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GARVIN'S AREA, WALTON HEATH
includes GARVIN'S 79, JONES + BURGROVE SITES

7.80

# TREE-RING STUDIES IN THE SOMERSET LEVELS: GARVIN'S 1979

79



Ruth Morgan

The 1979 excavation of brushwood structures at Garvin's provided 97 samples for tree-ring analysis, the composition of which is given in Table 1. Almost all were birch (Betula) with small quantities of hazel (Corylus), ash (Fraxinus) and alder (Alnus); the proportions were similar to those from the 1975 excavation (Morgan, 1977) except in the smaller quantities of hazel. All the samples were roundwood rods and poles with bark still attached or the under-bark surface evident. In view of the similar quantities of material available for study and the corresponding wood species, some assessment of the possible relationship of this site with the brushwood junction excavated nearby in 1975 has been possible.

## BIRCH

The birch wood, as invariably in the Somerset Levels tracks of all periods (cf Garvin's 1975 in Morgan, 1977, 85; Baker 1978 in Morgan, 1980, 24; Difford's 1 and 2, 1976 in Coles & Orme, 1978, 99), was very varied in size and age - the range is indicated in Table 1, and Figs. 1-2. This suggests the random collection of what would have been a widely available if not very durable timber; birch can be coppiced (Rackham, 1976) but there would be little necessity here. The wood shows an even distribution in age (Fig. 1) except for a peak at 20 years; no doubt the use of trunk, branch and twig wood from the same tree accounts for this spread.

Of the 34 samples, wide outermost growth rings in 16 suggested winter cutting, but this does not exclude the possibility

that many more had been cut in winter. The felling season is generally indeterminate.

Only one birch stem proved suitable for ring-width measurement, so a comparison of growth patterns with the 1975 material has not been able to suggest their contemporaneity or otherwise. However, a comparison of the age and size distributions between the two groups of material is of interest. While the 1979 wood has an average diameter almost half that of the 1975 birch, the average age is slightly higher (Table 1) - ie the 1979 trees had grown much more slowly and showed narrower annual rings. The discrepancy is made clear in Fig. 2. The age range in Fig, 1 indicates the use of younger wood in the 1975 track, where the majority lies between 7 and 15 years in age with a peak at 14-15 years. The most probable explanation lies in the exploitation of a different source of material, from a location where the birches were growing much more slowly. Deliberate selection of certain sized material would affect the size distribution only, not the growth rate.

HAZEL

Examination of the few hazel stems indicates the use of the same type of material as in the 1975 site (Table 1).

ASH

Only 4 ash stems were studied; they were larger and much slower grown than the 1975 examples, with such narrow growth rings that the cutting season could not be determined.

The mixture of coppiced hazel and natural birch wood - branches and topwood of young trees according to Rackham (1977) - resembles that found in the 1975 excavation. The predominance of birch may suggest very local collection; if it is Betula pubescens

(as given by Rackham (1977, 65) though the species are difficult to distinguish - Betula pendula has more vessel multiples and narrower rays than B. pubescens (Brazier & Franklin, 1961) - the preference for wet swampy ground might necessitate its removal to construct the trackway for a dry passage. Since birch is always the first coloniser of cleared ground, it is tempting to suggest some extent of natural or anthropogenic clearance in the immediate area in the preceding decade or two.

The absence of suitable stems for ring-width measurement among the 1979 birch removes any possibility of suggesting whether the two excavated structures are part of the same trackway. The stem age distributions offer no evidence on this point. The same woodland type, in terms of species composition, was being exploited, but tree growth was much slower. Possibly they grew in a slightly drier environment. Little is known of the preferences of the different birch species and how these affect growth rates (see only Tucker & Fitter, forthcoming) but the use of this wood may indicate a fairly hastily built structure for which a long life was not anticipated.

References:

Brazier, J.D. & Franklin, G.L. 1961 Identification of hardwoods, a microscope key Forest Products Research Bulletin 46

Coles, J.M. & Orme, B.J. 1978 Structures south of Meare Island Somerset Levels Papers 4 90-100

Morgan, R.A. 1977 Tree-ring studies in the Somerset Levels: the Garvin's tracks Somerset Levels Papers 3, 85-86

Morgan, R.A. 1980 Tree-ring studies in the Somerset Levels: the Baker site Somerset Levels Papers 6 24-28

Rackham, O. 1976 Trees and Woodland in the British Landscape London, Dent

Rackham, O. 1977 Neolithic woodland management in the Somerset Levels: Garvin's, Walton Heath, and Rowland's tracks Somerset Levels Papers 3 65-71

Tucker, J.J. & Fitter, A.H. forthcoming Ecological studies at Askham Bog Nature Reserve. 2. The tree population of Far Wood. Naturalist

| SPECIES | AGE Ave. | AGE Range | DIAMETER mm Ave. | DIAMETER mm Range | WINTER CUT | TOTAL EXAMINED |
|---|---|---|---|---|---|---|
| BIRCH '75 | 13.6 | 5-30 | 43.6 | 20-80 | 5 | 73 |
| '79 | 15.3 | 3-65 | 24.5 | 5-110 | 16 | 84 |
| HAZEL '75 | 9.4 | 5-15 | 28.9 | 20-40 | 4? | 30 |
| '79 | 9.5 | 5-14 | 25.7 | 16-40 | 8 | 8 |
| ASH '75 | 12.1 | 8-20 | 23.7 | 15-35 | ? | 7 |
| '79 | 39.2 | 30-50 | 34 | 23-48 | ? | 4 |
| ALDER '79 | (9) | | (31) | | 1 | 1 |

Table 1. Age and size details of the wood examined from the 1979 Garvin's excavation, with comparative figures for the 1975 material.

# TREE-RING STUDIES IN THE SOMERSET LEVELS: THE JONES SITE

Ruth Morgan

The brushwood complex excavated at the Jonessite in 1979 consisted largely of birch (Betula) stems of various dimensions and some hazel (Corylus) rods. Tree-ring studies included the examination of 24 samples of birch and 14 of hazel, as well as one substantial ash (Fraxinus) stem collected after the excavation and C14 dated to ± bc.

Details of the material are summarised in the Table and Figure. The birch stems varied considerably, not only in diameter and age but in growth rate - some (9 examples) showed uniformly wide rings while others were very variable. Two had piths which were not central and several were knotty. However, the majority of birch stems were aged between 15 and 20 years despite a diameter variation of 27 to 59 mm; selection therefore was not based on size but may have been made among fairly even-aged material.

The hazel stems are few in number, but suggest an origin in coppiced woodland; most lie between 3 and 6 years in age with another small group of 10-12 years.

The large ash stem was 45 years old with a diameter of 100mm. The felling season was indeterminate due to narrow outer rings.

| | Age | | Diameter mm | | Winter cut | Number of samples |
|---|---|---|---|---|---|---|
| | Ave. | Range | Ave. | Range | | |
| BIRCH | 17.2 | 6 - 30 | 35.7 | 19 - 59 | 4 | 24 |
| HAZEL | 6.4 | 3 - 12 | 17.5 | 13 - 24 | - | 14 |

Table. Details of the birch and hazel stems examined from the Jones site.

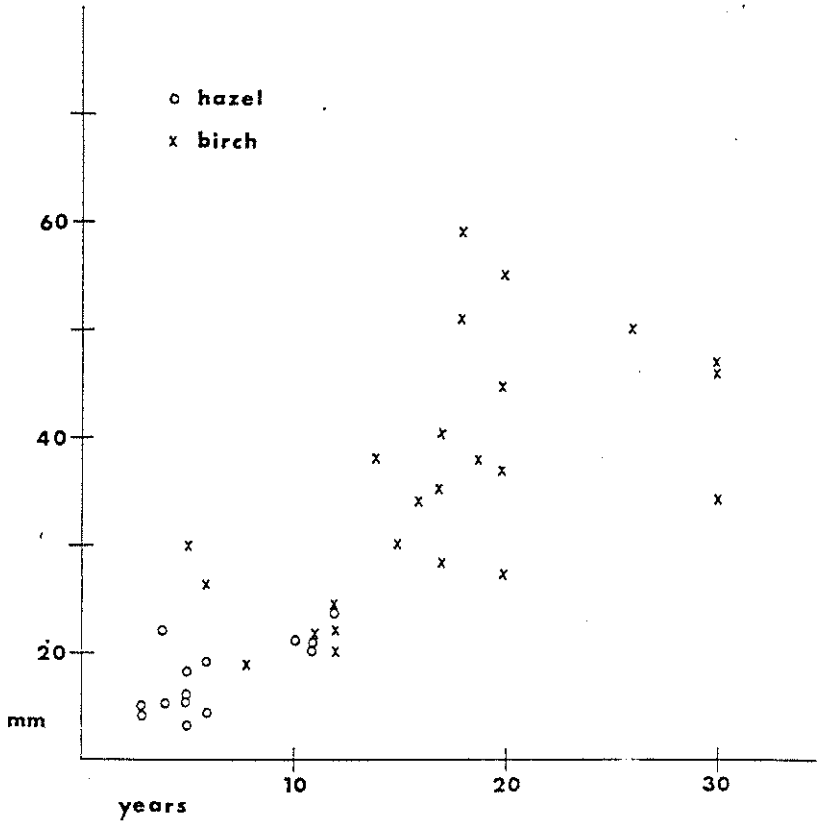


Fig. Age-size variations among the birch and hazel stems from the Jones site.

TREE-RING STUDIES...: BISGROVE 50

Ruth Morgan

Fifty nine wood samples from the Bisgrove ~~structure~~ site consisted entirely of birch (Betula sp.). The structure of the wood itself showed great variability in colour, vessel size and distribution, and average ring-width, suggesting that several habitat types and/or species were involved.

As with the Jones and Garvin's sites, the range in age and size of the birch stems (Figs. 1-2, Table) suggests the random collection of natural local material with no particular concentrations in age or diameter. At least 15 stems were cut in winter, and 2 possibly in summer. Five stems were double-centred, ie cut across the base of a fork. Eleven stems had wide uniform growth rings, while 13 showed a distinctive pattern of initial wide rings (early rapid growth) followed by an outer zone of extremely narrow indistinguishable rings.

A total of 9 stems had sufficient clear rings for ring-width measurement, over 25-36 years. Most were very sensitive and narrow-ringed, the annual rate of growth being below 1mm on average. Two however (samples 15 and 24) had a much less variable growth rate.

The patterns of several curves were matched together. One pair (samples 5 and 17) were very similar and perhaps originated in the same tree. Another group of 5 curves are illustrated in Figs. 3 and 4; distinctive narrow rings appeared regularly around arbitrary years 17/18. The slight variability in cutting year (double line in Fig. 4) can be accounted for by the very narrow outer rings in several cases.

Comparison of the tree-ring results from Garvin's, Jones and Bisgrove

Birch sample numbers from the apparently contemporary and similar structures at Jones, Garvin's (1975 and 1979 sites) and Bisgrove were sufficiently large for comparisons to be made. The data are summarised in the Table and Figs. 1 and 2. Age differences are insignificant except for GV75, where Fig. 2 clearly shows the concentration of stems aged 7-15 years. The other sites have a more even range of material up to 30 years or more in age, with a slight concentration at 20 years.

The GV75 birch also stands out as having the largest diameter, ie the fastest growth rate, and the wide rings are clear in the measured examples (eg. in Fig. 3). This is illustrated by the steeper slope of the line derived from linear regression analysis in Fig. 1; the other three sites are very similar to each other. It is evident that the wood for the GV75 structure had grown in a more congenial environment, although still subjected to periodic stress.

There is a degree of similarity in the ring-width curves from GV75, GV79 and BG, the accuracy of which is difficult to prove, but which supports the archaeological and C14 evidence. Fig. 3 illustrates four of these curves, each of which show a similar year to year variation irrespective of actual ring-width. Their relationships are shown in Fig. 4, with more or less corresponding cutting years (BG 25 has about 5 more unmeasured rings).

The suggestion is that the three sites were constructed of at least some wood which was cut at the same time. The small number of curves involved and their short ring-width sequences must be considered. As with hazel from other Somerset Levels sites, more research on modern growth patterns and degree of synchronisation must be carried out before these results can be assessed.

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| | Age | | Diameter mm | | Winter cut | Total examined |
|---|---|---|---|---|---|---|
| | Average | Range | Average | Range | | |
| BISGROVE 80 | 19.06 | 4-40 | 29.03 | 7-75 | 15 | 59 |
| JONES 79 | 17.2 | 6-30 | 35.7 | 19-59 | 4 | 24 |
| GARVIN'S 75 | 13.6 | 5-30 | 43.6 | 20-80 | 5 | 73 |
| GARVIN'S 79 | 15.3 | 3-65 | 24.5 | 5-110 | 16 | 84 |

Table Summary of the age and size details of birch stems from the four excavated sites in the Garvin's area.

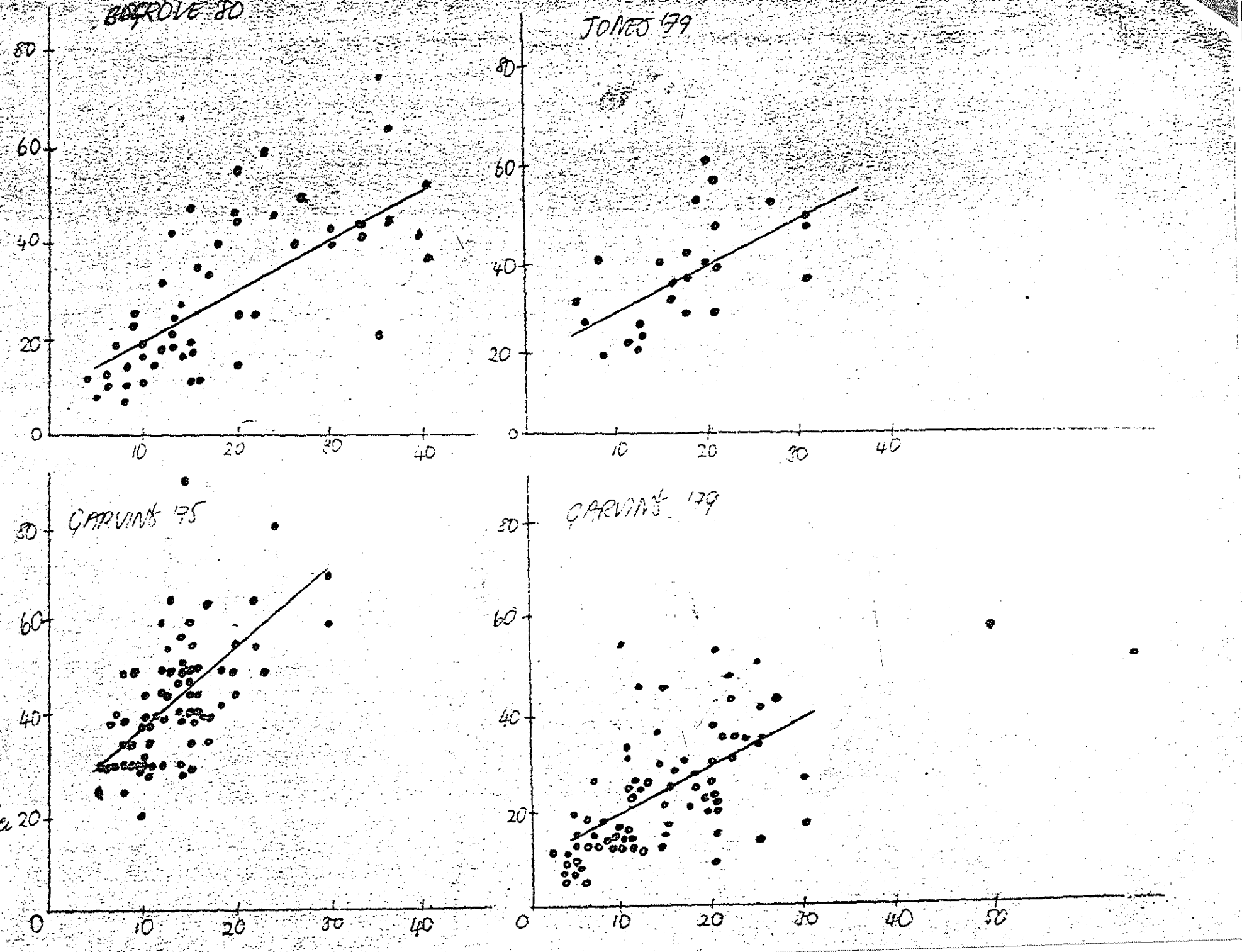



Fig. 1. Scatter diagrams of the age/size relationship of birch stems from the four excavated sites in the Garvin's area. The slope of the lines derived by linear regression analysis illustrates a difference in the Garvin's 75 material

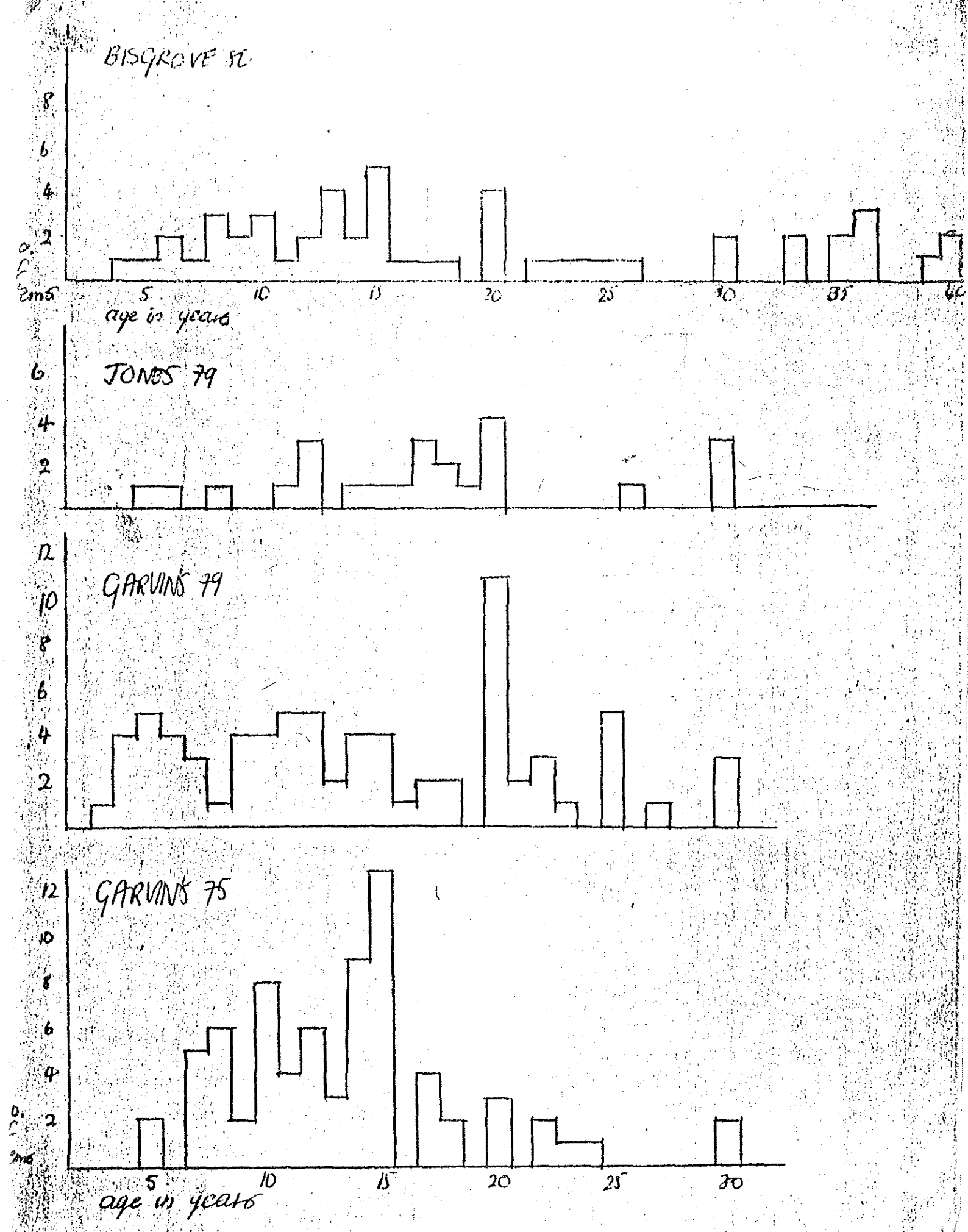
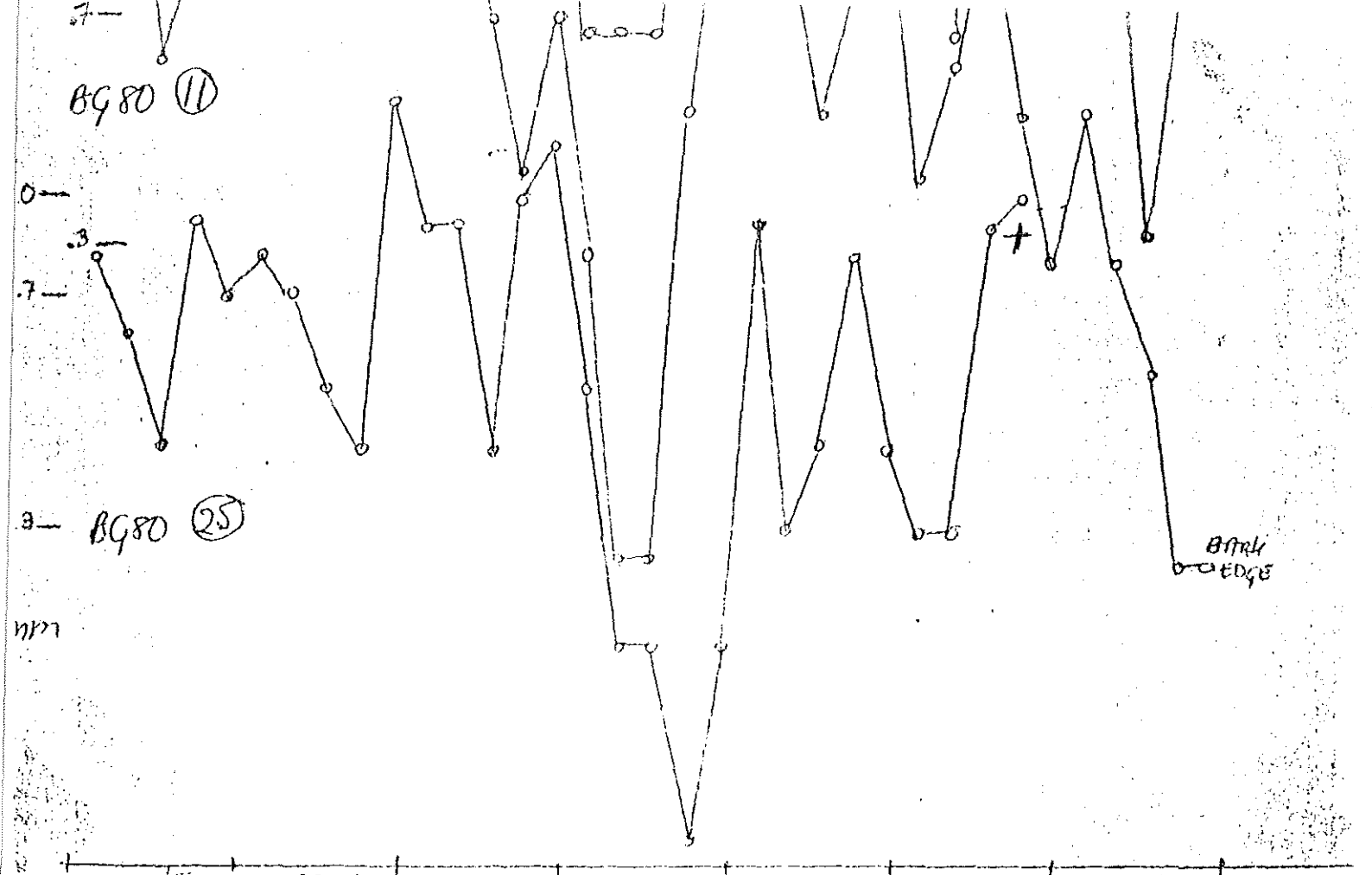



Fig. 2 Histograms showing the age concentrations among birch from the four Garvin's area sites.


.7
BG80 (11)
0
.3
.7
BG80 (25)
BANK EDGE

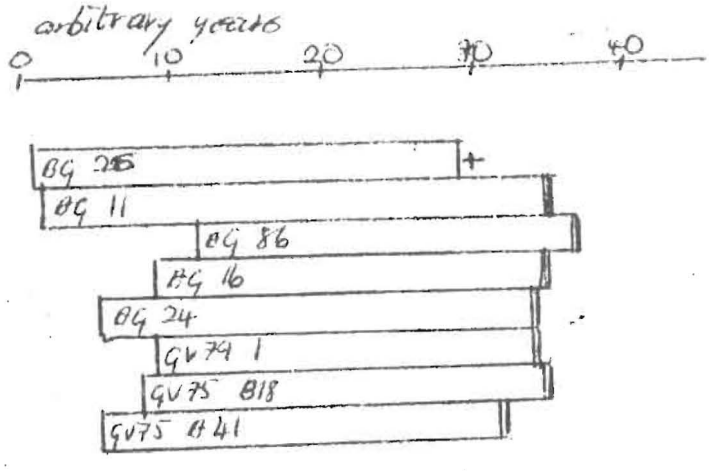



Fig. 4 The relative positions of matching ring-width curves from Bisgrove, Garvin's 75 and Garvin's 79. The double line on the right indicates the bark edge.