Ancient Monuments Laboratory
Report 201/88

TREE-RING STUDIES IN THE SOMERSET LEVELS; BOG OAKS FROM THE BRUE VALLEY AND SEDGEMOOR.

Ruth A Morgan

Ancient Monuments Laboratory Report 201/88

TREE-RING STUDIES IN THE SOMERSET LEVELS; BOG OAKS FROM THE BRUE VALLEY AND SEDGEMOOR.

Ruth A Morgan

Summary

This note describes attempts to link dendrochronologically bog oaks from various parts of the Somerset Levels with each other and with dated reference material. Links between the often single finds are few, but two floating chronologies are available from groups of oaks in Sedgemoor.

Author's address :-

128 Psalter Lane
Sheffield
S.Yorks
S11 8YU

0742 660425

TREE-RING STUDIES IN THE SOMERSET LEVELS: BOG OAKS FROM THE BRUE VALLEY AND SEDGEMOOR.

Ruth A. Morgan

Over the past decade, a number of tree trunks of oak (*Quercus* spp.) have been revealed by ploughing, peat-cutting and ditch-cleaning operations in various parts of the Somerset Levels. They are not large deposits of trees, giving evidence of extensive forests overwhelmed by changing environmental conditions, as in Northern Ireland (Baillie 1982, ch.10) or the East Anglian Fens (Godwin 1981). The Levels examples tend to be isolated finds, though there have possibly been concentrations in Sedgemoor.

Almost all the trees have now been removed from their original position within the peat, so that the dating evidence provided by their stratigraphic context has been lost; only two examples could be roughly dated by this means. Two other trunks have radiocarbon dates based on selected tree-rings. The remainder have no dating information at all, much reducing their value as tree-ring chronology 'building blocks'.

Slices were salvaged from the trunks as they were discovered, often during field-walking by the field

archaeologist, and their tree-ring data was added to the program underway on trackway timbers from the Brue valley. The aims of recording the tree-ring pattern of bog oaks were several: 1) to search for contemporary groups of trees, which might suggest some widespread change in conditions in the Levels, sufficient to cause the death of an area of woodland.

2) to look for any correlation in growth pattern with the trackway timbers, a rather remote chance in view of the small number of both bog oaks and trackways spanning several millennia.

3) to attempt absolute dating of tree-ring patterns against the long Irish chronology (Brown, Munro, Baillie & Pilcher 1986), aimed ultimately at creating a local chronology.

As yet, the finds have proved too few for any clear results to be available, but this note records the existence of the samples and the treatment they have received so far.

ORIGIN OF THE TREE TRUNKS.

Details of all the samples are given in Table 1 Not all were complete trunks, though whether their splitting was due to natural causes or to the assistance of man is not known. Clearly erosion and decay had caused the loss of outer wood, particularly the sapwood in most cases.

A description of the processing methods currently in use in tree-ring studies can be found in the report on the Meare Heath track (these Papers).

The Brue valley. Samples from the Brue valley in the northern Levels, where most of the trackways have been found, include a bog oak found on the line of the Meare Heath track in 1977, in area 4 close to the track terminal (Coles & Orme 1978, 20). The outer 20 rings of this mature tree gave a radiocarbon date of 3230+70 bc (HAR3195), suggesting that it grew shortly before the Sweet track was constructed (Morgan 1984; 1988).

The sample from the Drove site of the Sweet track (Coles & Orme 1979, plan p.63) has been suggested as a bog oak on the basis of its completely different character from the other track timbers, and the lack of correspondence of its tree-ring pattern. If so, it must be of similar date or earlier than the Sweet track (i.e. early 4th millennium BC).

The remaining timbers constitute 'small finds' by the field archaeologist. The two pieces from Tinney's Ground came from around head 31 (ST 46913805), about 100m north-east of the known remnants of track TIN B (Coles & Orme 1978a). Their tree-ring patterns showed no correspondence with each other or with other tree-ring data from Tinney's Ground trackways (Morgan 1980); the timbers could however be part of a trackway of slightly different date. With such isolated finds, there may be no clear

distinction between natural bog oak and deliberately fashioned trackway component.

Three complete tree trunks were found in 1984 during peat-cutting in Stileway (ST 46324054), just south-west of Great Place Drove. Two were sampled, of which one (B84.123) provided a valuable long tree-ring series.

The Skinner's Wood oak (ST 41334036) was found at the base of a ditch cleared for land drains. It also provided a long tree-ring pattern, including possibly the entire sapwood zone.

In 1986, an isolated find of an oak pole at Sharpham (ST 47173958) gave only a short 60 year tree-ring pattern. Several pieces of wood emerged during the digging of a diversionary channel for the river Brue at Westhay Bridge (ST 438426). Their location at the interface of blue clay and peat suggested a date early in the 4th millennium BC, when peat growth started. Three of the timbers were split pieces from a tree (or trees) around 350mm in diameter and over 160 years old; their identical ring patterns provided a 143 year curve.

The most recent discoveries were a piece of split oak in a ditch one field north of the Glastonbury lake village, with around 100 rings, and a trunk from the peat base just north of Moorgate Farm at Shapwick, near the

southern terminal of the Sweet track. This tree had extremely wide rings.

Sedgemoor. During the course of ploughing in 1983, a number of oak trunks were located in various parts of western Sedgemoor, at Aller (ST 38062944), Stoke St Gregory (ST 35462880), Fordgate (ST 31673187) and Lyng (ST 31132874). Most of the trunks were eroded roundwood, with some sapwood preserved on two examples from Fordgate. The trees originally ranged in age from over 80 years to around 160 years, with diameters of 150-350mm, allowing for sapwood.

One radiocarbon date from a Fordgate trunk (085) suggests a Bronze Age context for some of the trees (see Table 1).

TREE-RING DATING

Correspondence of tree-ring patterns among the timbers was only apparent in two groups from Sedgemoor. Three trees from Lyng (090,091 and 092) provided cross-matching patterns spanning 87 years, illustrated in fig.1. A further group of 4 trees from Fordgate correlated over a time span of 185+ years, with which one of the Lyng trees also appears to match (fig.1), though extending only over 56 years.

The two groups of tree-ring curves were averaged.

They were then compared with the other individual curves and with various chronologies available for the prehistoric period. These are:

1) three floating chronologies based on oak timbers from trackways in the Brue valley (the Neolithic Sweet track - Morgan 1984, 1988; the late Bronze Age Meare Heath - Morgan, these Papers - and Tinney's tracks - Morgan 1980 and currently being reprocessed).

2) seven tree-ring series from oaks eroding from the beach deposits at Stolford on the Somerset coast (Heyworth 1978), two of which match the Neolithic Sweet chronology. Several have also been used for extensive radiocarbon tests (Campbell & Baxter 1979).

3) a 630 year floating chronology for the Neolithic, based on the cross-matched Sweet chronology, two trees from the 'submerged forest' at Stolford and a chronology from oaks in the Trent river gravels near Nottingham (Salisbury, Whitley, Litton & Fox, 1984; Morgan 1988; Morgan, Litton & Salisbury, 1988).

4) the Irish bog oak chronology, now extending back to 5289 BC (Brown, Munro, Baillie & Pilcher 1986), and the German chronology back to 4144 BC, based on river gravel oaks from the Danube (Pilcher, Baillie, Schmidt & Becker 1984).

As yet, no firm results are available. There are possible links between the bog oak from Meare Heath 77

area 4 and Stolford tree 8, with the Sweet chronology, as yet unconfirmed. There is also a possible late Bronze Age group, linking the two Stileway trees with the Meare Heath and Tinney's chronologies, and possibly the Lyng chronology. Work is still in progress and full details will not be given until dating can be confirmed.

There are difficulties in dating random trees, the often short ring series of which may lie anywhere over several millennia; cross-matching would have to be supported by very high levels of agreement to be acceptable. The lack of a network of chronologies against which to check matches, and the great geographical distance between the Levels and the sources of the reference chronologies, mean that any possible correlations cannot easily be confirmed. Also dating is rarely achieved on single trees; the initial formation of an average chronology greatly enhances the chance of dating.

The lack of tree-ring links thus far between the Levels oak chronologies and the Irish chronology in particular is puzzling, especially for the long and well-replicated Neolithic master chronology for Sweet, Stolford and the Trent valley. It is thought that differing conditions of growth may have affected the trees' response to climatic change, thus reducing the vital signals by which cross-matching is revealed (Morgan, Litton & Salisbury, 1988). Some hope of further progress lies in the long

Fenland chronology currently being created at Belfast (Baillie pers. comm.).

Meanwhile, the complex and detailed comparisons of the Somerset bog oak growth patterns will continue with other available material, in the hope that some links and dating will eventually be found.

REFERENCES

BAILLIE, M.G.L. 1982. Tree-Ring Dating and Archaeology. Croom Helm, London. 274 pp.

BROWN, D.M., MUNRO, M.A.R., BAILLIE, M.G.L. & PILCHER, J.R. 1986. Dendrochronology - the absolute Irish standard. Radiocarbon 28, 279-283.

CAMPBELL, J.A. & BAXTER, M.S. 1979. Radiocarbon measurements on submerged forest floating chronologies. Nature 278, 409-413.

COLES, J.M. & ORME, B.J. 1978. The Meare Heath track. Somerset Levels Papers 4, 11-39.

COLES, J.M. & ORME, B.J. 1978a. Multiple trackways from Tinney's Ground. Somerset Levels Papers 4, 47-81.

COLES, J.M. & ORME, B.J. 1979. The Sweet track: Drove site. Somerset Levels Papers 5, 43-64.

GODWIN, H. 1981. The Archives of the Peat Bog. C.U.P. 229pp.

HEYWORTH, A. 1978. Submerged forests around the British Isles. In J.M. Fletcher (ed) Dendrochronology in Europe, B.A.R. S51, 279-288.

MORGAN, R.A. 1980. Tinney's Ground. Somerset Levels Papers 6, 69-72.

MORGAN, R.A. 1982. The Meare Heath track 1974-1980 Somerset Levels Papers 8, 39-45.

MORGAN, R.A. 1984. The Sweet track 1979-1982. Somerset Levels Papers 10, 46-64.

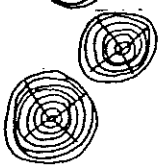
MORGAN, R.A. 1988. Tree-Ring Studies of Neolithic and Bronze Age Trackways in the Somerset Levels. B.A.R. in prep.

MORGAN, R.A., LITTON, C.D. & SALISBURY, C.R. 1988. Trackways and tree trunks - dating Neolithic oaks in the British Isles. Tree-Ring Bulletin 47, in press

PILCHER, J.R., BAILLIE, M.G.L., SCHMIDT, B. & BECKER, B. 1984. A 7272 year European tree-ring chronology. Nature 312, 150-152.

SALISBURY, C.R., WHITLEY, P.J., LITTON, C.D. & FOX, J.L. 1984. Flandrian courses of the river Trent at Colwick, Nottingham. Mercian Geologist 9, 189-207.

TABLE 1 Bog oaks and tree-ring studies from the Somerset Levels

Source	Number of rings (sapwood)	Dimensions mm	Sketch section	Dating
BRUE VALLEY				
Meare Heath 77 area 4	210	350x210		4180 ± 70 BP HAR-3195
?Sweet Drove 445	97	190x65		Neo or pre Neo
Bell ditch B82.8	84+	90+ radius		
Tinney's Ground B84.120	52	55+ radius		
B84.121	110	120+ radius		
Skinner's Wood	180 (35)	140 radius		
Stileway B84.122	84	190 radius		
B84.123	248	290 radius		
Sharpham B86.11	60	60 radius		
Westhay bridge B86.12	143	160+ radius		?5500 BP, peat base
Glastonbury B87.1	101 (?5)	160 radius		
Moorgate, Shapwick	34	165+ radius		?peat base
SEDGEMOOR				
Aller S83.082	92	115 radius		
Stoke St Gregory S83.083	57	100 radius		
Fordgate S83.085	156 (48)	140 radius		3470 ± 90 BP HAR-6263
S83.086	88	135 radius		
S83.087	145+ (35)	180 radius		
S83.088	137	110 radius		
S83.089	90	70 radius		
Lyng S83.090	62	70 radius		
S83.091	64	105 radius		
S83.092	83	90 radius		
S83.094	56	90 radius		

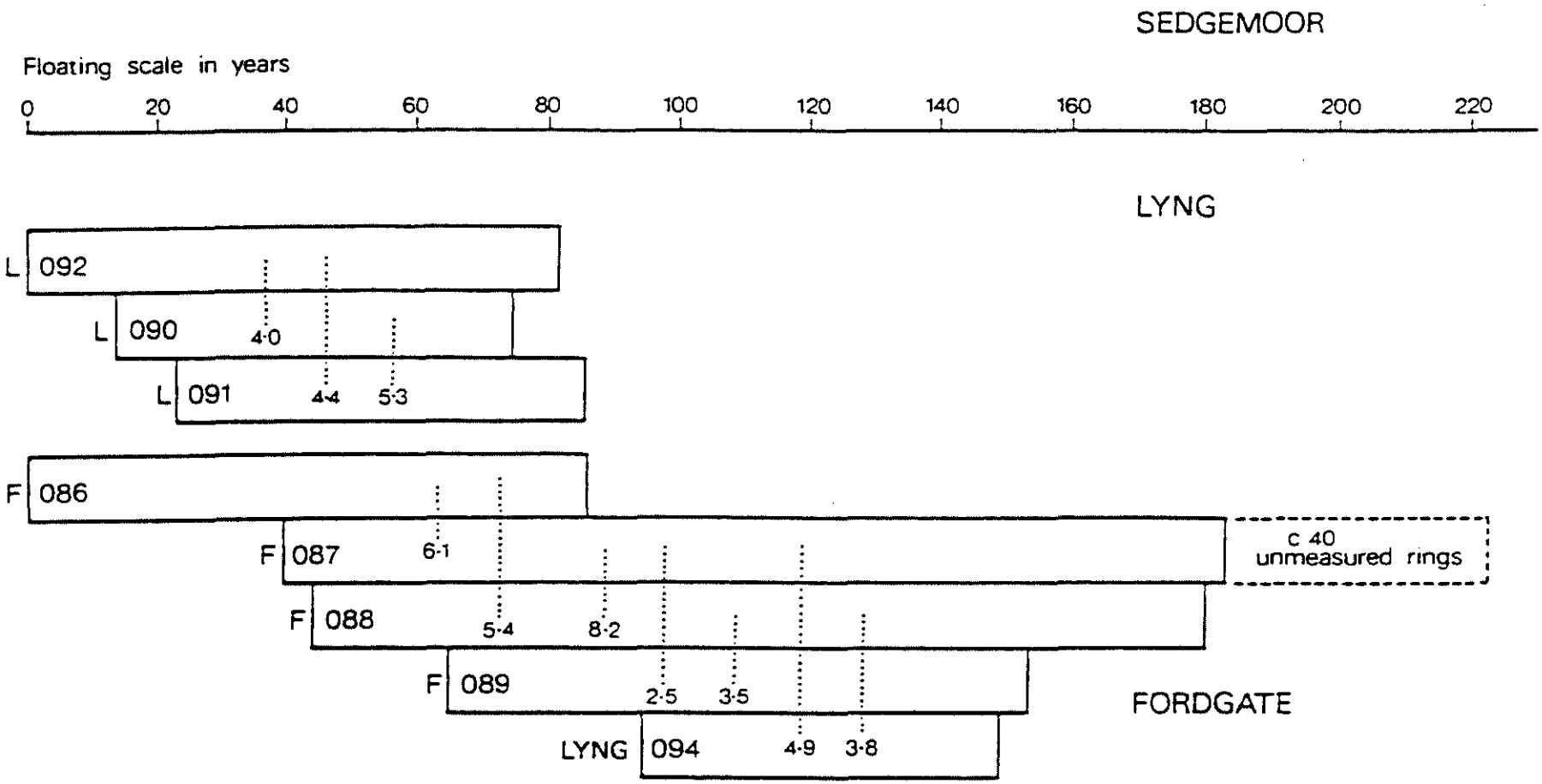


Fig. 1 Tree-ring correspondence of 2 groups of trunks from Sedgemoor.