

The Formation of Boundaries in Anglo-Saxon England: A Statistical Study

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ANALYTICAL TESTS are used to demonstrate that there is a real association between parish boundaries and Anglo-Saxon pagan burials, but this is not true of those of the 5th century. It is unlikely that pre-existing land-units dictated the boundaries of Anglo-Saxon estates. The boundaries seem to have become increasingly stable during the early Anglo-Saxon period, and this explains why there are more 7th- than 6th-century burials on or close to them. Different parts of the country produce different statistics, however, and developments may not have been uniform.

INTRODUCTION

This study developed out of an analysis of the boundary clauses of the Anglo-Saxon land charters, in which burial features are frequently used as land-marks to define the line of the boundary. Besides studying the documentary evidence it seemed valuable to examine the archaeological evidence in order to discover whether there existed any special relationship between burials and boundaries.

The relationship between boundaries and burials of all periods has been frequently discussed; some authorities have considered that a definite relationship exists between them, although opinions differ on how this may have arisen. There are both anthropological and archaeological parallels for the burial of the dead close to territorial boundaries. Dr T. M. Charles-Edwards¹ has discussed the phenomenon in Ireland, where a law tract of the late 6th or early 7th century describes burial mounds as a feature of boundaries. He suggests that the burial of ancestors on the boundary served to emphasise the right of their descendants to the land. Literary references seem to show the same principle at work in the burial of kings facing their enemies. More generally, Maurice Bloch² and Claude Meillassoux³ have noted a connection between an increased sense of territoriality and the development of ancestor cults.

Work on the English evidence has been varied, and many of the conclusions drawn from it contradictory. Each study has approached the subject from a distinctive point of view, examining particular classes of burial, different types of boundary and separate areas of the country; furthermore, criteria of proximity to a

boundary have differed, precluding comparisons which would enable general conclusions to be drawn about the nature of the relationship between boundaries and burials.

As far as Anglo-Saxon burials are concerned, this work may be said to have begun with J. M. Kemble's publication of many of the Anglo-Saxon charters⁴ and his analysis of the burial features that are referred to in their boundary clauses.⁵ Kemble's main aim, however, was to examine the terms used for burials and he did not consider that they stood in any special relationship to the boundaries, being simply used as landmarks. Nor did he recognise the extent to which prehistoric barrows figure in the boundary clauses, concentrating exclusively on the Anglo-Saxon aspect of the evidence. More recent work on charter boundaries by Dr M. Gelling in Berkshire,⁶ Dr D. Hooke in the West Midlands⁷ and Mr L. V. Grinsell⁸ in a number of counties has concentrated on identifying the specific type of burial indicated by the terms used in the charters and has shown that both Anglo-Saxon and prehistoric barrows without any secondary use by the Anglo-Saxons may occur on charter boundaries and that specific terms are used to describe them. As Dr Hooke has pointed out, however, it is not possible, using this body of evidence alone, to determine whether burials are more likely to occur on boundaries, or whether some of the available burials have been used, where suitable, as boundary markers.

Dr D. J. Bonney brought evidence from other sources to bear on this question.⁹ He examined the Anglo-Saxon charter boundaries, manorial estate boundaries and parish boundaries in Wiltshire, Hampshire and Dorset in relation to the archaeologically known Anglo-Saxon burials. In Wiltshire he found that 29% of his sample were on parish boundaries, which he suggested demonstrated a preference for boundary burial among the early Anglo-Saxons and a pattern of land division which remained stable within the county from that period. Since many of these burials represent secondary use by the Anglo-Saxons of prehistoric barrows, the association of boundaries and burials and hence of the land-units themselves might be very much older than the Anglo-Saxon period.

Work by Dr M. Faull¹⁰ and Dr D. A. Spratt¹¹ has produced a similar correlation between Bronze Age barrows and parish boundaries in parts of Yorkshire. The relationship does not, however, extend to all parts of Yorkshire where Bronze Age barrows are known; as Dr Faull's careful statistical work has shown, it is only in the East Riding, where 28.6% of Bronze Age barrows are on or close to a parish boundary that a strong correlation can be found. Her results give some indication that whatever the relationship existing between boundaries and Bronze Age barrows, it is not a matter of the barrows having been used as landmarks, since only 1.6% of them are actually on a parish boundary. The relationship would therefore seem to be between the boundary zone and the barrows, not the line of the boundary itself. Spratt's work in NE. Yorkshire seems to confirm this, showing that Bronze Age barrows are typically on the watershed, which he argues demarcated Bronze Age territories. The parish boundaries also follow the watershed and divide the valleys by following tributary streams, giving each parish a share of arable and pasture. In view of this distribution of natural resources the fact that the parish boundaries and the postulated Bronze Age boundaries follow the same general line

except by aerial photography and modern excavation techniques. Similarly, the distinction between primary and secondary barrows may, in some instances, be mistaken if based upon the reports of early excavators. Had major differences 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, eliminating all doubtful cases which could not reliably be established as belonging to a specific category. Meaney's gazetteer itself introduces errors, as must always be the case in this type of work. Several map references had to be discounted because they did not refer to the part of the country described in the notes on the site. But undetected errors of this kind, or indeed, errors which I have introduced, will tend to follow a random pattern, so that they will cause no specific bias in the results. A large number of errors would simply have made it more difficult to discern any statistical regularity. Had a smaller sample been used, as for example in a local study, greater precision would have been needed, both in mapping the sites and categorising the burials; indeed, it is questionable whether the gazetteer would have been an adequate source for such a study.

The 754 burials were plotted on one-inch Ordnance Survey maps;¹⁸ with six-figure national grid references this gave a position accurate to within 100 metres and larger scale maps could not have provided any greater degree of accuracy than this using six-figure references. Statistical allowance was made for this degree of error. The distribution of the burials was compared to that of the civil parish boundaries. This choice of boundary had the advantage that they were readily accessible and applied to the whole country; had charter boundaries been used the study would have been restricted to southern England and the line of many of the boundaries would have been debatable. Although the civil parish boundaries are an essentially post-medieval development as an administrative form,¹⁹ where they have been studied there is a close correspondence between charter and parish boundaries.²⁰ It should be borne in mind, however, that the history of parish development has varied greatly in different areas of the country: while the southern parishes typically contain a single township, in Yorkshire several townships may be included in a single parish. The Danelaw as a whole may have experienced a somewhat different pattern of parish development.²¹ As with other aspects of the study, had major differences been observed between different areas of the country it would have been necessary to refine the data base and discover how the history of boundary development in a specific area had influenced the resulting pattern of boundary/burial relationships. Fortunately, this was not the case, for a significant relationship between parish boundaries and early Anglo-Saxon burials existed in all areas which had a viable sample of sites. It is probable that the result underestimates the number of burials on boundaries, because it is an extreme test, using the most modern boundaries which have been subject to many changes.

THE RESULTS

The overall results are shown in Fig. 1: 135, or 17.9% of all the burials in the sample, occur on civil parish boundaries. This figure is less striking than that

a medieval surveyor and could have been incorporated as a landmark on a new boundary laid out at any time. The occurrence of a barrow on a boundary may not, therefore, be proof of the boundary's continuity, but rather, of the barrow's continued visibility. Burials without barrows that are sited on boundaries may at one time have had barrows that have subsequently been eroded, or represent a random distribution coinciding with the boundary by chance.

A4. The early Anglo-Saxons may have buried some or all of their dead on the boundaries of their land-units, some of which may have been incorporated into later estates of the type recorded in the charters. Only in this case have we any basis for making deductions about the character of early Anglo-Saxon settlement and land use. This final hypothesis cannot be accepted until the others have been discounted and a necessary connection proved between early Anglo-Saxon burials of all types and boundaries.

METHOD

Dr C. M. Hills, commenting on this question of the relationship between boundaries and burials,¹⁵ has emphasised the importance of a statistical approach, and it is clear, on considering the problem of distinguishing between the rival hypotheses listed above, that only a statistical method can give a firm answer. Such a method has been adopted in this study, using as large a sample as possible, to avoid the effects of random fluctuation. All the burials listed in Dr A. L. Meaney's gazetteer¹⁶ have been considered for inclusion in the sample. Those which cannot be mapped with a six-figure national grid reference must be excluded; this affects Derbyshire in particular, because, as Dr Meaney explains, the exact position of some of the Derbyshire barrows excavated by Bateman is not known. Burials which are listed but are not considered to be Anglo-Saxon have also been excluded, as have probable burials known only from isolated finds, since it cannot be certain that these objects originally belonged to a burial and were not redeposited. Finally, all burials within an urban area must be excluded, since the boundaries of modern parishes are only relevant to a consideration of rural organisation. The sample may then be updated by reference to recent editions of *Medieval Archaeology* to give a sample size of 754 sites.

Using Dr Meaney's data, the burials have been classified according to whether they are in primary or secondary barrows, or the burials of a few individuals without a barrow, or are in a cemetery at which no barrow had been recorded.¹⁷ Inhumations and cremations are not grouped separately, although this could have been done retrospectively, if a marked difference had been noted between areas where one or other ritual was common.

There are many criticisms that may be made of this sample. Many of the faults are, unfortunately, inherent in the use of archaeological material, particularly when it has been gathered over many generations to a variety of standards. Barrows may, for example, have existed at sites classified here as being without barrows, because the vestigial traces of a barrow were not noticed and could not have been recognised

THE STUDY

I have attempted to overcome some of these difficulties in this study by examining a large sample of burials from a single period — early Anglo-Saxon England, which has the advantage that it can be subdivided chronologically. A series of hypotheses, based on existing work, will be set up, all of which receive some support from the evidence, but are mutually contradictory. These hypotheses will be tested by comparing the distribution of the sample of burials to that of the modern civil parish boundaries, with the result that some of the hypotheses can be excluded and others further developed to produce a second series of hypotheses. These will in their turn be tested by examining the relationship of burials to boundaries through time. Finally, the conclusion will be drawn that early Anglo-Saxon burials were associated with parish boundaries and that since this relationship developed through time, it was not the outcome of any external factor, but arose from a necessary relationship between the two.

THE FIRST SERIES OF HYPOTHESES

A1. We may be observing an entirely random effect enhanced in some areas by the small size of parishes, density of burials and inaccuracies in their plotting. If this is the case a good deal of ink has been spilt in a lost cause. The apparent association of burials and boundaries is no more significant than that between archaeological sites and motorways.

A2. It may be that burials and boundaries are situated in the same areas without there being any necessary relationship between them, but because of some quite independent factor. This second hypothesis, if proved true, would be no more useful for the study of settlement than the first. A statistically significant association of burials and boundaries could be produced if, for example, both are in areas of poor soil. It might be argued that burials would stand a greater chance of survival in poor soils which had been subject to less intensive agricultural use, so that they are not representative of the original distribution. Alternatively, marginal land might have been chosen for boundaries and burials independently in different periods of history because the ground had little agricultural value.

A3. Barrows, whether pagan Anglo-Saxon or prehistoric, may have been used as landmarks for later boundaries. If this is the case we cannot, except as a *terminus post quem*, use the barrow to date the boundary. A barrow might be used as a landmark for an estate boundary recorded in a charter, some of which are known to have survived as ecclesiastical parish boundaries and so to have influenced the formation of civil parish boundaries in the modern period. The existence of a barrow on the boundary does not enable us to say that such a parish boundary dates back to the early Anglo-Saxon or prehistoric period. All that one can say is that the barrow was in existence by the time that the estate boundary was recorded, which, since most of the charters date to the 10th century, is hardly surprising. If a barrow is on a parish boundary which is not already recorded as an estate boundary, there are no grounds for according the boundary great antiquity, since the barrow would have been visible to

does not prove continuous recognition of the boundary, although Spratt inclines to the view that this is the case. It is perhaps significant that the area in which the correlation of parish boundaries and prehistoric boundaries is closest is the poorest and least densely populated in Spratt's study. In the more prosperous areas of the Tabular Hills, i.e. N. of Pickering and Helmsley, the postulated prehistoric territorial organisation is not so closely mirrored in later boundaries. A similar correlation is to be found between linear earthworks of the Late Bronze Age and parish boundaries on the Wiltshire/Hampshire border, where the parishes consist of strips of land running down from the chalk into a river valley and, as with the Yorkshire examples, in this way giving each a share of the available arable and pasture.¹²

Dr C. J. Arnold¹³ examined the relationship between boundaries and burials from a very different perspective; taking the Isle of Wight and part of Sussex as his study area, he constructed Thiessen Polygons around the early place-names and found that Anglo-Saxon burials tended to occur on the boundary of these figures. He initially interpreted this result as evidence that the Anglo-Saxons showed a preference for burying their dead close to the boundaries of their land-units, but in a subsequent article¹⁴ he revised his interpretation and suggested that the Anglo-Saxons buried their dead close to their settlements, as is shown by some of the archaeologically known settlement sites with nearby cemeteries. The early settlement sites were, he argued, on relatively poor soil, which was, nevertheless, easily cultivated. By the 8th century these early settlements had been abandoned and settlement shifted to more fertile, but heavier, soil, leaving the old settlements and their cemeteries in the boundary zone of the new territorial unit, on land which had now become marginal. The earliest known place-names do not, according to this theory, reflect the earliest phase of settlement, but rather the later movement to more fertile soils.

Potentially, a study of the relationship between boundaries and burials could tell us much about the development of territorial units, in particular whether there is any degree of continuity in the recognition of boundaries. As can be seen from the wide divergence of opinions summarized above, no firm conclusions can be drawn on the basis of present work. Where a correlation between boundaries and burials has been found, it is in limited areas and often in studies using small samples, in which random fluctuations can produce misleading results. Within any one locality such factors as the restricted distribution of natural resources might impose a rigid framework on successive land-units intended for mixed farming, which might therefore appear to have been in continuous use. This could, for example, be the case in NE. Yorkshire and Wiltshire. The Bronze Age barrows and parish boundaries used in the Yorkshire studies and in some of Bonney's work are separated in their origin by such long timespans that it is obviously difficult to achieve chronological precision; at best an impressionistic picture is gained of the different phases of development. The suggested Bronze Age boundaries are the product of a lengthy development, meeting in their formation the changing needs of an increasingly complex society, while the parish boundaries have undergone many changes in their long history, so that a general correspondence between them is hardly to be expected.

discovered by Bonney in Wiltshire, where 29% of burials were on boundaries, but it is nonetheless statistically significant and could not reasonably be expected to be random.

The possibility that the distribution could be random was tested in the following way: since the burials could only be placed to within 100 metres, the area formed by taking a 50-metre strip either side of the parish boundary was calculated, and expressed as a percentage of the total parish area; this indicated the percentage of burials which could be expected to fall randomly in the boundary zone. This figure reached a maximum of 9.9% in the counties of Oxfordshire, Buckinghamshire and Bedfordshire, where the average size of the parishes was smallest. Applying the highest percentage to the whole country an average of 75 burials could be expected to occur randomly in the boundary zone. Using standard statistical techniques for the precision of the estimate of a proportion it is possible to say that there is a probability of 99% that the random distribution would be within the range of 75 ± 21 , i.e. 54 to 96 burial sites could be expected to be situated within 50 metres either side of a parish boundary (see Appendix 1).²²

	On Boundary		Not on Boundary		TOTAL
	No.	%	No.	%	
Primary barrow	17	24.6	52	75.4	69
Secondary barrow	30	29.7	71	70.3	101
Few individuals (no barrow)	41	15.2	229	84.8	270
Cemetery (no barrows)	47	15.0	267	85.0	314
TOTAL	135	17.9	619	82.1	754

FIG. 1

Table showing the percentage of the different categories of burial on boundaries

REVIEW OF THE FIRST SERIES OF HYPOTHESES

In the light of these results it was possible to review the hypotheses initially put forward.

A1. The first hypothesis may be dismissed. The mapping was sufficiently accurate, even where the smallest parishes were concerned, and the sample was large enough to ensure that chance effects did not distort the result.

A2. It is still possible that burials and boundaries may be associated without any necessary relationship existing between them.

A3. The idea that barrows are associated with boundaries as visible landmarks would seem unlikely, as although a smaller proportion of burials and cemeteries

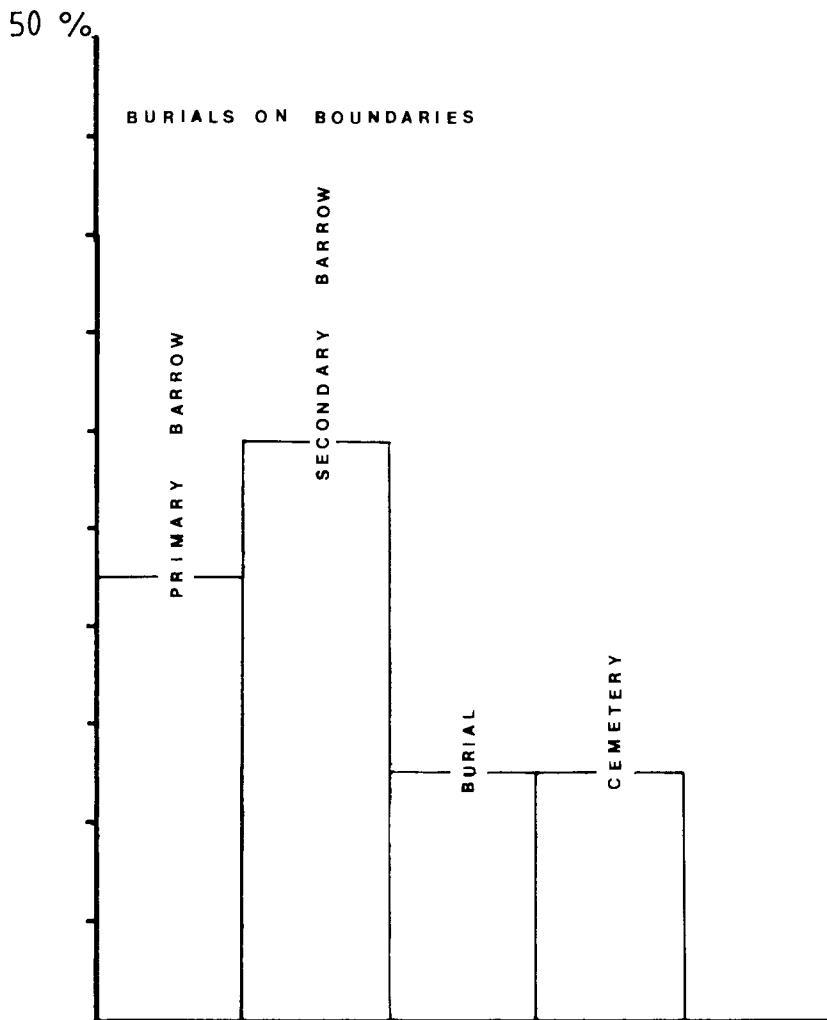


FIG. 2
Block diagram showing the percentage of the different categories of burial on boundaries

without barrows are situated on boundaries it is nonetheless a significant figure and does not fall within a random distribution (see Fig. 1).

A4. It is possible, although not yet proven, that the association between boundaries and early Anglo-Saxon burials was produced by the burial of some or all of the dead on the boundaries of early Anglo-Saxon land-units.

CONCLUSIONS

Two possibilities are therefore left, *A2* and *A4*. Both allow that an association between boundaries and burials exists, but the question of how that relationship arose remains. A second series of hypotheses may now be proposed, and tested.

THE SECOND SERIES OF HYPOTHESES

B₁. The association between burials and boundaries, while statistically significant, was not produced by a necessary relationship between them, but by the influence of a third factor, which independently influenced the siting of both burials and boundaries. For example, the same types of topographical feature, such as a watershed, river or marginal land might have been attractive for boundary demarcation and burial at different times. If this is the case, the association of boundaries and burials is of no value to settlement studies.

B₂. Equally, the association might have been produced by factors influencing the survival of archaeological evidence for burials. Burials which were made on poor soil would have had a greater chance of survival, since they would have been subject to less intensive agricultural pressure. Mrs A. Ozanne makes this point in discussing the Derbyshire burials,²³ many of which were excavated when they were threatened by

Century	IV		V		VI		VII		VIII		IX	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
On boundary	0		1	4.5	8	15.7	14	25.0	1	33.3	0	
Not on boundary	1		21	95.5	43	84.3	48	75.0	2	66.7	1	
TOTAL	1		22	100.0	51	100.0	64	100.0	3	100.0	1	

FIG. 3
Table showing the percentage of burials on boundaries by century

the encroachment of arable land into marginal moorland areas in the 19th century. In the more densely settled lowland areas comparable burials have, she argues, been destroyed by agriculture. If the fertility of the soil tends to be lower towards the boundary of a parish, burials in this position would have a greater chance of survival. In this case the association of boundaries and burials is of limited historical value, indicating the relative intensity of land use in a parish over an undefined timespan and offering no new evidence for Anglo-Saxon studies.

B₃. As Arnold has argued, the Anglo-Saxons may have buried their dead close to their settlements. Early settlements were, he suggests, made on light, easily cultivated, but low fertility soils. Only later was there a movement onto heavier soils with greater potential for agriculture, leaving the former settlements and their cemeteries on the boundaries of the new land-units. If this is the case, then the burial evidence indicates a major shift in settlement throughout the country; the Domesday pattern of settlement could not have begun to develop until the 7th/8th century.

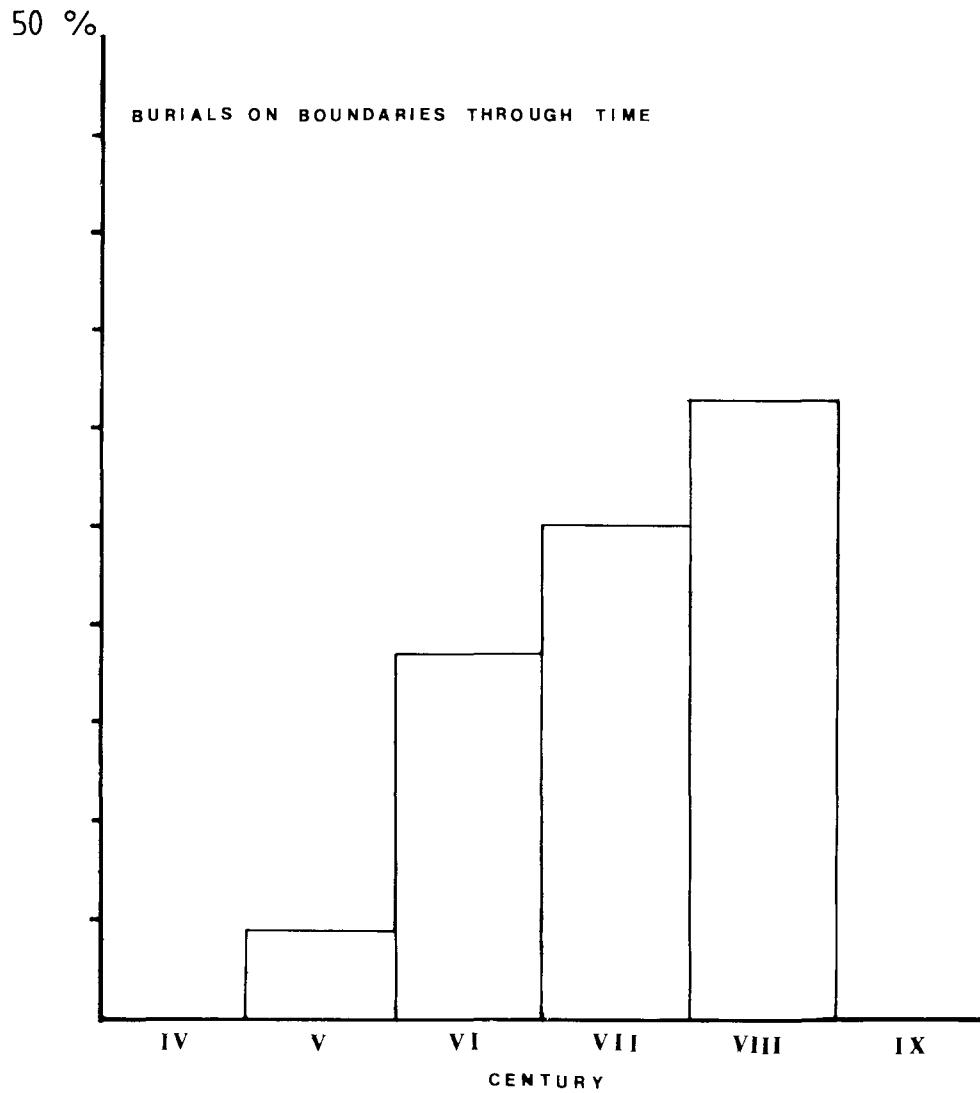


FIG. 4

Block diagram showing the percentage of burials on boundaries by century

B4. The Anglo-Saxons buried their dead on the boundaries of their land-units, some of which were incorporated into the boundaries of estates of the type recorded in the charters, which in turn influenced the formation of civil parish boundaries. In this case parts of the modern civil parish boundaries, presumably those which were previously ancient ecclesiastical parish and estate boundaries, were originally formed much earlier in the Anglo-Saxon period. Our knowledge of the organisation of the Anglo-Saxon landscape would be extended beyond the area covered by charter evidence and to an earlier date than the charters permit.

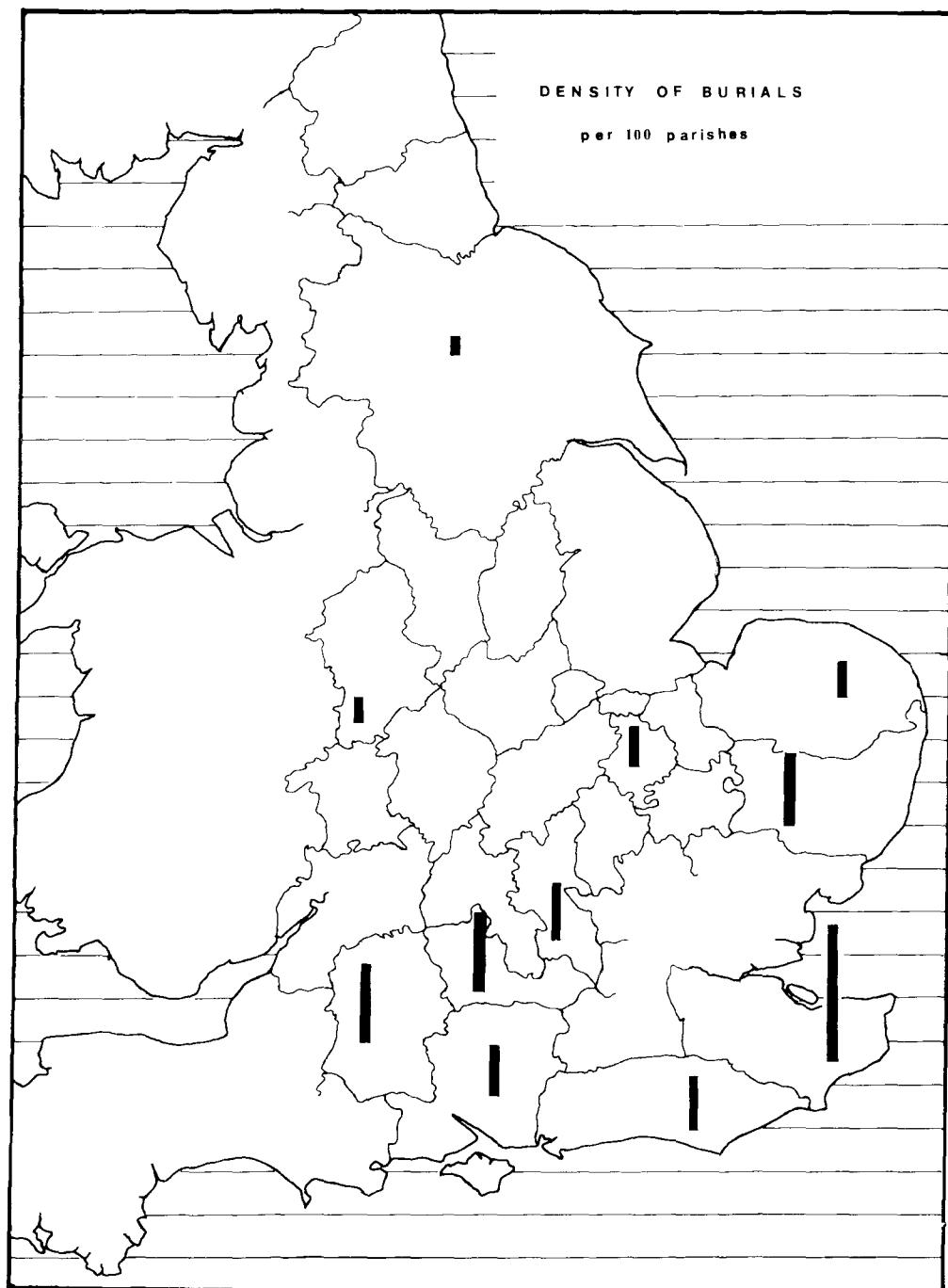


FIG. 5
Map showing density of burials per 100 parishes (for data, see Fig. 7)

B5. The Anglo-Saxons buried their dead on the boundaries of their land-units, some of which were incorporated into civil parish boundaries as in B₄, but these land-units had existed from earlier times, hence the large number of secondary barrow burials on the boundaries. As in B₄, this would extend our knowledge of Anglo-Saxon settlement and would also indicate a marked degree of continuity of land division in all parts of the country from an early date.

METHOD

To decide between these hypotheses burials datable within a century, amounting to only 168 of the original sample of 754, were examined. This sample size reflects the difficulty of dating Anglo-Saxon burials, a problem which has been outlined by Dr T. M. Dickinson,²⁴ who points out that burials of the 5th century are much more difficult to date, because of the paucity of grave goods or our lack of knowledge, than those of the 6th and 7th centuries. It is possible, therefore, that the sample underestimates the number of 5th-century burials, but the effect of this will, to some extent, be overcome by considering proportions rather than absolute numbers of burials. However, it is not possible to place any reliance on the figures for individual centuries, as the samples are not large enough. While the results for individual centuries are shown in Figs. 3 and 4, for statistical purposes they will be grouped together.

THE RESULTS

The proportions of burials on boundaries increases over time (see Figs. 3 and 4). Before A.D. 600, there are nine burials on boundaries out of a total of 75, i.e. 12%, and after 600 there are 23 burials on boundaries out of a total of 93, i.e. 24.73%. This increase in proportion is statistically significant, i.e. there is only a 5% probability that this could be random.²⁵

REVIEW OF THE HYPOTHESES

B1. These figures do not accord with the view that the association of boundaries and burials was produced by a third factor, unless this also changed through time. Natural features of the landscape such as rivers, or a watershed, would not produce this effect.

B2. Differential survival would also seem an unlikely cause of the association between boundaries and burials, since it would benefit burials of all periods equally and no change in the proportion of burials on boundaries could be expected through time. However, were there to have been colonisation of marginal land in the 7th century, as Mrs Ozanne suggests, the burials made on this poorer soil might have had a greater chance of survival than contemporary burials on richer land. Nonetheless this could only account for the association between boundaries and burials if the less fertile soil was restricted to a 50-metre zone along the parish boundary. In view

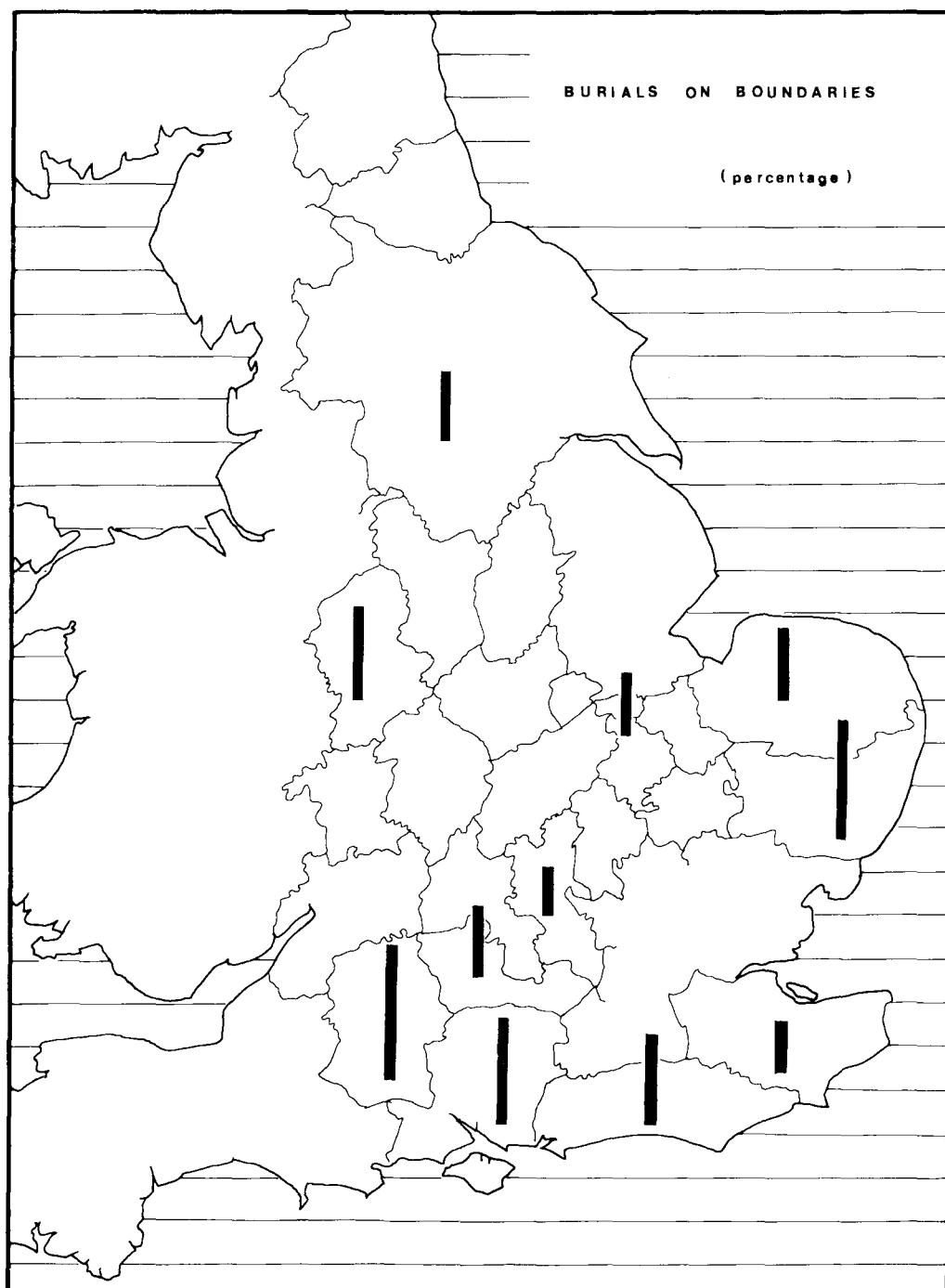


FIG. 6

Map showing percentage of burials on boundaries (for data, see Fig. 7)

of the notorious difficulty of establishing the quality of soil in early historical periods and of assessing the attitude of earlier farmers to soil type, the detailed study which would be required to establish whether this was the case or not would be long drawn-out and unreliable. Where differential survival does seem to play a part in producing the present pattern of boundary: burial relationships it is on a local level, in areas such as the Peak District and Suffolk, where many late burials have survived (see Fig. 6).

B3. The view expressed by Arnold that the early Anglo-Saxon settlements and their neighbouring cemeteries were sited on easily cultivated soils which subsequently became marginal to settlements on more fertile soils is not supported by these results. If this were the case a higher proportion of early burials would be situated on the boundaries, the exact opposite of the actual result.

B4. The results strongly suggest that the Anglo-Saxons buried a significant proportion of their dead on the boundaries of their land-units and that some of these boundaries were incorporated in later estate boundaries, which in turn influenced the formation of ecclesiastical parish boundaries and those of civil parishes.

B5. It would seem unlikely that any substantial degree of continuity exists between Anglo-Saxon and earlier boundaries, since the single burial which occurs on a boundary before 500 (see Fig. 3) is well within the random distribution for this sample size and may therefore be a purely chance phenomenon. If the Anglo-Saxons recognised earlier boundaries they did not immediately conceive of the idea of burying their dead on them.

CONCLUSIONS

Only one of the second series of hypotheses would seem to be acceptable, B4. The hypothesis that a third factor influences the siting of burials and boundaries, or favours the survival of burials in the boundary zone, can be rejected, although this could explain the association between prehistoric burials and modern or medieval boundaries. Unless a factor is found to influence the siting or survival of burials which itself changes through time, it is impossible to avoid the conclusion that the present relationship between civil parish boundaries and early Anglo-Saxon burials was produced by the Anglo-Saxons burying their dead on their own boundaries and that there was very little continuity in the recognition of earlier boundaries.

DISCUSSION

Many further questions which are worthy of discussion because of their relevance to the more general issues of early Anglo-Saxon society arise from this conclusion. Essentially the questions we need to examine are:

1. Does the beginning of boundary burial coincide with the development of the boundary or is it a response to an existing boundary triggered by some other factor?

2. With what kind of land-units are we dealing? Are they similar to the estates recorded in the later charters and do they indeed represent an early phase in the development of these units or are they completely different?
3. With what social structure are these units to be associated? If they represent an early phase in the development of the charter estates can they be associated with the élite group of thegns who held these estates or must we envisage some other form of organization?
4. What is the ideological significance of boundary burial?

To answer these questions we must go beyond the basis provided by the statistical evidence presented above into a more contentious area. At this stage I can do no more than propose a new series of hypotheses, which eventually must be tested against another data set. This, however, must be the subject of a subsequent paper; in this paper I will merely discuss some of the issues involved.

The simplest answer to the first question is that boundary burial reflects the process of boundary formation, rather than being a response to an existing boundary triggered by some other factor. Other answers might be put forward, but none has the merits of this hypothesis, which makes no unwarranted assumptions about the other unresolved questions and adheres closely to the available evidence. It might be suggested, for example, that economic competition between neighbouring communities led to the ritual 'reinforcement' of existing boundaries to protect scarce resources. But we would then have to ask why competition should have reached such a critical pitch at that particular time. An alternative model which gave greater importance to political factors might argue that the development of rival élites lay behind the increased competition for resources, but this would be to assume the answer to our third question about the social character of the land-units. Approaching the problem from a different point of view it might be suggested that an ideological change had taken place which required structural differentiation between the zone occupied by the living and the dead, but proof of this would require more knowledge than we can at present claim of Anglo-Saxon ritual practices. Clearly further evidence might make one or other of these models more acceptable, but on present evidence it would seem most reasonable to argue that as boundaries formed so burials were sited on them. The relationship between early boundaries and burials has, therefore, been lost because the boundaries of the earliest land-units have changed. Not until the 7th century did the pattern of boundaries become sufficiently stable for the relationship to survive in a significant proportion of cases.

In putting forward this first and simplest hypothesis we make no unwarranted assumptions about the character of the land-units, the subject of our second question. The fact that these ancient boundary lengths are preserved as parish boundaries does not mean that the whole length of the present parish boundary may be dated to the early Anglo-Saxon period. Only that portion of the boundary contiguous with the burial place is datable; the rest of the boundary may have undergone changes in any period. Even when the boundary is recorded as a parish and an estate of the late Anglo-Saxon period our one point of reference does not

enable us to say that it was substantially the same in the early Anglo-Saxon period. Four or five hundred years may have elapsed between the formation of the early boundary and the recording of an estate boundary in a charter. The size of the land units represented by the lengths of early boundary is, therefore, unknown. They may have been similar to the later estates and parishes, but equally they may have been much larger or smaller units. The estates recorded in the charters may, therefore, be the result of another phase of boundary formation, involving the splitting of larger units or the amalgamation of smaller units, which incorporated parts of the earlier boundaries. We cannot take for granted that we are dealing with an early phase in the development of estates of the type recorded in the charters.

The third question about the social structure to be associated with these early land-units is intimately connected to that of the character of the land-units. If indeed they represent an early phase in the development of estates such as those recorded in the charters it is also possible to relate them to the rise of the thegns as landowners. However, it should be borne in mind that within the same confines a very different social system, possibly based on ownership of land by kin groups could have existed. Dr J. Shephard's work on the social organisation reflected by burial practices is potentially of value here.²⁶ He has argued that in the south-eastern counties the construction of barrow cemeteries reflects a more 'egalitarian' society than that represented by the isolated barrows found elsewhere in the country, in which the exceptional position of a pre-eminent individual within society finds expression. If this is the case, both groups show an equal propensity to boundary burial; no distinction is apparent in the proportion of barrow cemeteries and isolated barrows on boundaries, although the sample is not large enough to give a statistically reliable result.²⁷

Nor do there seem to be any grounds for distinguishing a sub-group from within the community as the object of boundary burial, which might have indicated something about the social system. Admittedly, this could only be thoroughly tested by an analysis of the grave structure and lay-out of a number of sites. The categories which I have derived from Meaney are not sufficiently fine to distinguish a sub-group, but the boundary burials are clearly not confined to the burial of one or two individuals. If a sub-group is involved it includes a great many people. Clearly much more work is needed in this area, both on the burials and on the question of what we may understand by such terms as 'egalitarian' in the context of Anglo-Saxon society.

Any hypothesis about the character of the land units and the social structure of the communities which inhabited them must be of the most tentative kind in view of the generally low level of our knowledge of these issues. But in the absence of evidence pointing to a major reorganisation of land-units between the 7th century and the appearance of the charters in any number it is tempting to suggest that the early land-units are indeed similar to those recorded in the charters and represent an early phase in their development. It would seem probable that a social group similar to the thegns known from the charters may have controlled these units. If this could be proved we could then place the emergence of the thegns as landowners within a definite timespan.

Our evidence promises to make a greater contribution in relation to the fourth question, about the ideological significance of boundary burial, in particular to the transition to Christian burial practices and the development of Christian graveyards. The problems surrounding this question have been outlined in a recent discussion,²⁸ which criticised the oversimplistic models previously proposed to explain the transition and emphasised the lack of knowledge on this important matter. A key group of burials for this question, if indeed they can be considered a homogeneous group, are the 'final phase' burials. First identified in Kent,²⁹ they are now known in many parts of the country and are datable between 650–750. They are characterised by a distinctive range of artefacts, some of which may be interpreted as having a Christian significance, and are sometimes arranged in a regular manner, often with an E.-W. orientation.³⁰ These burials have been interpreted by some³¹ as Christian and it has been suggested that they represent a transitional phase from pagan to Christian burial practices. In some cases a new site seems to have been adopted and the previous cemetery abandoned, although 'final phase' burials are known from cemeteries with earlier use. It has been suggested that the establishment of a 'final phase' cemetery precedes the eventual move to Christian graveyards within the settlement, with which we are familiar in the later period. In a discussion of the Sancton cemeteries,³² a similar process has been suggested, with the earliest cemetery, Sancton I, on the outskirts of the parish and the later, Sancton II, close to the postulated centre of Anglo-Saxon settlement. The evidence in this study does not support the view that this was a general process. While not disputing that in individual cases this movement of cemeteries towards the settlement may have taken place, the statistical evidence shows that for 7th-century burials in general it was not the case. Nor do the 'final phase' burials when considered separately show a different pattern. They are no less likely to be associated with boundaries.³³ Boundary burial seems to have persisted to a late date. The exact date is difficult to determine because the number of datable burials is not statistically viable in the 8th and 9th centuries. It is possible, however, that it often continued until the introduction of graveyards attached to the proprietary churches which formed the basis of the ecclesiastical parish system and were developing between the 8th and 11th centuries.

Some support is given to this hypothesis by the relative density of boundary burial in different areas of the country (see Figs. 5, 6 and 7). For the purposes of these distributions some counties have been grouped together on the basis of the presumed limits of the Anglo-Saxon kingdoms³⁴ in order to give a statistically viable sample. Where this was not possible and the sample size fell below 30 the county has been excluded. Even so the figures cannot be accepted with the same degree of confidence as those derived from larger samples. In most cases individual counties or groups of counties conform so closely to the mean proportion of burials on boundaries that no comment can usefully be made about the slight fluctuations from the mean which they show. In only three cases does the percentage of burials on boundaries differ sufficiently from the mean for it to be reasonably certain that in that county there is an unusually high or low proportion of burials on boundaries. In Kent and the grouped counties of Oxfordshire, Buckinghamshire and Bedfordshire the percentage of burials on boundaries is well below the average, while in Wiltshire, at the

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County or Group of counties	Area (Sq. miles)	No. of parishes	Average Size of parish (Sq. miles)	Total no. of burials	No. of burials per 100 parishes	No. of burials on boundary	% of burials on boundary
Wiltshire	1343.91	304	4.42	56	18	19	33.9
Hampshire	1650.47	299	5.52	34	11	8	23.5
Berkshire	724.73	186	3.90	35	19	6	17.1
Oxfordshire Buckinghamshire Bedfordshire	1971.91	554	3.56	74	13	8	10.8
Sussex	1457.06	288	5.06	34	12	7	20.6
Kent	1440.14	335	4.30	105	31	12	11.4
Cambs. Hunts. Notts. Northants. Leic. Lincs. Rutland	6721.18	1687	3.98	149	9	22	14.8
Warwick. Worc. Glouc. Staffs. Derby.	5090.59	1199	4.25	77	6	7	22.1
Yorks. Durham. Northumberland.	9132.39	1607	5.68	69	4	11	15.9
Norfolk	2053.72	524	3.92	43	8	7	16.3
Suffolk	1481.68	323	4.59	40	12	11	27.5

FIG. 7
Table showing data for Figs. 5 and 6

other extreme, by far the highest proportion of burials on boundaries occurs. This is in part, no doubt, due to the relative proportions of early and late burials in these counties. Wiltshire has a high proportion of late burials and could, therefore, be expected to have a high proportion of boundary burials. But this does not entirely explain the difference between the counties, since, while Kent has many early burials which, as the statistical results show, would be unlikely to be associated with boundaries, there are besides many late burials in the county. Perhaps, therefore, the exceptionally low proportion of boundary burials in Kent may have been due to an early and effective organization of the church at parish level which cut short the practice of boundary burial. In Wessex the development of the church was later and more fitful than in Kent, so that extensive provision of local graveyards was probably a late development. Whether the low proportion of boundary burials in Oxfordshire, Buckinghamshire and Bedfordshire may be explained in the same way is uncertain, since the church did not develop so rapidly in this area as in Kent. In other counties the evidence is even less certain, but in Sussex there is a suggestion that the percentage of boundary burials is above average. This would be in accordance with the late development of the church in that kingdom, but the percentage is not sufficiently different from the average for any weight to be placed on this interpretation. Elsewhere, as for example with the apparent distinction between Norfolk and Suffolk, similar doubts may be raised. These questions of local variation in the timing of the transition to churchyard burial can only be pursued further by means of more detailed studies, particularly of the churchyards themselves.

On many of these questions work is, as yet, only in an early and exploratory stage, so the main conclusion of this study awaits development and refinement by future work. Definite statistical evidence that the Anglo-Saxons buried their dead on the boundaries of their land-units is, however, a step forward and will, it is to be hoped, provide a sound foundation for further research.

APPENDIX I

The first problem was to calculate the boundary length of a parish. Since the perimeter of a square divided by the square root of its area is equal to 4 and similarly constant figures can be found for other regular figures, it was possible to estimate that such a factor for an irregular figure, i.e. a parish, would be in the region of 5. This method was checked by measuring a sample of 50 parishes on an Apple Graphics tablet. The mean was found to be 5.26, seldom rising above 6.

The figure of 6 was taken as representing the worst possible case and giving the greatest boundary length, although, in fact, it only represents the situation with the most elongated or involuted parishes. The calculation below represents the situation in the counties of Oxfordshire, Buckinghamshire and Bedfordshire, where the small average parish size produced the greatest boundary length. In no other region was the boundary length so great, proportional to the area. Counties were grouped together on the basis of the

Anglo-Saxon kingdoms, in order to maintain a sufficiently large sample of burials for statistical purposes (see Fig. 7)

Example calculation for Oxfordshire, Buckinghamshire and Bedfordshire:

$$\text{Total area} = 1971.91 \text{ sq. miles}$$

$$\text{Total number of parishes} = 554$$

$$\begin{aligned}\text{Average area of parishes} &= 1971.91 / 554 \\ &= 3.56 \text{ sq. miles}\end{aligned}$$

$$\begin{aligned}\text{Average perimeter} &= 6 * \sqrt{3.56} \\ &= 11.32 \text{ miles}\end{aligned}$$

$$\begin{aligned}\text{Total boundary length} &= 11.32 * 554 / 2 \\ &= 3135.64 \text{ miles}\end{aligned}$$

(divided by factor of 2 since each boundary has been counted twice)

The area of the hundred metre boundary zone was then calculated:

since 1 metre = 1.094 yards
and 1 mile = 1760 yards

$$100 \text{ metres} = 100 * 1.094 / 1760 \\ = 0.06216 \text{ miles}$$

Therefore the area of boundary zone

$$= 3135.64 * 0.06216 \\ = 194.91 \text{ sq. miles}$$

the proportion of the total area taken up by the boundary zone

$$= 194.91 / 1971.91 \\ = 0.099 (9.9\%)$$

Assuming that this figure, for the worst case, holds true for the whole sample, the number of burials within the hundred metre boundary zone, assuming randomness (i.e. a normal distribution) was calculated as follows:

sample size, $n = 754$
proportion on boundary, $p = 0.1 (10\%)$

i.e. rounding up the above figure of 9.9%
then there is a probability of 99% that the number of boundary burials lies in the range:

$$p^*n + 2.58 * \sqrt{n * p * (1-p)} = 75 \pm 21$$

APPENDIX 2

Statistical test for difference between proportions of burials on boundaries before and after A.D. 600

number on boundary after 600,
 $x(1) = 23$

test for difference (assuming normal distribution)
since $n(1)$ and $n(2) > 30$

total number after 600,

$n(1) = 93$

proportion $p(1) = x(1)/n(1) = 0.2473$

$$z = p(1) - p(2) / \sqrt{p(1-p)(1/n(1) + 1/n(2))}$$

$$\text{where } p = (x(1) + x(2)) / (n(1) + n(2)) \\ = 2.089$$

number on boundary before 600,

$x(2) = 9$

since this is > 1.96 the probability is less than 5%
that the difference is due to random effects.

total number before 600,

$n(2) = 75$

proportion $p(2) = x(2)/n(2) = 0.12$

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