THE FORMATION OF BOUNDARIES IN THE PAGAN ANGLO-SAXON PERIOD: A STATISTICAL STUDY

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Background to the study

Since the nineteenth century field workers have noted an apparent association between pagan Anglo-Saxon burials and modern boundaries, but the reality of this association has never been established beyond doubt for all areas of the country, nor have convincing reasons for the phenomenon been conclusively established. The present study began as part of an attempt to examine the burials used as boundary markers in the Anglo-Saxon charters, isolating the different categories and relating them to archaeologically-known features. It seemed logical therefore to consider the question from a strictly archaeological point of view to see if certain types of burial were more likely than others to occur on boundaries, or indeed if pagan Anglo-Saxon burials were generally associated with boundaries.

In Wiltshire an association between parish boundaries and Anglo-Saxon burials has been demonstrated by Desmond Bonney (Bonney 1976), who has shown that almost a third of such burials are on, or close to, a parish boundary. Other areas of Wessex which he examined did not, however, show the same remarkable correlation, so that it seemed possible that the close association of boundaries and burials in Wiltshire had been brought about by exceptional circumstances. For Wiltshire, however, the implications of Bonney's work were far reaching; since the majority of the Wiltshire burials are secondary inhumations in existing barrows, it would suggest that the boundaries predate the Anglo-Saxon period.

C.J. Arnold (Arnold 1976) pursued the subject in a slightly different manner: he examined both the early place names and the burial evidence for part of Sussex and the Isle of Wight. He found that Anglo-Saxon burials in these areas tended to occur on poorer soil and were frequently situated near the boundaries of areas defined by Thiesson polygons which he constructed around the early place names. He concluded that the Anglo-Saxons showed a preference for boundary burial.

In a subsequent paper (Arnold 1981), however, he put forward a different hypothesis to explain this pattern. He argued that as was the case with many of the known early settlement sites, such as Mucking, the Anglo-Saxons buried their dead close to their settlements, and not on a boundary. But the earlier settlements were made on light, easily cultivated soil; only in the seventh and eighth centuries did a shift occur towards heavier, but more fertile soils. The earlier

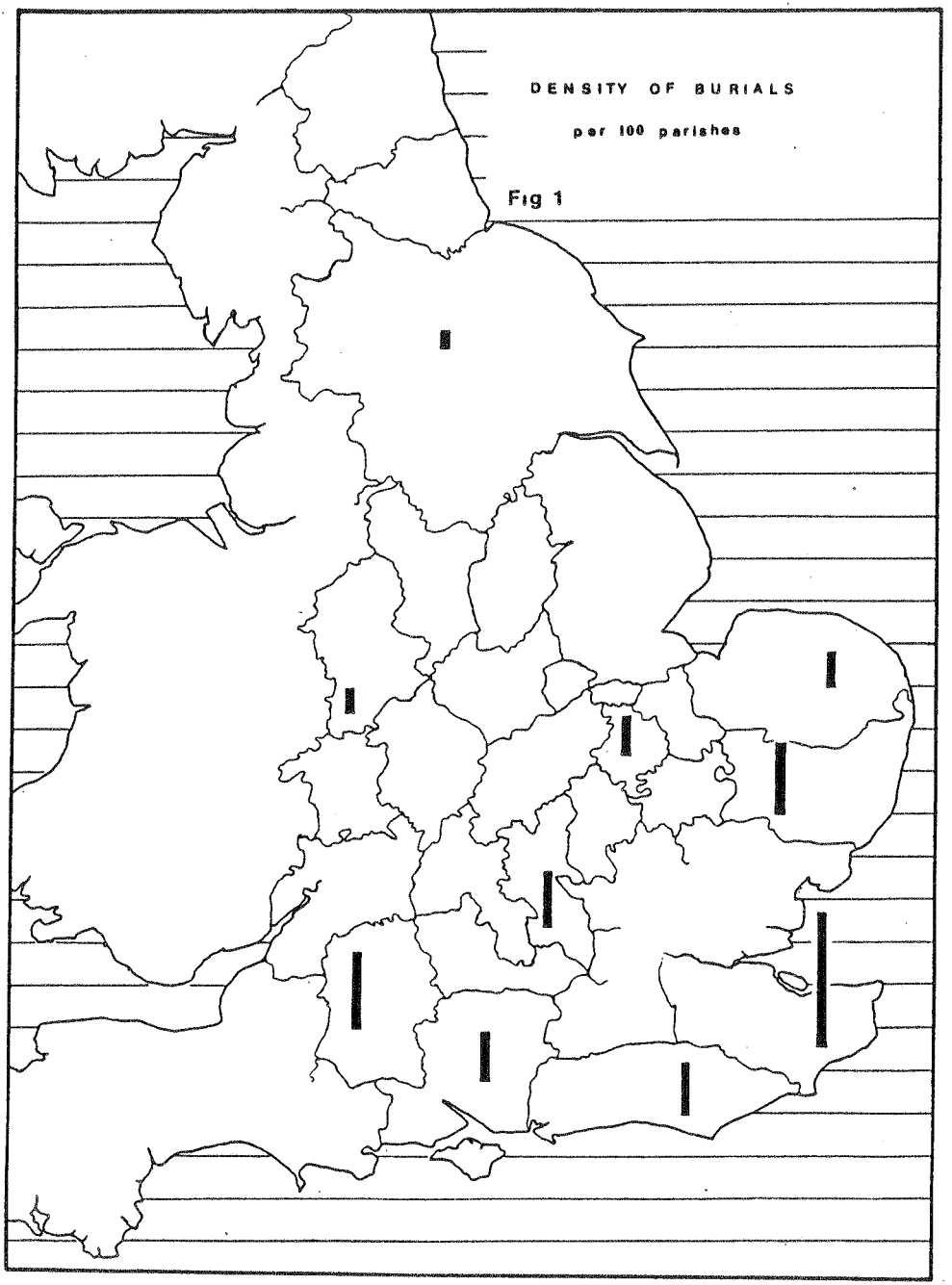


Fig 1

settlement sites and their cemeteries were, therefore, left in the new boundary zone on what had become marginal land. This theory clearly runs contrary to the argument for continuity of boundaries which can be based on Bonney's work, and cast doubt on the established chronology of place names.

The aim of the statistical study was to distinguish between these widely differing interpretations of the existing pattern of boundaries and burials, and to draw firm conclusions about the implications of this material for the study of settlement patterns and late utilization in Anglo-Saxon England. Neither Bonney's nor Arnold's work could provide a certain conclusion. Each had worked in separate areas of Southern England, using such distinct approaches that their results could not be combined. Each had used a small sample from a restricted area, local traditions might have produced very different burial practices in other areas of England. The process of boundary development could also be expected to be different in other areas of the country. Above all, with the small samples which they had used, one could not be certain that the apparent correlation was not entirely a chance phenomenon.

The study

The method adopted was to take all the burials listed in Meaney (Meaney 1964) which could be mapped and to plot them on 1 inch:1 mile seventh series Ordnance Survey sheets, comparing their distribution with that of the civil parish boundaries. This choice of technique imposed certain limitations on the study, principally in the accuracy of mapping and the classification of burials, but it had distinct advantages. It provided a result of measurable accuracy, which although it could not answer all the historical questions one might have wished, provided a basis for future work.

Those burials listed in Meaney which could not be plotted with a six-figure map reference were excluded from the sample, as were those which were not considered to be Anglo-Saxon. Probable burials known only from isolated finds were excluded. Finally, all burials which fell within an urban area were excluded, since the modern civil parish is a specifically rural form of organisation. The sample therefore includes all the rural burials listed in Meaney which can be mapped with a six-figure reference and have been identified as Anglo-Saxon. It was updated by reference to recent editions of Medieval Archaeology, to give a sample size of 754.

The burials were classified using Meaney's data according to whether they were primary or secondary barrow burials, whether they were the burial of a few individuals, or a cemetery at which no barrow had been recorded. Clearly many criticisms might be made of this sample. Many of the faults are inherent in the use of archaeological data for statistical purposes. Barrow may, for example, have existed at sites classified here as being without a barrow. Similarly,

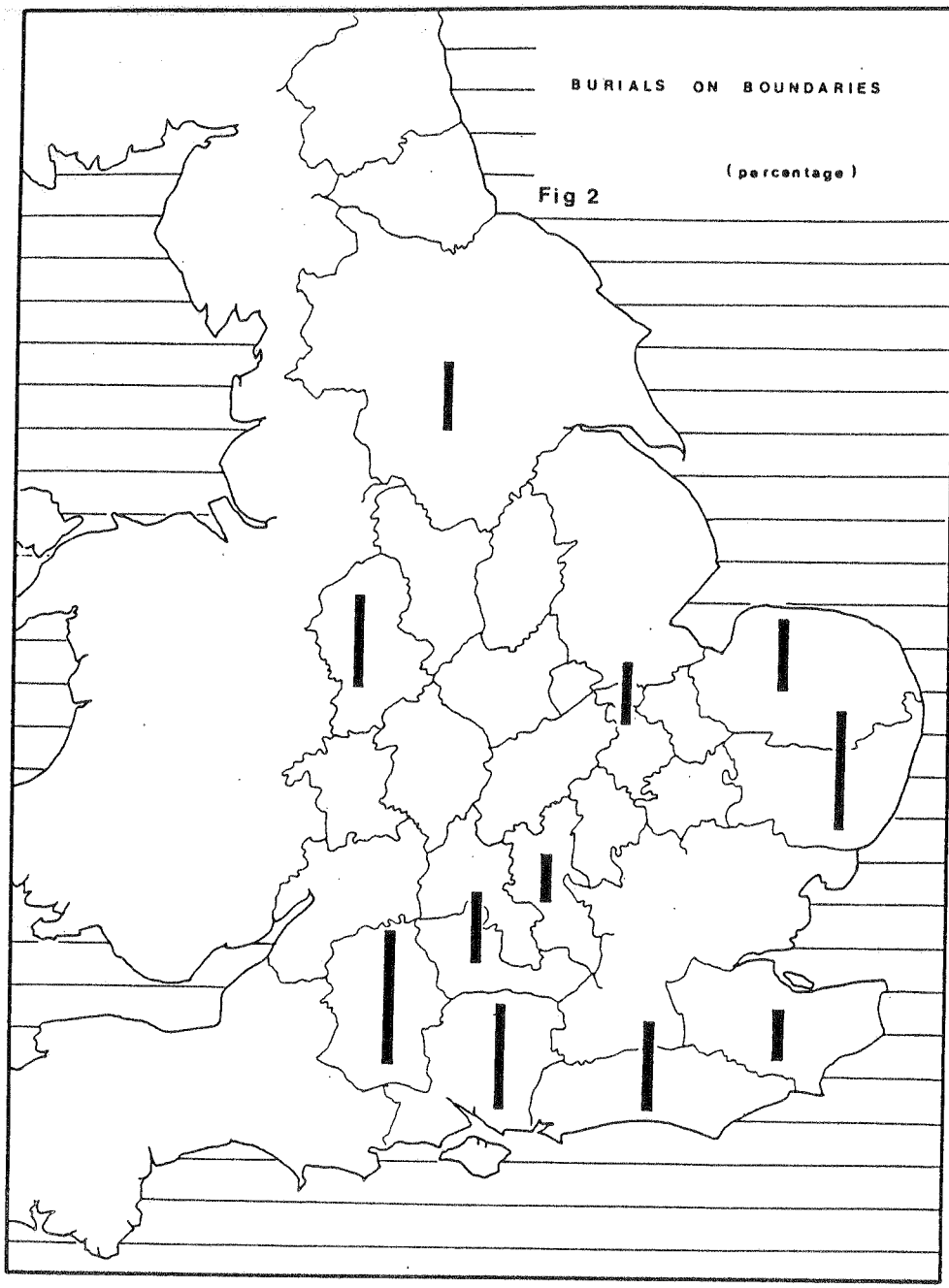


Fig 2

the distinction between primary and secondary barrow burials might in some instances be mistaken if based on the reports of early excavators. If major differences had been observed in the relationship between boundaries and the various categories of burial, it would have been necessary to do further research to establish the precise character of these burials.

Of the 754 burials 135 or 17.9% occur on parish boundaries. The figure is less striking than that discovered by Bonney in Wiltshire, but it is nonetheless significant and could not reasonably be expected to occur randomly. To determine this it was necessary first to calculate the margin of error involved in mapping the burials. Since six-figure map references were used each site fell within a 100 metre square, so that when a map reference appeared to coincide with a parish boundary, the burial could in reality be 50 metres either side of it. The total size of this boundary zone was then calculated and expressed as a proportion of the total area. Assuming a random distribution it was then possible to calculate the number of burials which could be expected to occur in a strip of this size.

Firstly, the average area of a parish in a county or group of counties was calculated simply by counting the number of parishes listed in censuses contemporary with the maps and dividing the total area of the county or counties by this figure. The average boundary length could not be arrived at so easily, particularly because initially no computing facilities were available. To overcome this problem a formula was worked out in the following way: since the perimeter of a square divided by the square root of the area gives an answer of 4 a similar factor could be found for an irregular figure. In most cases this factor was found to be about 5 and seldom rose above 6. This was later checked on an 'Apple' graphics tablet with a sample of parishes and a similar result obtained. Only in 8 cases, out of a sample of 50, did the factor rise above 6, the mean being 5.2. A factor of 6 was therefore chosen as the most rigorous test of the results. Using this factor it was possible to calculate the total area of the boundary zone. There was found to be a 90% probability that 75 burials ±21 would occur in this zone. In other words, the figure of 135 was clearly non-random.

We may, therefore, dismiss the idea that boundaries and burials are associated in some areas purely by chance. The idea that barrows were associated with boundaries as landmarks would also seem unlikely, as although a smaller proportion of cemeteries and burials without barrows were associated with boundaries the figure was significant. However, this result does not prove that the association was produced by the Anglo-Saxons burying their dead on the boundaries of their land units; some independent factor, which does not require a necessary relationship between boundaries and burials may be involved, such as soil quality, the presence of rivers, or high ground, which might influence the positioning of both boundaries and burials.

Fig 3

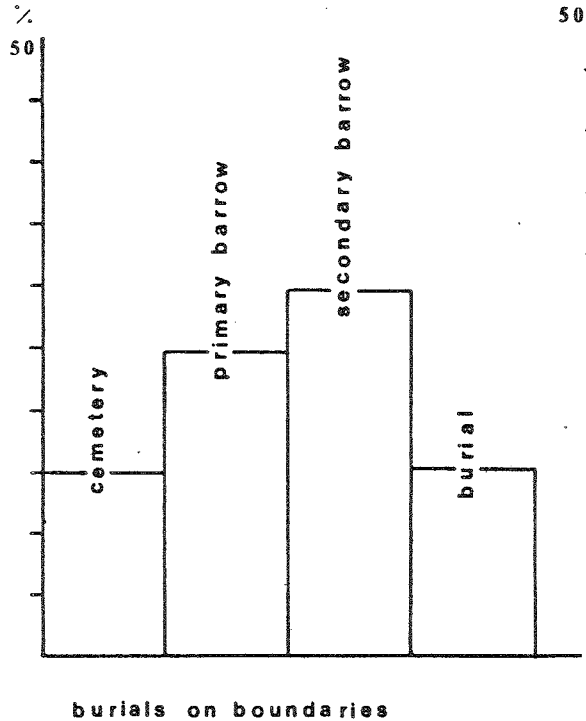
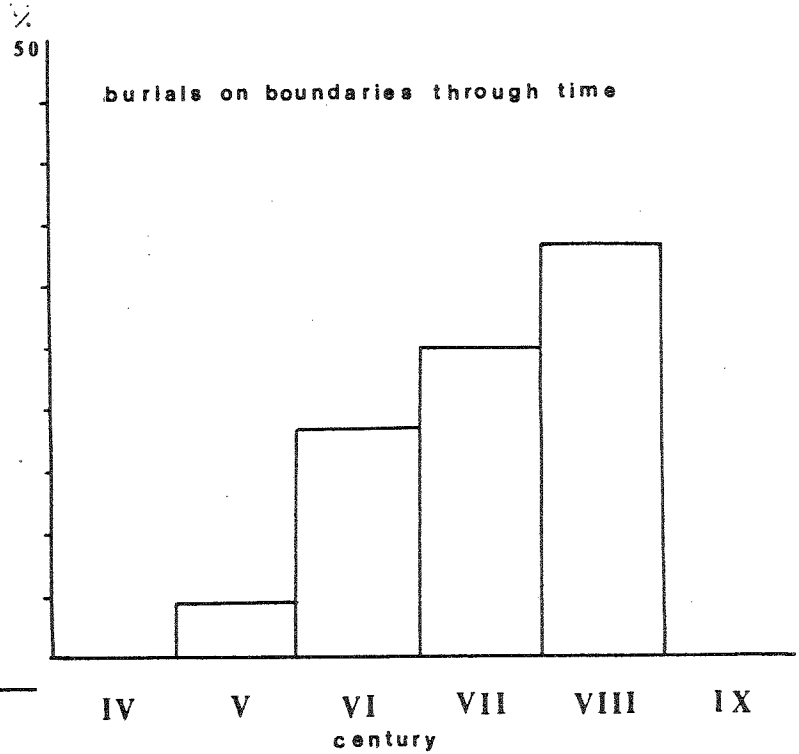

%
50
cemetery
primary barrow
secondary barrow
burial
burials on boundaries

Fig 4


%
50
burials on boundaries through time
IV
V
VI
VII
VIII
IX
century

To test each of these factors would have been time consuming and would inevitably have left other possibilities which had not been considered. A different approach was therefore adopted: the burials were examined through time to see if any development of the boundary-burial relationship could be detected.

Of the original sample of 754 burials only 127 were datable. Where a cemetery was in use over a long period the earliest date was taken as the very latest point at which burial could have begun on the site. In order to maintain a large enough sample in any date range it was not possible to date the burials any more closely than to within a century. Even so the sample did not allow statistically valid distinctions to be made between individual centuries.

Before 500 AD there is one burial on a boundary out of a total of 23 i.e. 4.3%; after 500 AD there are 25 burials on boundaries out of a total 119, i.e. 21.0%. When the possible spread about the average is calculated for the 23 burials before and the 119 burials after 500 AD there is a probability of 1% of the increase being due to chance effects. Similarly, before 600 AD there are 9 out of 74 burials (12.2%) on boundaries, after 600 AD there are 17 out of 68 (25.0%) on boundaries. The sample size here means that the probability of the increase being due to chance effects is less than 5%.

These figures do not accord with the view that the burials occur on boundaries because of some independent factor, unless this also changes through time. In particular Arnold's view that early Anglo-Saxon settlements with their cemeteries were sited on poor soil, which subsequently became marginal to settlements on more fertile soil, is not supported. If this were the case a higher proportion of early burials would occur on boundaries, the exact opposite of the distribution here. The chronological distribution also tends to contradict the idea that the Anglo-Saxons adopted existing boundaries to any extent. If they acknowledged Romano-British boundaries they did not begin to bury their dead on them until the 6th century.

Conclusions

Briefly, we might suggest, on consideration of the dating evidence that the boundaries of Anglo-Saxon land units began to 'fossilise' in the 6th century, or that greater importance was attached to them from this date. This would seem to offer an explanation of the relatively high proportion of burials on boundaries in Wiltshire and the low proportion in Kent, since in Kent settlement began at a comparatively early date, which would result in a high proportion of non-boundary burials in the sample, while in Wiltshire settlement began much later.

Finer distinctions between different periods and counties would require a larger sample and more accurate methods of classification, but but the firm evidence which has been provided for a general associa-

tion of Anglo-Saxon burials and parish boundaries is of some importance and takes us beyond the realm of speculation.

References

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Calculation of total boundary length

Let total area of county (group of counties) = A

Let total number of parishes in county (group of counties) = n

$\therefore$ Average area of parish $\simeq \frac{A}{n}$

and average perimeter of parish $\simeq 6 \times \sqrt{\frac{A}{n}}$

Total boundary length in county (group of counties) $\simeq 6 \times \sqrt{\frac{A}{n}} \times \frac{n}{2}$

(divide by factor of 2 since each boundary segment counted twice)

Counties or groups of counties used in study

1. Wiltshire.
2. Hampshire.
3. Berkshire.
4. Oxfordshire, Buckinghamshire, Bedfordshire.
5. Sussex.
6. Kent.
7. Cambridgeshire, Huntingdonshire, Nottinghamshire, Northamptonshire, Leicestershire, Lincolnshire, Rutland.
8. Warwickshire, Worcestershire, Gloucestershire, Staffordshire, Derbyshire.
9. Yorkshire, Durham, Northumberland.
10. Norfolk.
11. Suffolk.