Comment* (PW): date reported by Liestol (1962) incorrect, BP/AD values transposed. Worsley (1974b) gives correct Norwegian date: BP 1600 ± 100, T-263 not previously reported in *Radiocarbon*, obtained from *in situ* (*Betula odorata*) stump at same locality.

**HAR-386. PW/ENGA/2****1230 ± 80**

*In situ* stump, outermost layers of lower trunk, (*Salix* sp) ca 1m below present surface within Helga Sand Member of Svartis Gravel Formation Sta 39.4m.

**HAR-387. PW/ENGA/3****1480 ± 80**  
 $\delta^{13}C = -23.2\text{‰}$ 

Detrital wood fragments — litter, from surface organic accumulation at base of (*Salix*) stump of PW/ENGA/2 (HAR-386).

**HAR-388. PW/ENGA/4****1420 ± 80**  
 $\delta^{13}C = -22.3\text{‰}$ 

Wood from outermost layers of 4m-long detrital log (*Alnus* sp), Sta 18.3m. Depth ca 1m within Helga Sand Member.

**HAR-389. PW/ENGA/5****1160 ± 80**  
 $\delta^{13}C = -23.4\text{‰}$ 

Wood sample from small detrital log (*Alnus* sp), Sta 8.5m. Depth ca 0.5m within Helga Sand Member.

*C. England and Wales***HAR-463. Hill Farm, Burtle****4280 ± 70**  
 $\delta^{13}C = -28.0\text{‰}$ 

Unburnt wood (*Corylus*) branch, trunk, or root at Hill Farm Burtle, Somerset, England (51° 11' N, 2° 51' 20" W, NGR: ST399430). Sample from junction between Lias and Burtle clay with overlying sands (Kellaway, 1971; Kidson & Haynes, 1972; Hawkins & Kellaway, 1973). Coll Sept 1973 by A Heyworth; subm Oct 1973 by C Kidson. *Comment* (CK): sample is of either driftwood or *Corylus in situ* and indicates marine activity at site in late Flandrian. Interglacial age was expected since controversy over origin of Burtle Beds within which *Corylus* was found, was between those who suggested an Ipswichian interglacial and those who suggested a Wolstonian glacial age. A Flandrian date can mean either that Burtle Beds resulted from the Flandrian transgression or that the Flandrian transgression reworked earlier deposits. Samples from similar horizons will be dated from elsewhere in Somerset Levels.

**HAR-324. Marks Tey 2****>36,000**  
 $\delta^{13}C = -26.1\text{‰}$ 

Peat from Marks Tey brick pit, Marks Tey, Essex, England (51° 53' 15" N, 0° 47' E, NGR: TL912242), between 2 and 2.25m under sloping

surface. Probably early glacial Ho IV stage of Hoxnian interglacial (Turner, 1970). Coll & subm May 1973 by N R Page, Dept of Economics & Geography, Middlesex Polytechnic. *Comment*: age is minimum estimate.

**HAR-327. 675 (with 674 & 673)****3910 ± 220** $\delta^{13}C = -22.6\text{‰}$ 

Charcoal fragments from buried paleosol exposed in quarry sec across small combe valley at foot of Chilterns, Pitstone, Buckinghamshire, England (51° 49' 20" N, 0° 38' 35" W, NGR: SP939149). Deposits above and below paleosol highly calcareous chalky materials (Valentine, 1973). Coll Dec 1972 & subm May 1973 by K W Valentine, Dept Soil Sci, Univ Reading. *Comment*: small sample size accounts for larger than usual error term for this age. *Comment* (KWV): > 100kg paleosol sampled to obtain charcoal for this sample. Retained particles (3) id as ash (*Fraxinus* sp) by B Seddon, Univ Reading. Samples could represent clearing of original vegetation in which case  $^{14}C$  age dates first cultivation by Neolithic man.

**HAR-558. Yew Tree****3700 ± 90** $\delta^{13}C = -23.5\text{‰}$ 

Wood from yew tree at Arundel, West Sussex, England (50° 51' 55" N, 0° 31' 40" W) in blue-gray clay at ca 4.3m. Site of former mill leat. Coll 1972; subm 1974 by M G Hay-Will. *Comment* (MGH-W): tree was dug out completely but with evidence that branches were broken off, possibly in fast running water. Tree could have been carried downstream in Arun R and into estuary now forming coastal plains S and E of Arundel.

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