

Durham E-Theses

The archaeological evidence of the Hwiccian area

M.E. Wilson

How to cite:

Wilson, M.E. (1972) The archaeological evidence of the Hwiccian area. Doctoral thesis, Durham University.

Use policy

The full-text may be used and/or reproduced, and given to third parties in any format or medium, without prior permission or charge, for personal research or study, educational, or not-for-profit purposes provided that:

- a full bibliographic reference is made to the original source
- a <https://etheses.durham.ac.uk/id/eprint/7457/> is made to the metadata record in Durham E-Theses
- the full-text is not changed in any way

The full-text must not be sold in any format or medium without the formal permission of the copyright holders.

Please consult the [full Durham E-Theses policy](#) for further details.

THE ARCHAEOLOGICAL EVIDENCE OF THE HWICCIAN AREA

M. E. WILSON

A thesis presented for the degree of Ph.D.

1972

The copyright of this thesis rests with the author.
No quotation from it should be published without
his prior written consent and information derived
from it should be acknowledged.

ABSTRACT

The Hwicce, assessed at 7,000 hides (C.S.297), are probably one of the best documented representatives of the early Anglo-Saxon tribal groups which settled in England. They never had the political power wielded by the major kingdoms but were important enough to have their own bishop whose parochia preserved the tribe's territorial extent within the modern counties of Warwickshire, Worcestershire and Gloucestershire. I have used material from the pagan Anglo-Saxon burials in the West Midlands, together with saucer and applied brooches and small-long brooches from other parts of England, for the detailed analyses in this study.

The classification of archaeological objects is frequently by uncorroborated typologies which are based upon imprecisely specified criteria. I have used cluster analysis methods in this examination and have produced four typologies which I have then used as checks on the validity of extant ones. My results, based upon the constant consideration of many specified attributes, are substantiated by several analyses. The illustrations, mapping of distributions and lists of key diagnostic features make my typologies simpler to use than earlier ones.

From the brooch typologies it is possible to see trading and possible cultural patterns within England and this has been used to show that the pagan Anglo-Saxon peoples of the West Midlands had the closest affinities with Middle Anglia. A brief examination of place-names shows support for the links indicated by the archaeological evidence although these are not supported by the historical sources. Where the documentary sources are vital, however, is in the delimitation of the territory used in this study, the kingdom of the Hwicce, which has been shown in this work to have had distinctive material possessions.

The Archaeological Evidence of the Hwiccian Area

| <u>Contents</u> | <u>Page</u> |
|--|-------------|
| List of Tables, Figures, Maps. | |
| Introduction. | i |
| Part I. The basis for the area chosen | I.1 |
| The physiographic regions | I.3 |
| Pre-Anglo-Saxon occupation | I.5 |
| Part II. The archaeological evidence. | |
| :1 The pagan cemeteries | II.1 |
| :2 The method of analysis of the data | II.12 |
| :3 The shield-boss sample | II.23 |
| :4 The saucer and applied brooch sample | II.41 |
| :5 The small-long brooch sample | II.81 |
| :6 The pottery sample | II.115 |
| :7 Conclusions drawn from the archaeological evidence | II.154 |
| Part III. Other evidence. | |
| :1 The documentary evidence | III.1 |
| :2 The relationship of the archaeological evidence to other sources | III.25 |
| :3 Conclusion | III.34 |
| Bibliography | |
| Appendix I The gazetteer of cemeteries | A.1 |
| Appendix Ia The table of contents of the cemeteries | A.19 |

Tables

Tables at the end of the book.

- I. The shield-boss sample.
- Ia. The shield-boss characteristic features.
- II. The saucer and applied brooch sample.
- IIa. The saucer and applied brooch characteristic features.
- III. The small-long brooch sample.
- IIIa. The small-long brooch sample characteristic features.
- IV. The pottery sample.
- IVa. The pottery sample characteristic features.
- V. The charters consulted.

Tables in the text.

| | |
|--|--------|
| Ib. Shield-bosses: 2 and 5 clusters. | II.28 |
| Ic. Shield-bosses: 7 clusters. | II.28 |
| Id. Shield-bosses: 10 clusters. | II.28 |
| Ie. Shield-bosses: 7 cluster dendrogram. | II.28 |
| IIb. Saucer and applied brooches: 2 clusters, dendrogram | II.52 |
| IIc. Saucer and applied brooches: 9 clusters | II.52 |
| IIId. Saucer and applied brooches: 17 clusters. | II.52 |
| IIIb. Small-long brooches: 3 clusters, dendrogram. | II.90 |
| IIIc. Small-long brooches: 8 clusters | II.90 |
| IIIId. Small-long brooches: 17 clusters | II.90 |
| IIIe. Small-long brooches: 12 clusters. | II.114 |
| IVb. Pottery: 3 clusters. | II.130 |
| IVc. Pottery: 6 clusters. | II.130 |
| IVd. Pottery: 17 clusters, dendrogram. | II.130 |
| IV. Phonological features (after Mills). | III.24 |

Figures.

| | <u>After Page</u> |
|--|-------------------|
| I. Burial rites. | II.7 |
| II. Burials according to their incidence in various geological formations. | II.10 |
| III. Shield-boss dimensions (histograms). | II.24 |
| IV. The Bidford-on-Avon, Wa., shield-boss. | II.25 |
| V. Shield-boss classification: fusion coefficient values. | II.25 |
| VI. Shield-boss types. | II.25 |
| VII. Saucer and applied brooches: matrix of differences. | II.45 |
| VIII. Saucer and applied brooches: associated features. | II.45 |
| IX. Saucer and applied brooches: West Midland Characteristics. | II.46 |
| X. Saucer and applied brooches: fusion coefficient values. | II.47 |
| XI. Small-long brooches: matrix of differences. | II.84 |
| XII. Small-long brooches: associated features. | II.84 |
| XIII. Small-long brooches: West Midland characteristics. | II.85 |
| XIV. Small-long brooches: fusion coefficient values. | II.86 |
| XV. Pottery: characteristic points. | II.117 |
| XVI. Pottery: important ratios (histograms). | II.124 |
| XVII. Pottery: ratio ranges for each cluster type. | II.125 |
| XVIII. Pottery: fusion coefficient values. | II.126 |
| XIX. The Tribal Hidage. | III.4 |
| XX. The status of the Hwiccian royal family. | III.6 |

Maps.

| | <u>After Page</u> |
|--|-------------------|
| I. Physiographic regions. | I.3 |
| II. The archaeological sites. | II.1 |
| IIIa-c. Shield-boss types: distributions. | II.28 |
| IVa-q. Saucer and applied brooch types: distributions. | II.52 |
| Va-q. Small-long brooch types: distributions. | II.90 |
| VIa-c. Pottery types: distributions. | II.130 |
| VII. Grants involving the Hwicce and their bishops. | III.10 |
| VIII. Place-name evidence. | III.18 |
| IX. Dialect bounds (after Mills). | III.22 |

ACKNOWLEDGEMENTS

My thanks are due to many people, but especially to the following:- my husband, for sharing the household chores; Dr. D.M.Greig, for considerable help, advice and interest in cluster analysis applications in archaeology; Dr. A.H.Hawkes, for referring me to various statistical methods; Mr. A.A.Young, for help with computer programs; Mr. P.A.Barker, for advice and interest in the archaeological problems I have been trying to solve; Mrs. J. Gibson, for typing this thesis; Mrs. M. Watson, for drawing the final copies of Maps II and VII; Miss J. Dobie, for drawing Fig. IV; and Professor R.J.Cramp, for allowing me to use the facilities of the Archaeology Department.

Abbreviations

| | |
|-----------------|--------------------------------------|
| <u>A.S.Ch.</u> | <u>Anglo-Saxon Chronicle.</u> |
| C.S. | Birch, <u>Cartularium Saxonicum.</u> |
| K. | Kemble, <u>Codex Diplomaticus.</u> |
| S. | Sawyer, <u>Anglo-Saxon Charters.</u> |
| Glos. | Gloucestershire. |
| Wa. | Warwickshire. |
| Wo. | Worcestershire. |
| <u>E.P.N.S.</u> | <u>English Place Name Society.</u> |

INTRODUCTION

The Anglo-Saxon period of English history saw major changes in the historical geography of this island and these began when the first pagan settlers arrived. English was introduced to replace Latin and the Celtic tongue and the habitation pattern we now know was probably gradually established. Our money, place-names, laws and system of government have their roots in this period and the obscurity of events in the fourth to seventh centuries provides a tantalizing puzzle which needs to be solved. It is my attempts to unravel some of these problems which form the major part of this study.

I have used archaeological material from the pagan Anglo-Saxon cemeteries of the West Midlands (Warwickshire, Worcestershire and Gloucestershire) as data to determine the variability of material possessions regionally within the area and I have suggested a method which may then be used to show burials of warrior groups rather than family communities, cemeteries of the wealthy and the poor, and cemeteries with predominantly one cultural group rather than another. (These uses of pagan Anglo-Saxon burial material are referred to by Alcock, 1971: 147). The West Midlands are geographically interesting for such a study as the Celtic population may have remained in sizeable numbers while the cultural links of the Anglo-Saxon settlers there have been the subject of many theories. It is assumed that the original migrants were the Hwicce, a tribe known later from documentary sources, whose secular, political boundaries may have been fossilized in the diocese of Worcester. Four common artifacts, the shield-bosses, the saucer and applied brooches, the small-long brooches and the pots have been analysed to cluster objects with the greatest number of similar

features together in one group, or type, and this has resulted in the four typologies I give in Part II. In some cases the significance of these types may be chronological, as with shield-bosses (Part II:29ff), in other cases the types may be geographical, as with saucer and applied brooches (Part II:53ff), in either event they will provide an important key to the understanding of pagan Anglo-Saxon sites. It is the geographical aspect which I have used to show the migration route the Hwicce probably took in England in order to settle in the West Midlands, for the overwhelming evidence points to a Middle Anglian origin rather than a West Saxon one.

The archaeological material has been processed with the aid of a cluster analysis program, CLUSTAN 1A, six options of which have been used for each assemblage. The results thus obtained for each type have been correlated and presented in tabular form, since the acceptability of the typologies rests on the degree of agreement there is between the six. Each type is also discussed and its form and distribution illustrated.

Having mapped the distribution of the brooch types (Part II) the cultural links between the West Midlands and Middle Anglia are clearly seen and so the literary sources and place-name evidence are examined briefly (Part III) in order to see whether they support or contradict my results. The place-name and dialect evidence does agree with the archaeological distributions, but the written historical sources give only a shadowy picture which does not seem to support the other evidence. The data seems, therefore, to be more in agreement with a Middle Anglian link than with affinities elsewhere.

It is hoped that the use such computer analyses can be to the

archaeologist in sorting large quantities of data will be seen from this work. When data banks become more widespread (the pioneer work in this line now being done at Birmingham University is to be applauded) the production of similar typologies will be much easier and the samples used may be more widespread, but as the samples used for the brooch typologies were selected at random, the results may be accepted for use outside the West Midlands. The shield-boss typology and the pottery sample might be peculiar to the West Midlands, whence all the sample came, but this must be studied further. From the typologies produced it should be simple to classify any object not included in the original sample for all the characteristics for each type are listed. The value of such standardised criteria should mean that distribution maps can be produced for other areas and that eventually it may be possible to map the whole of the English evidence and so determine reliable cultural regions.

PART I. THE BASIS FOR THE AREA CHOSEN

Among the Germanic migrants to Britain in the early Anglo-Saxon era were several small tribal groups among which the Hwicce are frequently singled out as representative and who will be discussed more fully in Part III. Once settled, local administrative units were established although in the period of instability following the end of Roman rule such territories were more likely to be defined by frontiers than by boundaries. Boundaries are not known for the pagan period of Anglo-Saxon settlement when we have no documentary evidence to help illumine the material remains found with burials (Part II: 1) and it is not surprising that our first definition of a Hwiccian area is ecclesiastical (Part III: 13). The establishment of a diocese for the Hwicce was part of the Theodoran ecclesiastical reforms, (Stenton, 1947: 134) which gave bishops to many of the minor kingdoms (e.g. Lindsey, Magonsaete, Middle Angles) and thus it might be assumed that the ecclesiastical bounds so defined reflected the older bounds of the secular folk-groups they were to serve. There was to be one bishop per tribe. The Hwiccian diocese was centred on Worcester (S.1254 of 721-43; S.1255 of 774) and included land in the modern counties of Gloucestershire, Warwickshire and Worcestershire and although the precise bounds were not recorded at this date the charters granted by or donated to the bishops of the Hwicce indicate the bishops' sphere of influence in the area and may be used to help define the diocese. The boundary used on the maps throughout this thesis is thus based primarily on the charters relating to Worcester (Map VII) but is supported on the south-east by place-name studies (M. Gelling, 1953: I, xxix and Part III: 18); on the west by Bishop Athelstan's boundary (c. 1012-56,

S.1561, Finberg, 1961: 225-7) endeavouring to settle boundary disputes between the Hwicce and the Magonsaete; on its peculiar route through Warwickshire by place-names (e.g. Martimow in Radway has a mercna mere referring to the Mercian/Hwiccian border -S.773 and 969; Tachbrook (taecele broc, boundary brook, S.967 of 1033) on the border of the dioceses of Lichfield and Worcester). Physical features, such as the Bristol Avon in the south and the Arden watershed across the Midland Plateau, are also used. That the original diocesan boundary was coincident with the secular folk-boundary is generally accepted (Earle and Plummer, 1896, ii: 246; Finberg, 1961: 180, where he suggests that the diocese of Worcester until 1541 perpetuated the pre-Danish administrative unit of the Hwicce; Smith, 1965a: 59, who accepts the diocesan bounds recorded in the Taxatio Ecclesiastica of 1291). Having examined the evidence I find no good reason to reject the boundary as given on the O.S. map of Monastic Britain (South Sheet, 1954) as being substantially that of the Anglo-Saxon Worcester diocese and thus also of the Hwicce in the late seventh century. The niceties of the border are not important for this thesis but what is of more significance is that in the West Midlands we have comparatively early evidence for the definition of a tribal unit and its territory, a territory which escaped wholesale destruction of documentary evidence during the Danish raids and, despite its tribal rulers losing political power (Part III), whose separate identity was not destroyed by the influx of Scandinavian settlers from the ninth century onwards (S.1352 of 985). This area therefore provides a more convincing background than any other against which to measure the effectiveness of the analysis I am attempting in Part II which forms the major part of my original work.

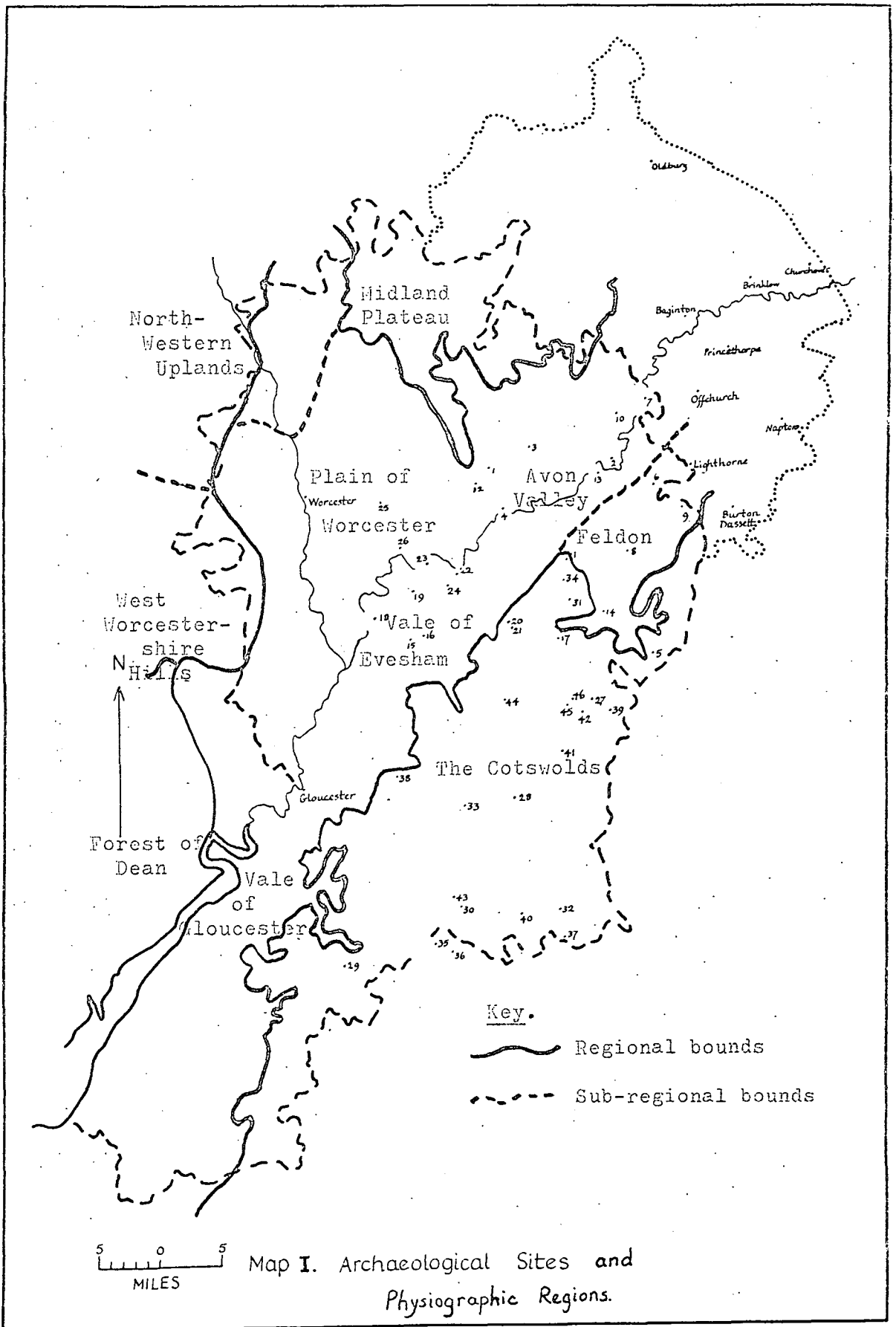
In considering the archaeological evidence for the period from the fifth to the seventh centuries, when it is acknowledged that the borders were probably not very clearly defined, I have nevertheless used the cemeteries within the later Hwiccian diocese as being those most likely to be typical of the settlers and it is their evidence that I have considered in Part II, where I suggest a means of measuring the strength of links between areas, using artifacts from burials, and also a method for isolating the characteristics of a small assemblage to define local groups. It should be stressed that although the examples cited here are based upon Anglo-Saxon material the methods discussed can be applied equally well to material from any period.

Having accepted an area which can be defined politically by the seventh century it is necessary to consider briefly the variations in its physical make-up and note earlier occupation of the area although whether the political unit was created by the Anglo-Saxons or was adopted by them from a previous culture need not concern us here.

The Physiographic Regions

The West Midlands, namely the modern counties of Worcestershire, Warwickshire and Gloucestershire, can be divided into four main physiographic regions (Map I). These four regions are:-

- a. The Cotswolds.
- b. The Midland Plateau.
- c. The Western Hills.
- d. The Severn-Avon Lowlands.



a. The Cotswolds.

This is a deeply dissected region, mainly at 600' - 800' O.D. but higher to the north and west where it rises to 1000' in some places. It slopes gently to the south-east but the western scarp edge gives a clearly defined boundary to the region.

b. The Midland Plateau.

North-east Worcestershire and north-west Warwickshire form the southern part of the Midland Plateau which has steep scarps separating it from the surrounding lowland. It is mainly over 400' but rises at the scarps to 1000'+ in the south-east.

c. The Western Hills.

These hills are part of the Malvernian faultline and make a distinct physiographic region generally over 450' and rising to nearly 1400' in the Malverns themselves. They separate two less elevated, flatter areas: the Hereford Lowland and the Severn-Avon Lowlands.

d. The Severn-Avon Lowlands.

The fluviatile terraces of the Severn-Avon drainage system give local areas of better-drained soils in a region which has predominantly clay soils. The gently undulating relief is below 400' and estuarine lands in the Vale of Gloucester are frequently flooded.

This brief description of the West Midlands highlights the fact that there is a central lowland region surrounded by much higher regions. During the Anglo-Saxon period this central lowland was the heartland of the diocese of the Hwicce whose borders were generally located within the peripheral, higher lands: an apparent correlation of physiographic and cultural regions.

The pre-Anglo-Saxon settlement of the West Midlands

The valuable paper by Webster and Hobley (1964: 1-22) demonstrates clearly and concisely the density of settlement and constant attraction which the terraces of the Warwickshire Avon had for successive groups of pre-historic peoples. Many of the features shown on air-photographs were clearly mapped and discussed, but some possible post-Roman structures were not noted, for example P. Rahtz (1970: 137 ff.) has discovered an Anglo-Saxon long house at Hatton Rock among the crop-marks; nevertheless this lack of Saxon features is difficult to understand in a region which has continued to be settled in the post-Roman era. As Webster and Hobley state (p. 2)

"The map, even in its present form, leaves no doubt as to the amount of cultivable land along the Avon and in the West Midlands generally and its accessibility along the main rivers and their tributaries. The heavy subsoils of Keuper Marl and Boulder Clay occupy considerable patches, and these areas of thick natural woodland would have been avoided by the early settlers, while remaining a valuable source of food for the hunters of wild life. This is a quite different picture from the older conception of a vast tangle of 'damp oakwood forests' which blanketed much of the West Midlands (Fox, 1938: 55, 58), a description which has led to such general comments as 'the heavily wooded Midlands where pre-Roman occupation of any kind is likely to have been scanty or transient or both...' (Piggott, 1958: 13)" .

A similar survey of the Severn is being carried out (West Midlands Archaeological News Sheets, 1969, 1970, 1971) but has yet to be published. Nevertheless I understand from Mr. P. Barker that a comparable picture seems likely to emerge. Finally the long occupation of the Worcester area has been the subject of a recent volume of the Worcestershire

Archaeological Society Transactions (1968-9) and despite the paucity of evidence for certain periods it seems very probable that the Severn terraces were as attractive for early settlement as were those of the Avon.

In the pre-Anglo-Saxon period there is more evidence however (O.S. Roman Britain, 1964), as indeed is generally true for the rest of England, in particular for the period of the Roman occupation. For the student of the Anglo-Saxon period it is the legacy of the Roman occupation which is of particular significance as this was the setting into which the Anglo-Saxons came.

The Roman era

By c.75 A.D. the legionary fortress at Gloucester was abandoned and Caerleon was used as a base for attacks against the Silures and so it may be assumed that in the Severn-Avon Lowland conditions were peaceful enough for civilian settlement. Between 96 A.D. and 98 A.D. a new town was built at Gloucester for the civil settlement of discharged soldiers. It was slightly south of the Kingsholm legionary fortress on a small area of land a little higher than the surrounding marshes and became a centre for the Romanization of the surrounding region as traders were attracted, a ferry established at this first point upstream where it was also possible to bridge the Severn, and a port developed. Originally these functions were stimulated by the presence of the legionary fortress but by the end of the first century the civil administration was encouraging commerce (Frere, 1967: 125).

The Romans also had some form of settlement at Worcester but very little is known of its function, structures or even its name (Barker,

1968-9: 15ff.). However it was probably of some importance as it was the nodal point in the communication system. Droitwich and Alcester were also important civilian settlements. The former, which was occupied during the first century, developed as the civilian settlement on the south bank of the River Salwarpe, where natural brine springs emerge on the Keuper Marl, opposite the important fort of Dodderhill. The siting of small village settlements at Tiddington and Baginton on the Avon terraces is also noteworthy.

The prosperous tribal capital of the Dobunni at Cirencester, 17 miles away from Gloucester, in the Cotswolds, tended to eclipse Gloucester despite the difficulty of communication via the Cotswold scarp and by the fourth century may have been the capital of Britannia Prima. It was the earliest Roman town in the region, being founded before 54 A.D., and served both as a tribal capital and as a market town for a wide area, having many roads radiating from it.

Bath (Cunliffe, 1969) was probably founded shortly after Cirencester and was a smaller town and spa but it may have been outside the territory of the North Dobunni who were loyal to Rome. It was connected by road with the port and ferry town of Sea Mills which lay on a slope above the confluence of the River Trym and the Bristol Avon. Roman finds show that the town was occupied between the mid-first century A.D. and the fourth century. The Midland Plateau has produced many isolated finds and coins but present evidence suggests that it was sparsely settled by civilians.

Roads

The Roman occupation of the West Midlands led to the construction of a network of roads constructed in the first instance to allow troops

to be moved from one place to another quickly and to facilitate commerce (Margary, 1967: Map 12). The Watling Street, which left the Northampton Uplands to skirt the territory, crossed through woodlands on the eastern border of Warwickshire before turning westwards across the Midland Plateau and on through forests to Wroxeter. This road was probably built by 47 A.D. and being the main communication route for the invasion forces from London was used in the control of territory as far west as the Severn.

Consolidation of their control was possibly the reason the Fosse Way was built connecting the Western defences and probably this also was built by 47 A.D. It runs north-east from Bath across the Cotswolds, the Feldon and Dunsmore Heath before crossing the Watling Street and reaching Leicester and may have been constructed in several sections for civil purposes as Bath, Cirencester and Leicester appear to ante-date the Fosse route. The road from Bath to Sea Mills along the north bank of the Bristol Avon may also have been built by 49-52 A.D., during Scapula's fight against the Silures of South Wales, for this road was linked by ferry with the Monmouthshire bank of the Severn. The Rykniel Street protected the Watling Street and marked an advance from the Fosse whilst also connecting both roads. It crossed the Warwickshire Avon at Bidford-on-Avon where the river terraces on both banks gave dry access routes to the ford and continued north along the valley of the Arrow into the Midland Plateau region. In the Arrow valley the poorly constructed road base on the Keuper Marl would make this a difficult road to use in all but the driest weather. The Ermin Way and Akeman Street were also major communication arteries.

Minor roads, such as the White Way at Cirencester, branched off the

main routes and connected centres of varying importance. The major lines of communication were laid down by the mid-first century bringing early Romanizing influence to the whole territory. Many minor tracks have no doubt been lost, and we are unable to reconstruct the whole pattern of the communication system but Margary (1967) shows that the West Midland area was well served especially by roads linking the region with the south, the east and the north. The only known Roman road crossing of the Severn from the left bank was at Gloucester but contacts were established between the other regions of the West Midlands. Pre-Roman tracks were used, however, and these included river crossings further up the Severn (Barker, 1968-9: 10).

A strange gap in the known routeways is in the Avon valley which has been shown (Webster and Hobley, 1964) to be well populated since Neolithic times and it seems unlikely that no important road would follow the fertile river terraces where numerous stray Roman objects have been found. Boats travelled along navigable waterways and the whole of the Severn-Avon Lowland was accessible by this mode of transport which connected with the cross-country road system but perhaps the Avon served the local needs of the populace and, unlike the Severn, there was no need for a road to be built along its bank.

Christianity

Specific evidence for Christianity during the Roman period in the West Midlands is sparse but the general topic has been the subject of a useful review of the evidence from many sources (Barley and Hanson, 1968). Apart from York, London and possibly Colchester, Cirencester (Corinium) was the only town where we know Christianity existed in Britain by 312. Such paucity of evidence in a country regarded by the Romans as a

valuable source of wealth suggests that the Christian Church did not share that wealth in the early fourth century. By 360 paganism was restored in Cirencester and was referred to as the old religion (Barley and Hanson, 1968: 41). This implies that Christianity had almost totally replaced paganism and, although not confined to towns, the Christian religion drew its strongest support from such centres (Barley and Hanson, 1968: 4), where pagan shrines declined earlier than in the rural communities. Pagan temples, such as Woodeaton Oxon., Frilford, Berks., Yatton and Pagan's Hill, Somerset, were extended in the early fourth century and continued in use into the fifth century. To the west, the health resort with a large pagan temple, dedicated to Nodens, was built at Lydney, Glos., as late as 364+ while at Bath the temple of the goddess Sulis has produced evidence of late fourth century use. An educated, wealthy, villa-owning society became Christianised during the late fourth century but the effect this had on pagan worship is difficult to determine.

Evidence elsewhere shows that the normal administrative organisation in the late fourth century British church was based on an urbanised élite (Alcock, 1971: 133) and there is nothing to suggest that this was not so in the West Midlands. (Geoffrey of Monmouth (Thorpe, 1966: 193, 262), although of dubious authority, refers to Bishop Eldadus of Gloucester at the time of Hengist's invasion and also mentions that a Bishop of Gloucester was promoted to be Archbishop of London shortly after 542). Place-name evidence in the form eccles derived from the Primitive Welsh *eglés (church) occurs in Exhall, near Alcester, Wa., Exhall, near Coventry, Wa., and Eccleswall, near Ross, Heref. It is likely that the British church existed at these places (Part III:30f),

two of which were in the later Hwiccian diocese, and Gilbert (1968: 71 ff) thinks the foundation of a Christian centre at Deerhurst, Glos., also may date to this time. In general terms, what happened to the Church in the West Midlands during the late fifth to sixth centuries is not certain, but it is clear that during the fifth century the nature of Celtic Christianity changed from a diocesan organisation to a monastic one (Alcock, 1971: 134).

This break from Rome in religious organisation was paralleled in other spheres. Native tribal government and traditions modified slightly by the years of Roman influence replaced the centralised authority and in a study of penannular brooches, E. Fowler (1963: 134) comments

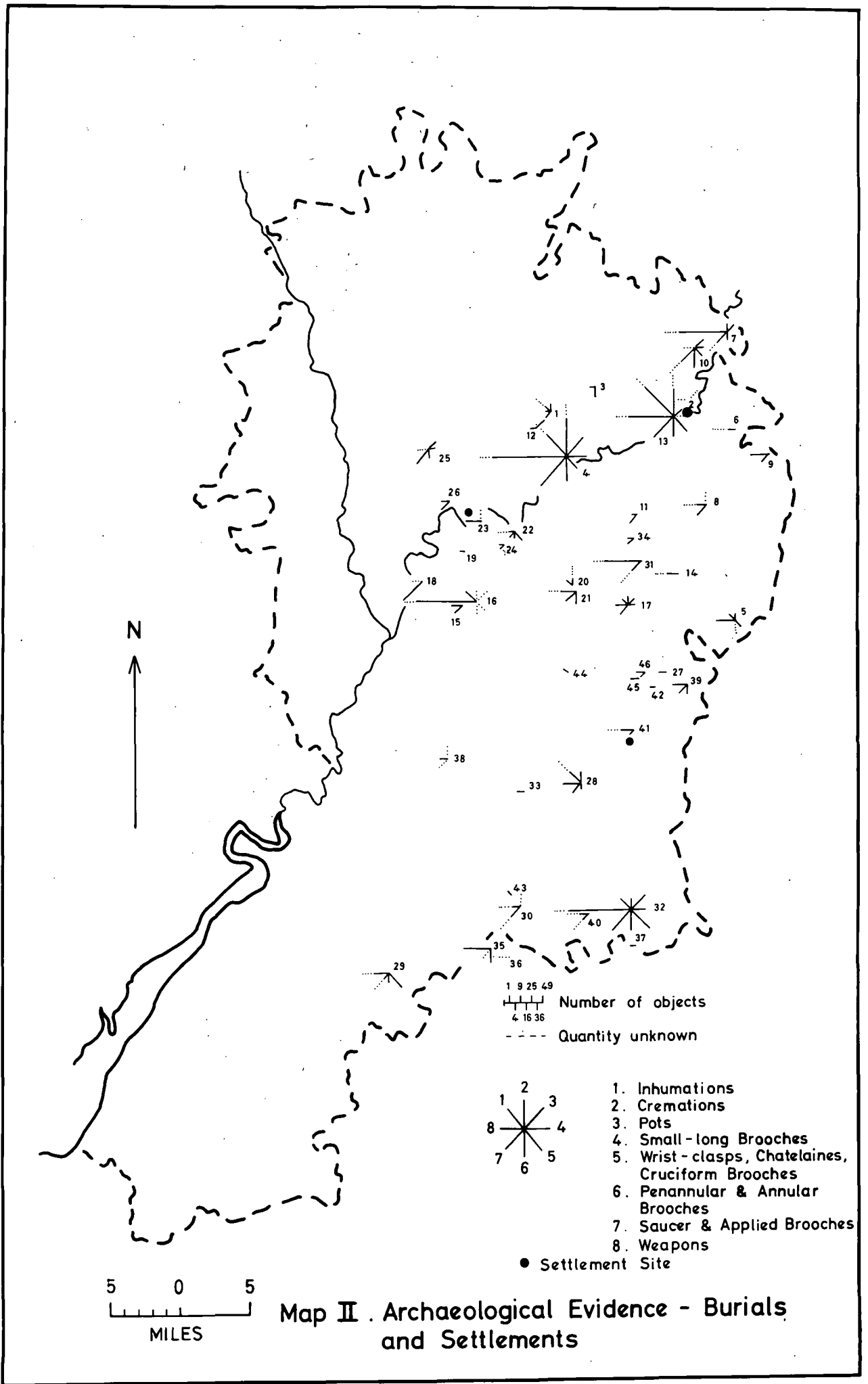
"the Romano-Britons of the late fourth and fifth centuries were by no means culturally or politically identical with those of the first and second. Basic changes had taken place: even the Army had adopted barbarian fashions, as well as leaders. The buckle types collected by Mrs. Chadwick Hawkes (Hawkes and Dunning, 1961: 1) remind us of this. It follows therefore that it is false to represent the Romano-British of the fifth century as totally unlike the Saxons. There were obvious political and religious differences but the cultural distinction may not be as real as one imagines. ... Fifth century conditions were not those of the late sixth or seventh centuries."

It is unfortunate that there is no overlap between the archaeological evidence from the fifth to seventh centuries, when the Anglo-Saxons can be distinguished as a distinct group by their material possessions, and the historical sources of the late seventh century with their references to the Hwicce tribe.

PART II: THE ARCHAEOLOGICAL EVIDENCE

1. The Pagan Cemeteries

Archaeological evidence provides our earliest records for Anglo-Saxon penetration into the West Midlands but this is almost entirely confined to burials and their associated grave-goods and it is for this reason that I have attempted an examination of the settlement of the area with a study of burial evidence. The gazetteer (Appendix I) provides a brief summary of each site, fuller references to each, with the exception of nos. 14, 23, 34, 44, being found in Meaney (1964), and the table of contents of the cemeteries (Appendix Ia) should be used in conjunction with this gazetteer for it provides concisely a list of types of objects. In this regional study I cannot redate every object as this would involve a wholesale analysis of almost all Anglo-Saxon objects. I have therefore given the dating according to excavators, and others, but few objects are finely dateable in this area. The gazetteer is also the key to the numbers given as reference to a cemetery within the text. To allow the spatial distribution of the sites to be seen, with quantitative variations in eight categories of significant objects, map II, should be examined for, from this, the ratio of any category to another and the total value of each can be seen in its regional setting. The structure of the cemetery groups will be considered first, using these categories, and the map is designed to show the character of each burial group relative to all the others in a quantitative and concise way. Individual objects, other than those classes discussed in the following chapters (Part II), are not stylistically considered, as they would have been had I been producing the classical corpus of grave-goods for the area, as the purpose of this



section of the work is to measure any regional variations in the grave-group assemblages and the siting of burial places within the territory.

It is frequently stated in cemetery reports that the absolute total of burials or objects is unknown for a variety of reasons and the following method is suggested as a means of using what evidence is available to show regional variations and trends and the character of one burial group relative to all the others. The evidence available (up to 1968) is plotted on map II and from this isoline maps may be drawn for each category of objects, but this crude use of absolute values does not solve the problem of regional variations and I suggest that this may be partially overcome by converting the absolute values into ratios. The ratio of each of the seven categories in relation to the number of inhumations shows variations in the proportion of goods from each category cemetery by cemetery. This ratio was selected as grave goods are more normal with inhumations than cremations but, of course, in those cases where the actual number of inhumations or objects is unknown no figures can be calculated, which complicates the picture although regional trends can still be seen clearly. When the actual value/^{range} is great this method is very useful in overcoming difficulties in assessing trends but actual values should be borne in mind when forming conclusions.

The only incidence of cremation exceeding inhumation was at Alcester, Wa. (1). Nearby, at Stratford-on-Avon, Wa. (13) and on the dip-slope at Hampnett, Glos. (28) there are half as many cremations as inhumations but elsewhere the ratio is below .2. Thus three clusters can be seen: between the Arrow and the Stour in the Avon valley (nos. 1, 2, 4, 13), where the highest proportion of cremation:inhumation

is found, along the Coln (nos. 28, 32), and a group stretching from the Cotswolds to Bredon Hill (nos. 5, 16, 17, 21) with very low ratios. Each of these groups is surrounded by an area with cemeteries with no cremation, for this was not a common rite in the West Midlands at this period.

As pottery is often barely commented upon in reports it is not always possible to distinguish between accessory vessels, cremation urns and domestic pots used for cremations and for this reason I have not divided the types - the incidence of pottery being of more importance in the present analysis. The pattern, therefore, is similar to the cremation one but the Avon group and the Cotswold group form one unit within which is an 'island' of known pottery around Meon Hill. The almost complete absence of pottery from most of the Cotswold region and the total lack of it in the south-eastern part of the territory around Stow-on-the-Wold should be noted. Pottery will be studied in more detail later in Part II .

Wrist-clasps, chatelaines and cruciform brooches are more commonly found in 'Anglian' areas than 'Saxon' ones (Leeds, 1911-2: 53; Leeds, 1913: 42ff, 68ff) and for that reason are counted together so that any place with a high ratio will be obvious and stand out as one with 'Anglian' influences. These objects occur in insignificant numbers in the territory but the Avon valley again has most of the examples although Fairford, Glos., (32) has a ratio not much less than Bidford-on-Avon, Wa. (4) while Blockley, Wo. (17) has the highest ratio. This latter shows the need to consider the actual values as there is in fact only one object at Blockley. As the ratios are low everywhere this category of objects does not support the suggestion of a strong 'Anglian' element in the population of the West Midlands or in any small part of it.

If small-long brooches are cheap copies of cruciform brooches they too may indicate links with the 'Anglian' areas and the Avon valley stands out clearly as a community of people using small-long brooches, with outliers at Beckford B, Wo. (16) and Blockley, Wo. (17). Fairford, Glos., (32) alone outside the main group has small-long brooches showing that although physically separated from most of the territory its cemetery again shares many characteristics with the more northern ones. A detailed study of these brooches is found later in Part II .

Penannular and annular brooches may indicate some degree of continuity in personal ornaments from the preceding cultures (Fowler, 1960; 1963: 118) but they are not relatively common in most of the territory. The Avon Valley group forms a major cluster and as was stated in Part I. 5, earlier culture groups were settled quite densely here. One different pattern seen from this distribution is the high incidence in the south of the Cotswold region - at Chavenage, Glos., (29) and Fairford, Glos., (32) with the ratio at Chavenage being higher than most of the other places. I suggest that the lack of pagan Anglo-Saxon evidence in the southern part of the territory could be explained by the presence of a strong group of Roman-British people, some of whom - or their racially mixed descendants - may be buried at Chavenage and Stretton-on-the-Fosse. The highest proportion of these brooches is found at Evesham, Wo., (22) in what is considered to be the land most densely settled by the Anglo-Saxons and although there are only two brooches here they do suggest an element of continuity of ideas in the Vale of Evesham. It should be noted that the highest ratios occur on the western edge of Anglo-Saxon burials, supporting the idea that an active Celtic community continued to exist in the western part of the West Midlands (see Part III).

Saucer and applied brooches, which will be discussed more fully later in Part II, show a curiously clear-cut division in the territory with the Avon Valley again emerging as a unit - Aston Cantlow, Wa. (3) has the highest proportion of all, +4.0. On the south-east lower dip-slope is another band of cemeteries with these brooches although some have very high ratios but between the two groups is an area with no examples. If these brooches are taken as an indicator of 'Saxon' influence these results are the reverse of what one would expect since the highest proportions are in the north of the territory.

A quite different pattern, and one which includes evidence from most cemeteries, is that of weapons (Map II), but excluding the ubiquitous knife which could also be a piece of domestic equipment. It should be noted that a man often had at least two pieces of equipment, a shield-boss and a spear, and so this ratio should be higher than in the other categories but in view of the lack of detailed information from so many cemeteries this might well be a useful category for indicating most clearly the different character of several burial groups: highest ratios show male dominated burial groups while the lowest ratios might belong to more settled communities with family units. The burials of males only had only one or two inhumations and might therefore be of warriors defending frontiers or conquering new lands but with the exceptions of Cirencester, Glos., (30), neighbouring Stratton, Glos., (43) and Alcester, Wa., (1) they do not occur near Roman towns - (Appendix I, nos. 1, 11, 18, 26, 30, 40, 42, 43). The possibly female only burials are also of three or less inhumations and occur in the Cotswolds (Appendix I, nos. 27, 33) or on the north bank of the Avon (Appendix I, nos. 3, 12) and it is difficult to find an explanation for these unless

communities of spinners or shepherdesses has scattered settlements, possibly for seasonal occupancy. The ratio of approximately half as many weapons as inhumations, which seems rather high in a mixed community, is found at Emscote, Wa., (7), Beckford A, Wo., (30), Blockley, Wo., (17) and Broadway Hill, Wo., (21) but as they are all small cemeteries of less than nine people they may well have been remnants of units established only a little while either before conversion to Christianity or before moving on to more desirable areas. Within the remaining burial groups both in the Avon Valley and on the Cotswold dip-slope weapons occur a third as often - or less - as the inhumations, suggesting a settled rather than a defensive community.

In conclusion, the area repeatedly emerging with a high ratio of objects to inhumations is the Avon Valley where the bodies are more often well equipped than in the smaller groups either away from the river or in the Cotswolds, with the exception of Fairford. This higher ratio may be explained if the Avon Valley settlers were wealthier than those elsewhere for they were living on agriculturally more attractive land than many of the other communities or, alternatively, these settlers may have been more tenaciously pagan than those elsewhere.

The following table, (Fig. I), shows the number of times each size group has been found for each rite.

| | size of the 46 cemeteries (inhumations, cremations) number of bodies | | | | | Total incidence of cemeteries with each rite |
|--|---|-----|------|-----|---------|--|
| | 0 | 1-3 | 4-14 | 15+ | unknown | |
| no. of times inhum. groups occur | 0 | 21 | 13 | 6 | 6 | 46 |
| no. of times crem. groups occur | 36 | 3 | 3 | 2 | 2 | 10 |
| Total no. of times crem. and inhum. occur in these groups | 0 | 21 | 12 | 7 | 6 | 46 |

Fig. I. Burial Rites

The commonest group of burials is three or less bodies while the second most common size of cemetery is the four to fourteen burial group. It is obvious that large cemeteries, the biggest in the area being Bidford-on-Avon, Wa., (4) with at least 227 recorded burials, are not the norm in the West Midlands but what the density of settlement was cannot be determined from this meagre evidence.

It has been stated above that both cremation and inhumation were practised in the West Midlands but there was also a form of partial cremation when the body was placed in the grave and then partly burned. Several reports (e.g. Appendix I: 4, 13, 32) record charcoal in the grave - of course, this may be carbonised remains of a coffin but many of the records report that this matter was around the hips only and Meaney (1964: 15-7) suggests that this was common in Mid Anglia, North Wessex and the Hwiccian territory - a pattern which will be seen to occur in the distribution of some brooch types. The orientation of the bodies is rarely noted in the earliest reports and I have therefore not

been able to use this as a basis for any conclusions.

The location of the cemeteries falls into three main groups which are, on the bounds of the modern parish but on the opposite side from the modern main community, on the bounds of the modern parish but near the modern main settlement, and those not on the bounds. Unfortunately, we do not have a single excavated village related to any of the cemeteries. Examples of burials in the first group are nos. 3, 6, 17, 20, 27, 33, 35, 36, 38, 40, 42, but the modern parochial units may possibly be subdivisions of earlier, larger units and the burials were made at a point conveniently sited for more than one small group of people. The settlement of Aston Cantlow, Wa., (3) is actually to the west of the burial at Pathlow, despite the parish name suggesting that it lay to the east of a more important centre, but Pathlow was the name of a hundred until 1316 (E.P.N.S. Wa. 1936: 230). The burials at Ready Token, Glos., (40) are more conveniently sited for a community using the Welsh Way than the modern parish centre of Poulton.

Very much the exception seems to be the incidence of burials within the parish and the best example is at Clopton, Wa., (11) which was of a single male. Probably, as far as it is possible to locate some burials, no others were so far from the parish bounds but in this instance the explanation may lie in the local topography as the burial is on Meon Hill which may have had some religious significance. Alternatively, this land was economically less productive than some near the parish bounds and so could be spared for burial purposes or the man could have been the victim of a raid and buried in haste at a suitably isolated spot.

In the third group of burials near to villages which are also near

the edge of the modern parish boundary are such cemeteries as Bidford-on-Avon, Wa., (4) and Fairford, Glos., (32) but also includes nos. 7, 10, 23, 24, 26, 37 and it should be noted that this category includes some of the largest cemeteries in the West Midlands. This fact immediately raises the question as to how much evidence has been lost through village expansion. Wyre Piddle, Wo., (26) and the recently discovered two bodies in Worcester Cathedral may show the continuity of land use for religious purposes and the Fladbury (23) burials may also support this for they are very near the modern rectory. The evidence seems to suggest that settlements and cemeteries were normally located adjacent to each other and this may be supported by excavations elsewhere (e.g. West Stow, Sf., - West, 1969: 19). As the first named group consists of small burial groups it is likely that they were merely a variant of the dominant pattern.

All the siting factors for individual burial groups are not studied because of the scanty information for many of the recorded burials but water availability and shelter divide the examples into two groups. Well-drained, alluvial soils along the river banks in the Avon Valley and the Vale of Evesham are characteristic of cemetery sites in the Severn-Avon Lowland but on the Cotswold dip-slope the burials are in sheltered river valleys with accessibility to water and protection from the elements. Such factors would be important if the settlement was adjacent to the cemetery.

The distribution of burials shows a markedly south-eastern distribution - all known ones being in the east of the Severn-Avon Lowland (except for the newly discovered two bodies under Worcester Cathedral (conversation - Mr. P. Barker)) and the Cotswolds.

| Geological formation | Keuper Marl | Alluvium | Lias | Oolite |
|--|-------------|----------|------|--------|
| Total no. of burials | 0 | 490+ | 280+ | 53+ |
| No. of cemeteries (inc. single burials) | 0 | 15 | 24 | 7 |

Fig. II. Burials according to their incidence in various geological formations.

The above figure shows that none is found on the Keuper Marl but more than 490 burials in fifteen burial groups are sited on the alluvial soils along the Warwickshire Avon or the Coln-Thames rivers. Two hundred and eighty or more are found in twenty four burial groups on the Lias, while only fifty three, in seven burial groups, are found on the Oolite. The cemeteries sited on the alluvium are, on average, much larger than those on other geological formations, e.g. Fairford, Glos., (32), Bidford-on-Avon, Wa., (4), and Stratford-on-Avon, Wa., (13). Although Beckford B., Wo., with possibly more than one hundred and thirty-one burials, is on the Lias most other sites on the Lias have less than a dozen burials and the burial groups found on the Oolite are usually small, too. Small groups are the norm in the West Midlands (Figure I) but when considering the area covered by each geological formation the above figure shows the importance of the relatively small area of alluvium especially when compared with the large amount of Keuper Marl (which is mainly in the north-west of the West Midlands). The Oolite, too, was avoided in favour of the alluvium. It seems likely that the burials were sited on good land rather than agriculturally difficult soil and, except where alluvium is only in very small patches, this might be what to expect if the cemeteries and settlements were sited close together

as I have just suggested. As we have said the major problem of the early Anglo-Saxon period in the West Midlands can be seen clearly in map II: namely the distribution of the pagan burials with its clear emphasis on the Avon Valley and the Cotswolds. Having considered the soils could another partial explanation for this be found in the distribution of Keuper Marl which soils would not favour the preservation of bodies?

After this brief description of the type of evidence available for study from the pagan Anglo-Saxon period in the West Midlands, together with a few conclusions which may be drawn from it, four common classes of objects are now examined in greater detail and a typology is suggested for each. In order that undue repetition is avoided, a short explanation of the method of analysis I have used for all four classes of artifacts is given before the typologies are discussed.

2. The Method of Analysis of the Data

Once archaeological material has been found and preserved a fundamental need is to compare and contrast it with similar known examples in order to discover, if possible, its relationships in time and space. For the interpretation of archaeological evidence classification schemes are therefore vital and, ideally, such schemes should be quickly and easily used. All classifications should be produced by a system which allows others to repeat the experiments, with different data if needs be, and arrive at the same conclusions and such a scientific approach to typologies, which is generally absent from current Anglo-Saxon studies, may well help to shed light on the Dark Ages. I have used material from the pagan Anglo-Saxon period burials, mainly from the West Midlands, in order to test the validity of two numerical approaches to classification when applied to archaeological evidence.

The most subjective part of any analysis is the selection of suitable criteria for these must be relevant, unambiguous and therefore both measurable and easily identifiable. Unnecessary detail which merely repeats other evidence should be avoided. I have processed four distinctive and quite different types of evidence and the criteria, or most significant characteristics, for each are listed in full (fold out pages at the end: shield-bosses, Table Ia; saucer and applied brooches, Table IIa; small-long brooches, Table IIIa; pottery, Table IVa). For all the samples the criteria chosen include features sometimes used as diagnostic features in the work of other archaeologists and these features are recorded as a chain of presence/absence attributes for each object. It should be noted that even actual measurements have been recorded in

this manner by subdividing the total range of values according to its mean and standard deviation (e.g. shield-bosses, Table Ia; pottery, Table IVa) thereby producing significant sub-sets within the range of values. It is possible to select the actual measurements of objects and record the continuously variable features for a numerical analysis (Hodson, 1970: 304) but this approach did not seem suitable for a trial examination including many decorative features. It is however possible to describe many decorative features by characteristic angle values should numerical data be preferred.

Actual measurements in the following typologies are in inches rather than millimetres for three main reasons, which are: the collection of the data and its analysis has taken several years and was begun before metrification was in vogue, the millimetre values might give an impression of an unrealistic precision to measurements of objects which are generally extremely badly corroded or distorted by earth pressures during at least thirteen centuries of burial, and, on a personal level, I am not convinced that an artificial unit of measurement, created in post-Revolutionary France, has as much significance to a study of size ranges found in various types of pagan Anglo-Saxon objects from England as has an ancient English measurement. The classifications are in no way affected by the unit of measurement used.

Because of their sizes the four samples provide a valuable test of the feasibility of a classification method with a small sample with few attributes (58 shield-bosses with 21 attributes), a small sample with many attributes (128 pots with 70 attributes), and large samples with few attributes (296 saucer and applied brooches with 26 attributes, 431 small-long brooches with 22 attributes). The shield-boss sample and the pottery

sample were collected in the West Midlands. The two brooch type samples include most of the examples from the West Midlands together with those in the Ashmolean Museum, Oxford, the Museum of Archaeology and Ethnology, Cambridge, the British Museum and some examples from small, local museums elsewhere in order to give a wide range both in area and type of brooch. The distributions of the brooch samples include the two major regions from whence the Hwicce may have migrated, Wessex and Middle Anglia, and are therefore valid measures for a test of cultural affinities within England. While none of the samples has any pretensions to being exhaustive their size and distribution patterns are considered sufficient to qualify them for use as random samples for classification purposes. They may reasonably be thought of as representative of their total populations.

My first analysis was based on a simple χ^2 test (Hoel, 1962: 244). From this test, which measures the degree of association between every two pairs of values, significant associations are found, and discussed, for the two brooch samples (Figs. VII, XI, and Part II: 42 and 82). Having found significant associated features for the total population I then wished to discover which associated features were peculiar to, and which were rarely found in, the West Midlands and used the "exact test of independence" (Kendall and Stuart, 1961: 549ff.) to obtain this (Figs. IX, XIII).

The χ^2 method may be of use to those without sophisticated machines available to aid them but the computer provides a means of using much more powerful methods of analysis because of its vastly superior storage facilities. I have taken advantage of this by using the CLUSTAN 1A package (Wishart, 1969) to sort my four samples.

Assuming that all attributes in each sample have an equal weighting, i.e. no one feature is more important than any other, the key to any classification is the method by which the degree of difference, or distance, between any two objects in the sample can be defined so that those objects most alike are grouped together, or clustered. The best way of grouping objects has received much interest in other disciplines (Cormack, 1971: 321) and Wishart (1970: 173) states that "the current exploratory stage of numerical taxonomy requires a comparative approach which makes use of several methods, if the species (or artifact) groupings are to be demonstrated as (archaeological) entities and not just artifacts of the particular method employed." I have, therefore, analysed my data in various ways and then correlated the results from each (Tables Ib-d; IIb-d; IIIb-e; IVb-d) in order that the validity of each grouping may be seen. Where there is no correlation the individual groupings of various methods have no validity.

The methods I have used are more fully described in Wishart (1969) but are briefly discussed here so that the reader may see the differences between them.

1. Fusion process. a. HIERAR. Each object forms its own cluster initially. From the set of measurements showing the degree of difference between each pair of objects, e.g. A,B,C,D, the two most like objects, e.g. A,B, are fused into one cluster e.g. (AB). Then the degree of difference between each cluster is again measured and the two most like are fused e.g. if (AB) to C is the most like these become (ABC) but if C is most like D these fuse to (CD). At each fusion there is one less cluster until the required number of clusters is reached. The degree of difference between each cluster immediately before fusion is recorded, (Figs. V, X, XIV, XVIII), and so any marked breaks in these values can be

seen. It is at these breaks that significant cluster groupings are most likely to be found. There is little variance between individuals within any of the tightly knit groups.

1.b. k-linkage, MODE. This second fusion method begins by assigning to each object a number which is a measure of how densely the object is surrounded by other objects in multidimensional space. It then builds up a classification by introducing the objects in order of density, those objects most densely surrounded by other objects being introduced first. Each object introduced may be fused with one of the clusters already established, become the starting point of a new cluster, or may act as a link to fuse two existing clusters, according to its distance in multidimensional space from the objects already introduced.

It should be noted that in both fusion methods once an object has been assigned to a cluster it is unable to move out of it to any other even though the character of each cluster changes with each addition.

2. Division process. DIVIDE. The total sample is examined to find which attribute most clearly differentiates the data which is then divided into two parts according to the presence or absence of the critical feature. The likeness between the two parts of the sample is measured. This process is repeated, with each part being formed into clusters, according to the presence or absence of a feature which is significant for that particular set of data, until the required number of clusters has been formed. As with the two fusion methods once an object has been assigned to a particular cluster it cannot be moved.

3. Iterative relocation, RELOC. It has been noted that a major problem associated with both fusion methods and the division method is the

possibility of making a poor allocation early in the clustering process which cannot then be altered. RELOC attempts to overcome this difficulty. Data is given either in partly sorted groups or as random groupings and these clusters are tested. Each object in turn is measured to test to which cluster it is most closely related and is moved if necessary several times until all objects are in the most suitable clusters. It should be noted that it is possible to perform a clustering process by using only RELOC, with several different initial clusterings, rather than by using several other methods.

Having outlined the methods used, which include all the procedures commonly used to find clusters (Cormack, 1971: 330), it is appropriate here to point out some of the problems encountered in order that anyone considering using the methods may know some pitfalls to avoid. The first consideration should be sample size for a small sample with many attributes is as greedy of computer time as is a large sample with a few attributes (e.g. 128 pots x 70 attributes and 296 saucer and applied brooches x 26 attributes require similarity matrices of comparable sizes). In fact it was found necessary to use the largest store available, Class F, for all the samples although the shield-bosses could be analysed in a smaller store for all but RELOC. For experimental work on the methods, on the options available and on the feasibility of the criteria selected the shield-bosses proved an ideal sized sample (58 objects x 21 attributes) as it allowed quick checks on the time needed for every process, the number of lines required for the print-out of every procedure and the accuracy of the job control cards. In order that future users may benefit from these experiments examples of the times taken and the print-out for various procedures is given below:

| <u>sample</u> | <u>procedure</u> | <u>time (working)</u> | <u>time (total time)</u> | <u>lines</u> |
|---------------|------------------|-----------------------|--------------------------|--------------|
| shields | RELOC. | 14.23 secs. | 4 min. 15.06 secs. | 8,227 |
| " | DIVIDE (ii) | 10.36 secs. | | |
| pots | RELOC. | 1 min. 27.70 secs. | 6 min. 31.85 secs. | 7,331 |
| " | DIVIDE (iii) | 1 min. 92.49 secs. | 6 min. 14.66 secs. | 6,509 |

Once this information has been obtained it is possible to estimate the approximate number of lines and time required for each method for other samples as well as the store size needed (this increases in proportion to the square both of the number of objects and of the number of features considered). If the sample size is very large, as was so for the small-long brooches, (431 x 22), it was found necessary either to divide the sample into smaller sub-groups or to run some of the programs in several parts. This in turn presented more problems as samples analysed from different starting points did not necessarily arrive at the same conclusion (Table IIIe).

The data has been analysed by two fusion methods, by the divisive method and by an iterative relocation process and for each of these a suitable program option had to be chosen. I selected the options after considering the results of experiments by Crawford, Wishart and Campbell (1970) and list them here together with references to the discussion of the merits and problems of different techniques given by Cormack (1971):

1.a. Fusion. HIERAR using Ward's method (Wishart, 1969: 38; Cormack, 1971: 332). The results obtained from this procedure varied only a little from those of RELOC and gave a useful dendrogram from which very closely related objects could be seen.

1.b. MODE (Wishart, 1969: 31; Cormack, 1971: 331-2, 340-1). This requires that k-linkage lists be stored for each data set and the samples I used needed the following:

- 8k for the small-long brooches,
- 6k for the saucer and applied brooches and the pots,
- 5k for the shield-bosses.

Unfortunately, I was not able to have the scatter diagram print-out as the Newcastle computer did not then have the necessary equipment and so much of the value of this program has no doubt been missed. The MODE results were used as initial arrays for RELOC for both brooch samples but only produced 2 and 3 clusters for the shield-bosses and the pots, which may indicate that these samples had two or three 'natural' groupings only.

2. Division. (Wishart, 1969: 53)

- (i) Association analysis using sum χ^2 (Cormack, 1971: 335, 344),
- (ii) Group analysis with interaction statistic (Cormack, 1971: 335, 344),
- (iii) Information analysis (Cormack, 1971: 335, 345).

To avoid lengthy repetitions of the names of these methods I have used the above Roman numerals in the text. These procedures give very quick techniques for the examination of a set of data and may be recommended for a rapid trial run to test the validity of the criteria selected and to establish that there are in fact clusters in the data set. Because of the trapping of an object in one cluster early in the division process the results are rather crude but if several division methods produce similar results the more lengthy cluster analysis programs may be used in an attempt to refine the groupings. Option (ii) proved to be less satisfactory than the other options when correlated with RELOC.

3. Iterative relocation. (Wishart, 1969:45; Cormack, 1971:333-4,344). The initial arrays, for all samples, were partially sorted by the HIERAR program since such arrays may need less computer time than random classifications (Wishart, 1969: 45) but Wishart has performed several trial runs on RELOC and has apparently "found that the procedure converged more rapidly, and to the optimal solution, from an extremely bad initial value than from a nearly optimal one" (Cormack, 1971: 334 with reference to Wishart's Ph.D. thesis, St. Andrews, 1971). RELOC was then performed on arrays produced by other methods: DIVIDE (i) for shield-bosses, MODE for both brooch data sets and a random grouping for pots. It has been found (Tables Ib-d; IIb-d; IIIb-d; IVb-d) that all methods produce clusters by RELOC which can be correlated fairly well with RELOC on HIERAR. The effectiveness of random groupings for the initial data enhances the claims of RELOC to be considered as the main tool for archaeological classifications, especially where the data set is not too big.

An essential part of the cluster analysis process has been the correlation of the results produced by the various methods (Tables Ib-d; IIb-d; IIIb-e; IVb-d). If the results are well supported the classification is acceptable but if there is not much correlation between the various results the classification must be rejected. Once a scheme has proved successful the resultant typology should be simple enough to allow it to be used by others without resorting to further computer sorting every time new material is discovered. Because of the number of variables to be considered for each sample no two programs can be expected to produce identical results for each cluster. This fact makes suspect typologies produced by only one method, as is the case with the traditional one of hopefully inspired intuition (Leeds, 1911-12, 1945,

Myres, 1969). Even Hodson has not correlated the results obtained from different methods of cluster analysis (Hodson, 1970) but he had the advantage in his prehistoric material of a well stratified context to aid in the interpretation of results. The greater the number of clusters the more precisely can significant criteria be shown. Both RELOC runs produced the same clusters for 10 - 2 clusters of shield-bosses while the saucer and applied brooch RELOC results agreed at two clusters, disagreed for three, four and five before producing identical results for six clusters after which they diverged again until eleven clusters when again many of them were the same. This merging and diverging continued as the number of clusters increased. Only a very low level of correlation was possible between clusters produced by all the techniques when the two RELOC runs disagreed which point highlights the need for the careful choice of significant cluster levels.

Although the degree of agreement between the various methods will be commented on for each cluster in the results section which follows it should be noted here that some clusters show a very high degree of support between the methods (e.g. Tables Ic: RELOC 7; IIId: RELOC 1,2,4, 10,12,13; IIIId: RELOC 9, 16,17; IVd: RELOC 3,10,12,16). From this evidence the DIVIDE procedures do not seem to obscure the significant characteristics of each cluster. When, however, there is any lack of correlation it is generally due to the inflexibility of DIVIDE (e.g. Tables Ic: RELOC 1,2,4; IIId: RELOC 3,7,8,14; IIIId: RELOC 1,14; IVd: RELOC 2,14,15), which stresses the need for caution when divisive techniques are used.

When the χ^2 method is compared with the cluster analysis

techniques two important facts emerge: the χ^2 method is extremely laborious, although not difficult, to perform and its results are not so precise as those of the cluster analysis systems. These two points rule out the use of any system relying purely on the analysis of single or associated pairs of features in any typology which is proposed to aid modern archaeological research and they also underline the dangers inherent in any of the traditional classifications which were frequently based on unspecified criteria (e.g. Leeds, 1911-12, 1945; Myres, 1969; Evison, 1963).

The following sections present my results in detail for each of the four samples used and note what degree of correlation there is between my typologies and those of others. In the saucer and applied brooch sample, at 9 clusters, and in the small-long brooch sample, at 8 clusters, I have also indicated which types were found by χ^2 .

The use of the cluster characteristic tables

(Tables Ib-d; IIb-d; IIIb-e; IVb-d).

1. The numbers across the top of the columns refer to the features used in the analysis (Tables Ia, IIa, IIIa, IVa).
2. The CLUSTAN 1A program and its cluster number are recorded down the left-hand side of the tables.
3. The ratios are the frequency of a feature in that cluster divided by the frequency of that feature in the total population which gives the significant features for the various clusters rather than the most common ones in the total population. The use of this ratio avoids problems which arise if too much reliance is placed on actual values in a sample.

4. The ratios may be seen to vary in the results obtained by different techniques e.g. being greater than 3.00 for some methods but between 2.00 and 2.99 for others. The expected ratio, if the incidence of a feature were the same as the incidence in the total population, is 1.00 and, therefore, anything greater than 2.00 occurs much more frequently in a cluster than it does in the whole sample or than it would purely by chance. In practice, the ratio of less than .50 generally indicates that a feature never, or extremely rarely, occurs. There is usually a large break in the ratio values from 0.00 to (approx.) .70 but .50 was chosen to indicate rare features rather than 0.00 because some insignificant features have an incidence ratio of .08 or .10 and I thought these should be marked as negative features.

5. * indicates a ratio greater than 3.00
 + indicates a ratio between 2.00 and 2.99
 \ indicates a ratio of less than .50
 ▣ indicates 100% presence of a feature.
 ▢ indicates 66 - 99% presence of a feature.

} positive features

} negative features

Where there is a blank space on the tables the feature may or may not be present in that cluster.

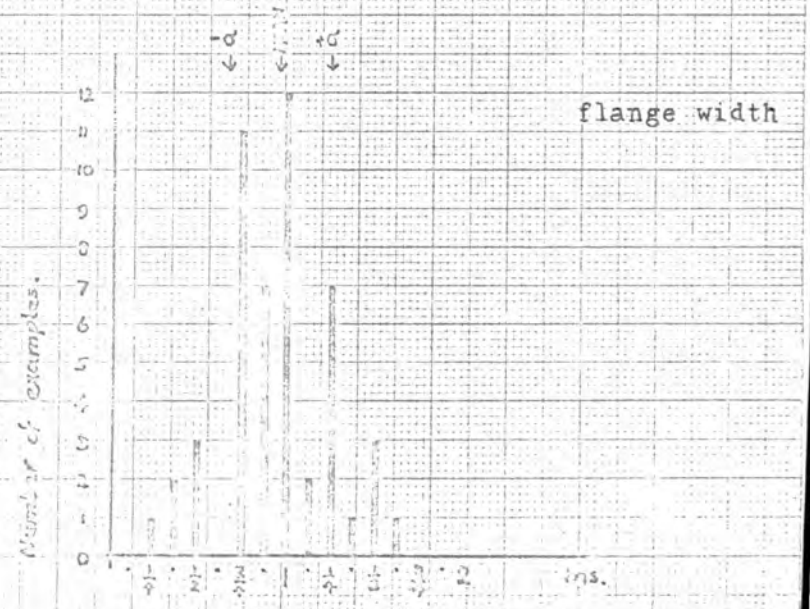
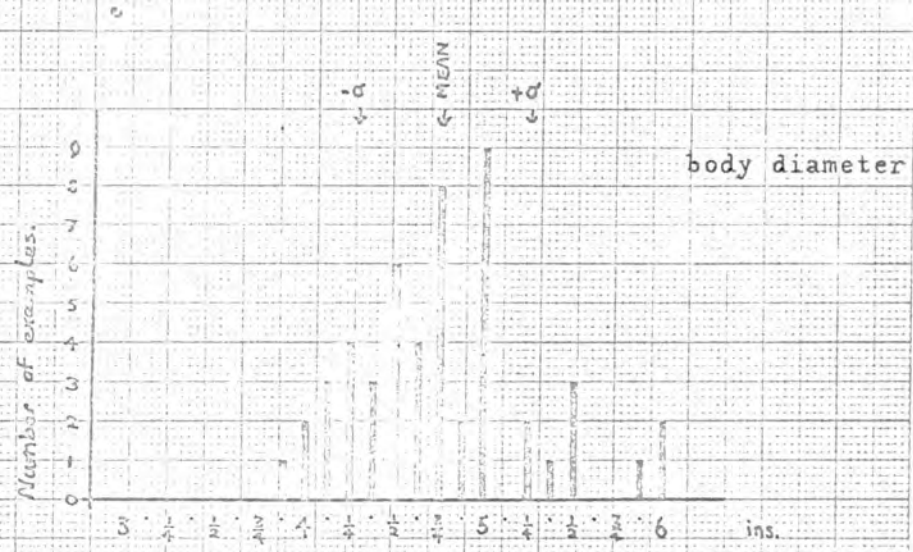
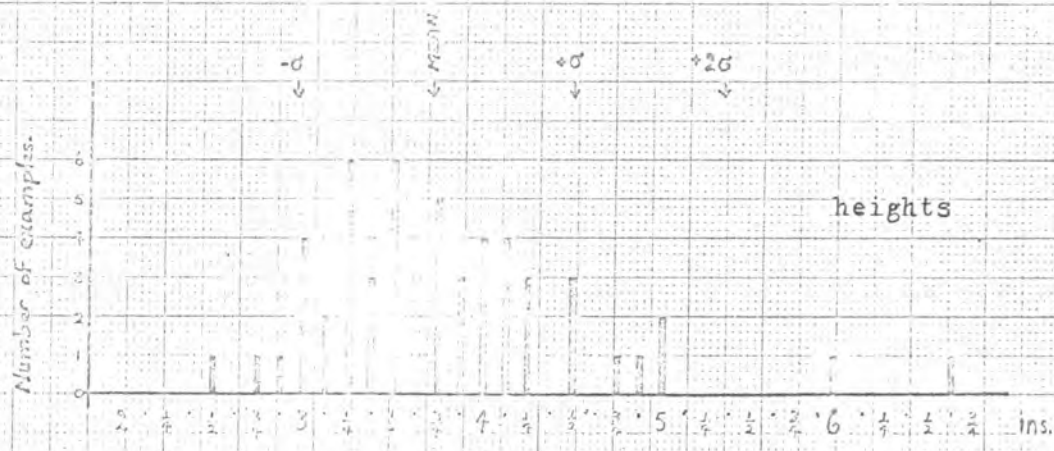
3. The shield-boss sample

Weapons form a large and important part of the archaeological material from pagan Anglo-Saxon burials but, with the exception of Miss Evison's discussion on the sugar-loaf type (1963: 38), shield-bosses seem to have been sadly neglected. I have examined 58 examples from the West Midlands (Table I) of which two are of the sugar-loaf type

(Table I: 57,58). Miss Evison illustrates the Baginton, Wa., example (1963: fig. 24a) but omits any reference to the Napton, Wa., one which is, however, similar to one from Loddington, Northants., (1963: fig.25a). Typologically, Miss Evison considers these to be late seventh-eighth century forms and indicative of men of high social rank. Unfortunately, the paper contains no list of criteria used for classifying shield-bosses although there are references to height, diameter (but not at which point this is measured), and flange width. Shapes are also mentioned for the upper part of the shield-boss. This seems to me to be a very unsatisfactory state because others are unable to be sure of placing a new find in its best group and for this reason I have listed all the criteria I have used (Table Ia). The absence of any typology dealing with all forms of the pagan Anglo-Saxon shield-boss has resulted in their neglect in even the well written excavation reports (e.g. Bidder and Morris (1959: 120-1) record a shield-boss as a "normal type, diameter $6\frac{1}{2}$ " - but what is "normal"? Why give the diameter (and which one is it?) but not the height?). My typology may help to overcome some of these difficulties because my sample covers most of the commoner types of shield-boss found in England and the characteristic features for each type are clearly indicated.

Seven types of attributes were selected for the cluster analysis, each attribute having three alternatives (Table Ia). The mean and standard deviation (σ) of the sample were worked out for height, dome diameter and flange width and the histograms of these measurements (Fig. III) show that the features can be divided into significant groupings using the σ . The actual measurements are given in Table I for ease of use although if the sample be greatly extended it may be

Fig. III. Shield-bosses.



W.E.L.L. Corp. Data for 350 mm, 2 and 1 cm

advisable to recalculate the mean and σ to see if, as seems to me unlikely from short trials on other shield-bosses, there is a major change in these ranges. The shape of the boss is then considered at the waist, shoulder and dome while the final category, the most vulnerable part of the boss, specifies the spike terminal now remaining. It might be interesting to include rivet details (size, shape, quantity) and forms of decoration (e.g. Table I: 8 and Fig. IV, from Bidford-on-Avon, Wa.) in further, more extensive studies but I decided to limit the initial experiment to the criteria specified in order that the effectiveness of the method might be tested.

The sugar-loaf shield-boss, discussed by Miss Evison (1963) is not the most common type in the West Midlands, however, and so all 58 bosses were analysed by the cluster analysis methods previously outlined and the clusters considered to be of most significance, according to the breaks in the fusion coefficient value (Fig. V) of HIERAR are 2,5, 7,10. It is noteworthy that RELOC on HIERAR and RELOC on DIVIDE (i) produced identical clusters from 2 - 10. The clusters produced for each level of clustering are shown in the accompanying tables (Ib, Ic, Id) according to the best correlation I have found and are illustrated (Fig. VI). I have attempted to correlate the frequency ratios first rather than percentage occurrence of a feature, as the former allows for peculiarities in any cluster to show up whereas percentage occurrence, which is heavily biased by the sample used, may hide the less common, but for diagnostic purposes most important, features. In practice this does not make a completely different pattern of characteristic features for any group (see details for RELOC 7 clusters).

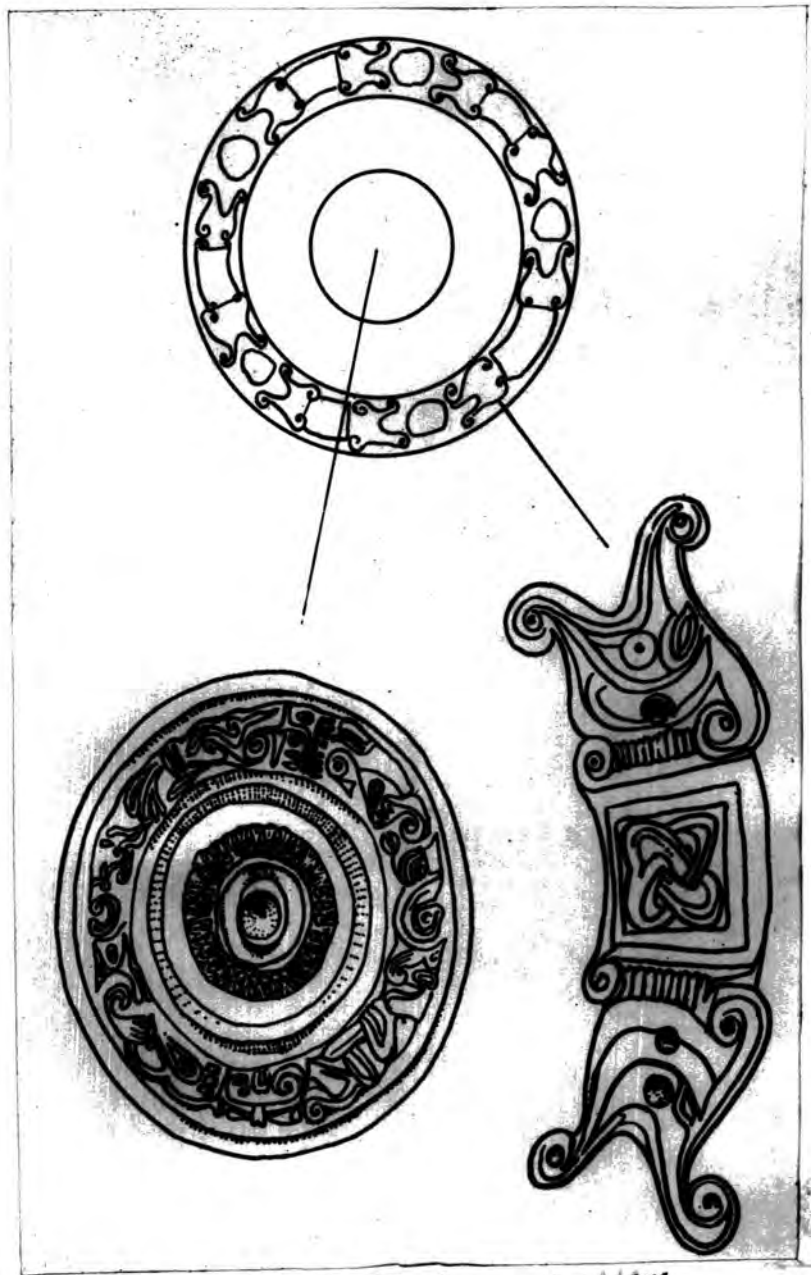
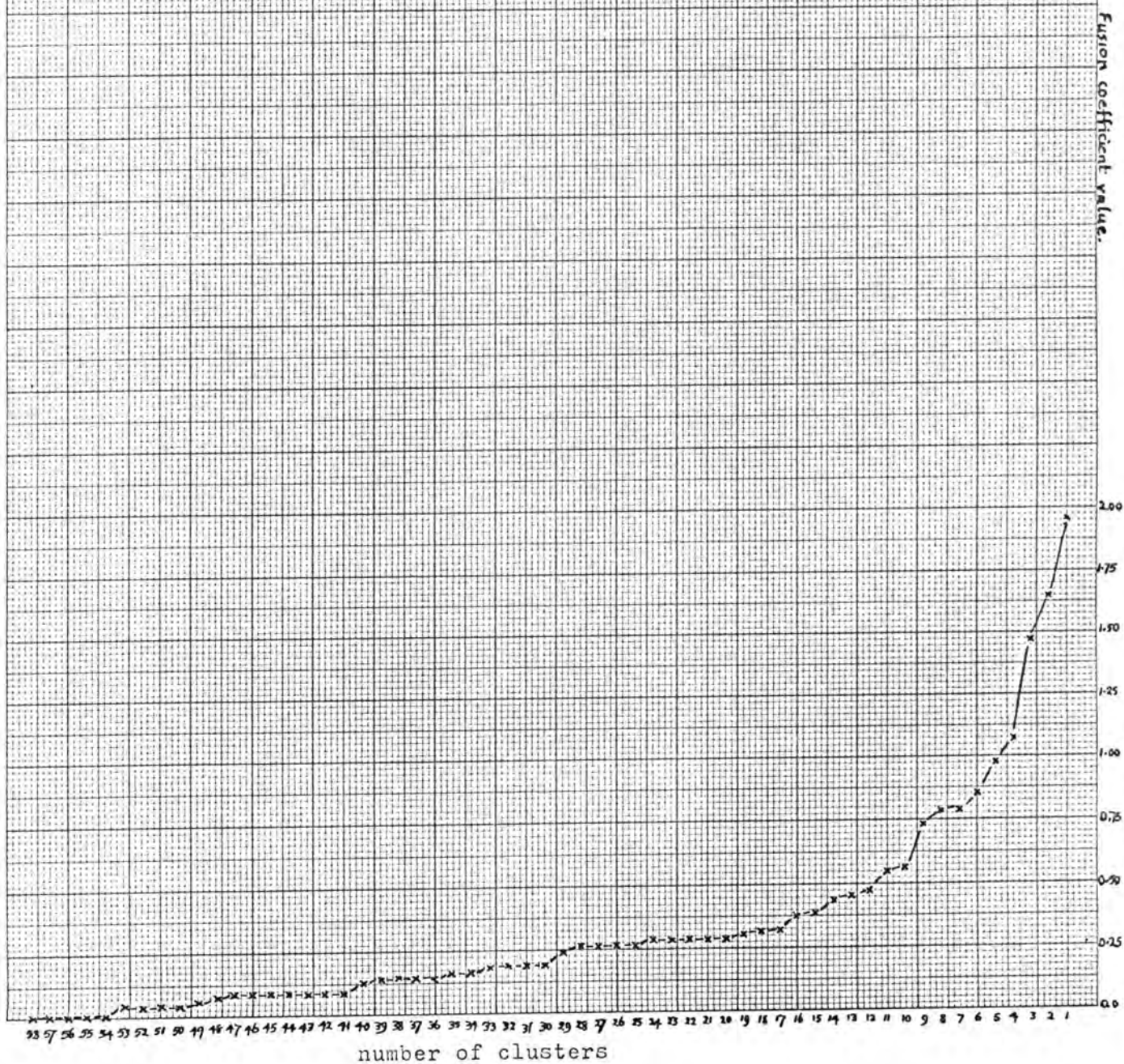
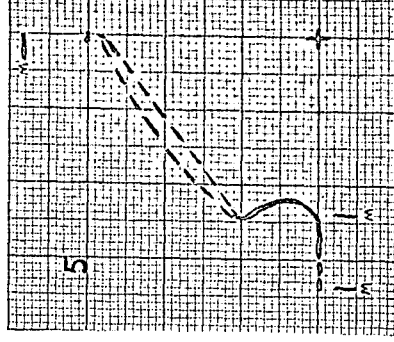
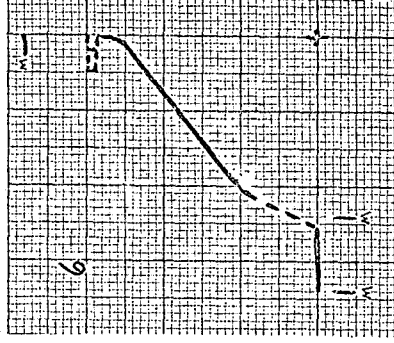
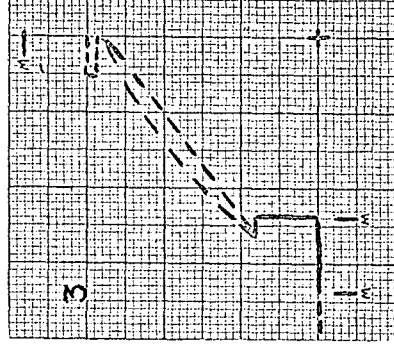
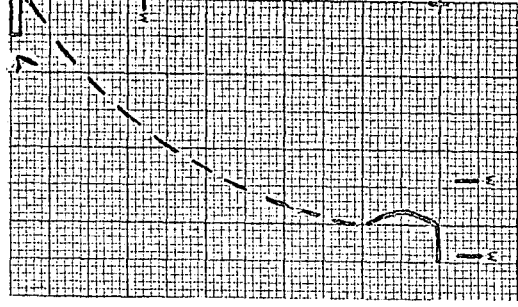
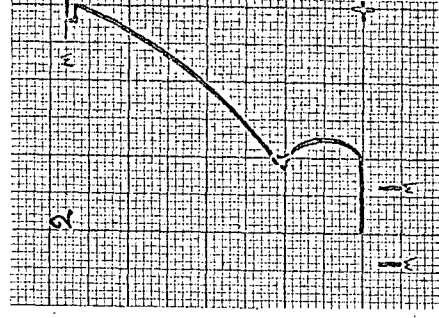
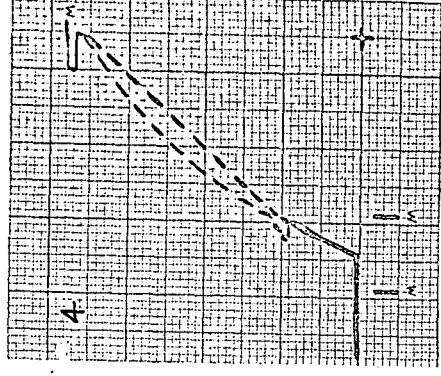
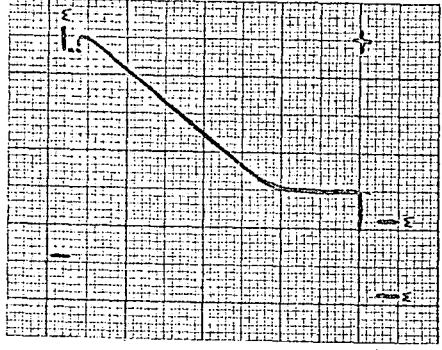


Fig. IV. The Bidford-on-Avon, Wa.,
Shield boss. (detail).

Fig. V. Shield-bosses: fusion coefficient values.

These fusion coefficient values are taken from HIERAR and indicate significant cluster levels.





1 inch.
M - Mean.

Fig. VI. Shield-boss types.

The two cluster stage. (Table Ib). This is the crudest division of the material possible. All that can be deduced from this stage is that the most significant feature is height, which supports Miss Evison's suggestion (1963: 40,41,42,46). RELOC 2 (with 26 individuals) is given slightly more precisely by RELOC and by all three DIVIDE options [note the total absence of features 2,3,4,7,9] than is RELOC 1, about which all we know is that it never has feature 1. At this stage we cannot claim any high degree of correlation between the various methods, however.

The five cluster stage. (Table Ib). The characteristic features of each cluster are clearly shown with RELOC on HIERAR being supported by at least three other programs and only a few discrepancies in the others. The identical results obtained by RELOC on DIVIDE (i) and RELOC on HIERAR should be noted and by themselves give strong support to the clusters. The cluster produced at the two cluster level which showed the more marked characteristics (Table Ib: RELOC 2) has remained stable (now Table Ib: RELOC 3), but the other cluster has now been subdivided into four distinct groups (Table Ie). To the dominant role in the classification scheme of attribute 1 has been added the proportions of the flange width (7,8,9), dome shape (16,17,18) and spike terminal (19,20,21) and recognisable groups are emerging, but they do not seem tight enough to allow their use with any degree of ease and so a further subdivision is considered.

The seven cluster stage. (Table Ic). At this level the original more clearly defined cluster (RELOC 2) has been sub-divided (the new RELOC 3, 5,6 and see Table Ie) and the shoulder carination (13,14,15) has been added to the list of diagnostic features used. The diameter of the dome

(4,5,6) which was emerging as a key feature at five clusters is much more clearly seen to be significant at this level. Therefore, by seven clusters all the features considered, except the waist shape (10,11,12), which is beginning to show signs of being a diagnostic feature, have been used to define the groups and these seem, on inspection of the actual sample, to be valid typologically. I suggest that seven clusters are the optimum grouping for the classification of West Midland Anglo-Saxon shield-bosses from the pagan period.

The ten cluster stage. (Table Id). In order to check that no major grouping has been omitted the ten cluster stage has also been examined and the final diagnostic feature, waist shape, has now been introduced to refine the clusters. It does not seem worth while to use this stage for field work although, as I have said earlier, in some instances more subdivisions, even beyond the ten cluster stage, may be of interest but in that case it would be advisable to extend the size of the sample used.

The detailed typology for the pagan Anglo-Saxon shield-bosses from the West Midlands is now presented.

The Shield-Boss Classification

In order to avoid any confusion with the types no new reference numbers have been given to the clusters produced in RELOC on HIERAR and therefore the numbers for the types are those produced at seven clusters. The characteristic features, both positive and negative, for all seven clusters have been summarised (Table 1c) by the ratio (percentage occurrence of a feature in the cluster:percentage occurrence of the feature in all the sample) and characteristic features.

The typology has a standardised form for each type for ease of use and this follows the order on the dendrogram (Table 1e) showing suggested relationships between the various types.

- a. characteristic features - 100% present.
- b. characteristic features - 66-99% present.
- c. * ratio ≥ 3.00
 + ratio 2.00 - 2.99
 \ ratio $\leq .50$

The degree of support for the type in CLUSTAN 1A.

Stylistic details of the type.

Spatial distribution of the type.

Relationship of my results to those of Miss Evison and possible dating of the type.

| 2 Clusters. | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | | |
|--------------|----------|----------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|---|--|
| % incidence | Reloc 1 | / | + | | | | | | | | | | | | | | | | | | | | | |
| | Hierar 1 | / | + | | | | | | | | / | + | | | | | | | | + | / | | | |
| | ÷(i) 2 | | | | | | | | | | | | | | | | | | | | / | | | |
| | ÷(ii) 2 | | | | | / | | | | | | | | | | | | | | | | | | |
| | ÷(iii) 2 | / | + | | | | | | | | | | | | | | | | | | | | | |
| | Mode 1 | / | + | | | | | | | | | | | | | | | / | | | | | | |
| | Reloc 2 | * | / | | | + | | | + | | | | | | | | | | | | | | | |
| | Hierar 2 | | | | | | | | | | | | | | | | | | | | | | | |
| | ÷(i) 1 | | | / | | | | | | | | | | | | | | | | | / | * | / | |
| | ÷(ii) 1 | | | / | | | * | / | | + | | | | | | | | | | | | | | |
| | ÷(iii) 1 | * | / | | | + | | | + | | | | | | | | | | | | | | | |
| | Mode 2 | | | | | | | | | | | | | | | | | | | | | | | |
| | Ratios | Reloc 1 | / | | | | | | | | | | | | | | | | | | | | | |
| | | Hierar 1 | / | + | | | | | + | | + | / | | | | / | | | | | / | | / | |
| ÷(i) 2 | | | | * | | | | | | | | | | | | | * | | * | | | | | |
| ÷(ii) 2 | | | | | + | / | + | | | | | | | | | | | | | | | | | |
| ÷(iii) 2 | | / | | | | | | | | | | | | | | | | | | | | | | |
| Mode 1 | | / | + | | | | | | | + | | | | | | | / | | | | | | | |
| Reloc 2 | | + | / | / | / | | | | / | / | / | | | | | | | | | | | | | |
| Hierar 2 | | | | | | | | | / | / | / | | | | | | | | | | | | | |
| ÷(i) 1 | | | | / | | | | | | | | | | | | | | | | / | | / | | |
| ÷(ii) 1 | | | | / | | | | / | | | | | | | | | | | | | | | | |
| ÷(iii) 1 | | + | / | / | / | | | | | / | | | | | | | | | | | | | | |
| Mode 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Clusters. | | | | | | | | | | | | | | | | | | | | | | | | |
| Reloc (H) 1 | / | + | / | + | | | + | | | | / | / | | | | | | | / | / | | * | | |
| Hierar 1 | / | + | / | | | | + | * | | | / | | | | * | / | | | / | / | | + | | |
| ÷(i) 5 | / | + | / | | | | + | | | | / | | | | | | | | / | / | | + | | |
| ÷(ii) 2 | / | + | / | * | / | + | + | | | | + | / | | | | | | | / | / | | + | | |
| ÷(iii) 1 | / | + | / | | | | + | | | | / | | | | | | | | / | / | | + | | |
| Reloc (Si) 3 | / | + | / | + | | | + | | | | / | / | | | | | | | / | / | | * | | |
| Reloc (H) 2 | | | / | * | / | / | / | / | | + | / | | | | | | | | / | * | / | + | | |
| Hierar 2 | / | | / | * | / | / | / | / | | | | | | | | | | | / | * | / | + | | |
| ÷(i) 4 | | | / | * | / | / | / | / | | + | / | | | | | | | | / | * | / | + | | |
| ÷(ii) 5 | | | / | / | / | / | / | / | | * | / | * | | | | | | | / | / | | | | |
| ÷(iii) — | | | | | | | | | | | | | | | | | | | | | | | | |
| Reloc (Si) 2 | | | / | * | / | / | / | / | | + | / | | | | | | | | / | * | / | + | | |
| Reloc (i) 3 | + | / | / | / | / | / | / | / | | | | | | | | | | | / | / | | | | |
| Hierar 5 | | | / | / | / | / | / | / | | | | | | | | | | | / | / | | | | |
| ÷(i) 1 | + | / | / | / | / | / | / | / | | | | | | | | | | | / | / | | | | |
| ÷(ii) 3 | + | / | / | / | / | / | / | / | | | | | | | | | | | / | / | | | | |
| ÷(iii) 5 | + | / | / | / | / | / | / | / | | | | | | | | | | | / | / | | | | |
| Reloc (Si) 1 | + | / | / | / | / | / | / | / | | | | | | | | | | | / | / | | | | |
| Reloc (H) 4 | / | + | / | / | / | / | / | / | | * | / | + | | | | | | | / | / | | + | | |
| Hierar 4 | / | + | + | / | / | / | / | / | | * | / | | | | | | | | / | / | | + | | |
| ÷(i) 5 | / | + | / | / | / | / | / | / | | * | / | * | | | | | | | / | / | | + | | |
| ÷(ii) 1 | | | / | / | / | / | / | / | | | / | / | | | | | | | / | / | | | | |
| ÷(iii) 2 | | + | / | / | / | / | / | / | | * | / | * | | | | | | | / | / | | + | | |
| Reloc (Si) 5 | / | + | / | / | / | / | / | / | | * | / | + | | | | | | | / | / | | + | | |
| Reloc (H) 5 | / | / | * | / | / | * | * | / | | / | / | | | | | | * | / | / | / | | | | |
| Hierar 3 | / | + | / | / | / | * | / | / | | / | + | / | | | | + | + | / | / | / | | | | |
| ÷(i) 2 | | | * | / | / | / | / | / | | | | | | | | | * | / | / | / | | | | |
| ÷(ii) 4 | / | / | * | / | / | * | / | / | | / | / | | | | | | + | / | + | / | | | | |
| ÷(iii) 3 | / | / | * | / | / | / | / | / | | | | | | | | | * | / | * | / | | | | |
| Reloc (Si) 4 | / | / | * | / | / | * | * | / | | / | / | | | | | | * | / | / | / | | | | |

Table No. Shield-Bosses: 2 and 5 clusters.

| 7 Clusters. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|-------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|
| Reloc (H) 1 | / | + | / | / | / | / | * | / | / | / | / | / | / | / | + | / | / | / | / | / | / |
| Hierar 1 | / | + | / | / | / | / | + | * | / | / | / | / | / | / | + | / | / | / | / | / | + |
| ÷(i) 5 | / | + | / | / | / | / | + | + | / | / | / | / | / | / | / | / | / | / | / | / | + |
| ÷(ii) 2 | / | + | / | * | / | / | + | + | / | / | / | + | / | / | / | / | / | / | / | / | / |
| ÷(iii) 4 | / | + | / | / | / | / | / | + | / | / | / | / | / | / | / | / | / | / | / | / | / |
| Reloc(÷i) 3 | / | + | / | / | / | / | / | * | / | / | / | / | / | / | + | / | / | / | / | / | / |
| Reloc (H) 2 | / | / | / | * | / | / | / | / | + | / | / | / | / | / | / | / | / | / | / | + | / |
| Hierar 2 | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | + | / |
| ÷(i) 4 | / | / | / | / | / | / | / | / | + | / | / | / | / | / | / | / | / | / | / | + | + |
| ÷(ii) 7 | / | / | / | / | / | / | / | / | / | + | / | / | / | / | / | / | / | / | / | + | + |
| ÷(iii) 3 | / | + | / | / | / | / | / | / | / | / | / | / | + | / | + | / | / | / | / | + | / |
| Reloc(÷i) 2 | / | / | / | * | / | / | / | / | + | / | / | / | / | / | / | / | / | / | / | + | / |
| Reloc (H) 3 | + | / | / | / | / | / | / | / | / | / | / | / | * | / | / | / | / | / | / | / | / |
| Hierar 3 | + | / | / | / | / | / | / | / | / | / | / | / | * | / | / | + | / | / | / | / | / |
| ÷(i) 1 | + | / | / | / | / | + | / | / | / | / | / | / | * | / | / | / | / | / | / | / | / |
| ÷(ii) 3 | + | / | / | / | / | + | / | / | / | / | / | / | + | / | / | / | / | / | / | / | / |
| ÷(iii) 1 | + | / | / | / | / | / | / | / | / | / | / | / | * | / | / | / | / | / | / | / | / |
| Reloc(÷i) 1 | + | / | / | / | / | / | / | / | / | / | / | / | * | / | / | / | / | / | / | / | / |
| Reloc (H) 4 | / | + | / | / | / | / | / | * | / | / | + | / | / | / | / | / | / | / | / | + | / |
| Hierar 4 | / | + | + | / | / | / | / | * | / | / | / | / | / | / | / | / | / | / | / | + | / |
| ÷(i) 3 | / | + | / | / | / | / | / | * | / | / | / | * | / | / | / | / | / | / | / | + | / |
| ÷(ii) 6 | / | / | / | * | / | / | * | / | / | / | / | / | / | / | / | / | / | / | / | / | / |
| ÷(iii) 2 | / | + | / | / | / | / | / | * | / | / | / | * | / | / | / | / | / | / | / | + | / |
| Reloc(÷i) 6 | / | + | / | / | / | / | / | * | / | / | / | + | / | / | / | / | / | / | / | + | / |
| Reloc (H) 5 | / | / | / | / | / | / | / | / | + | / | / | / | / | * | / | / | / | / | / | / | / |
| Hierar 5 | / | / | / | / | / | / | / | / | + | / | / | / | / | + | / | / | / | / | / | / | / |
| ÷(i) 2 | / | / | / | / | / | / | / | / | * | / | / | / | / | * | / | * | / | / | / | / | / |
| ÷(ii) 5 | / | / | / | / | / | / | / | / | * | / | / | * | / | / | / | / | / | / | / | / | / |
| ÷(iii) 5 | + | / | / | / | / | / | / | / | + | / | / | / | / | * | / | / | / | / | / | / | / |
| Reloc(÷i) 4 | / | / | / | / | / | / | / | / | + | / | / | / | / | * | / | / | / | / | / | / | / |
| Reloc (H) 6 | + | / | / | / | / | / | / | / | / | / | + | / | / | / | * | / | / | / | / | / | / |
| Hierar 6 | + | / | / | / | / | / | / | / | / | / | + | / | / | / | * | / | / | / | / | / | / |
| ÷(i) 7 | + | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / |
| ÷(ii) 7 | + | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / |
| ÷(iii) 6 | + | / | / | / | / | / | / | / | / | / | + | / | / | / | * | / | / | / | / | / | / |
| Reloc(÷i) 7 | + | / | / | / | / | / | / | / | / | / | + | / | / | / | * | / | / | / | / | / | / |
| Reloc (H) 7 | / | / | * | / | / | * | * | / | / | / | / | / | / | / | / | / | * | / | / | / | / |
| Hierar 7 | / | / | * | / | / | * | + | / | / | / | / | / | / | / | / | / | * | / | / | / | / |
| ÷(i) 6 | / | / | * | / | / | + | + | / | / | / | / | / | / | / | / | / | * | / | / | / | / |
| ÷(ii) 4 | / | / | * | / | / | * | * | / | / | / | / | / | / | / | / | / | * | / | / | / | / |
| ÷(iii) 7 | / | / | * | / | / | * | * | / | / | / | / | / | / | / | / | * | / | + | / | / | / |
| Reloc(÷i) 5 | / | / | * | / | / | * | * | / | / | / | / | / | / | / | * | / | / | / | / | / | / |

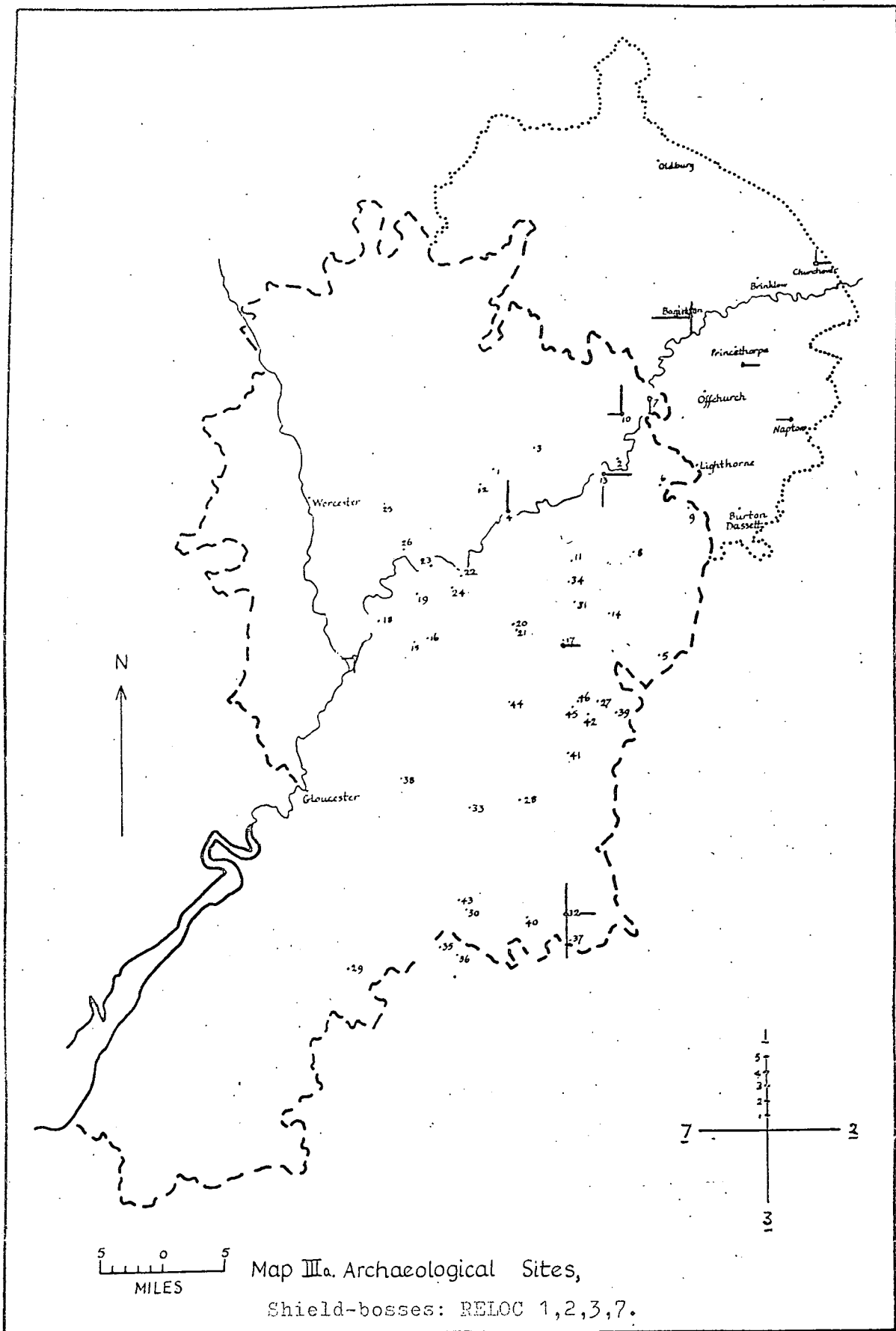
Table Ic. "High-resol": 7 clusters.

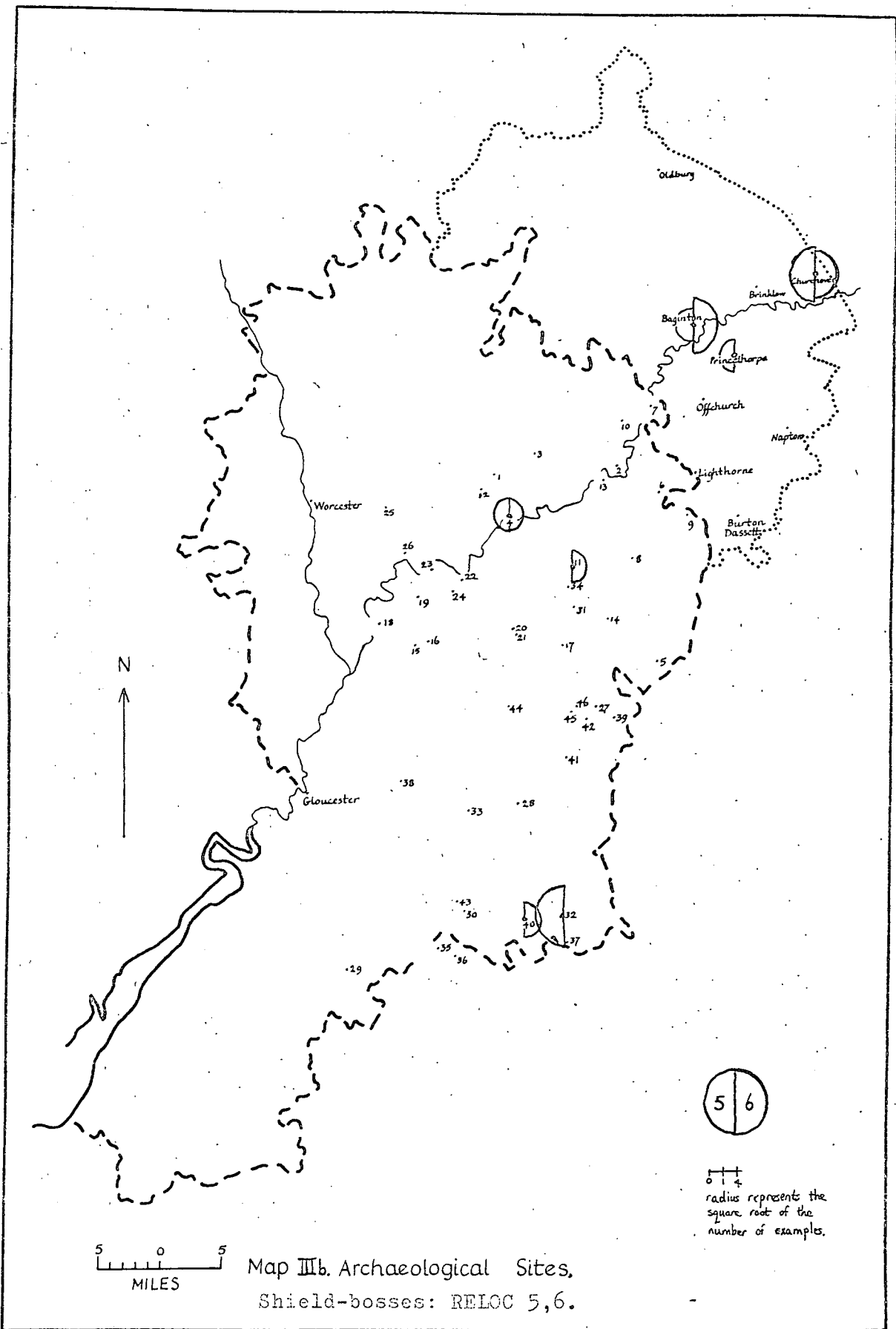
| 10 Clusters | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|
| Reloc (H) 1 | | | | | | * | * | | | | | | | | + | | | | | | |
| Hierar 1 | | + | | | | + | * | | | | | | | | * | | | | | | * |
| ÷(i) 5 | | + | | | | * | * | | | | | | | | * | | | | | | * |
| ÷(ii) 2 | | + | | * | | | * | | | | | | | | | | | | | | + |
| ÷(iii) 4 | | + | | | | | + | * | | | | | | | * | | | | | | * |
| Reloc (÷i) 3 | | | | | | | + | * | | | | | | | + | | | | | | |
| Reloc (H) 2 | | | | * | | | | | | * | | | * | | | | | * | * | | * |
| Hierar 2 | | | | * | | | | | | * | | | * | | | | | * | * | | * |
| ÷(i) 4 | | | | * | | | | | | + | | | | | | | | * | * | | * |
| ÷(ii) — | | | | | | | | | | | | | | | | | | | | | |
| ÷(iii) 1 | + | | | * | | | | | | + | | * | | | | | | * | * | | * |
| Reloc (÷i) 4 | | | | * | | | | | | * | | * | | | | | | * | * | | * |
| Reloc (H) 3 | + | | | | | | | | | | | * | | | | | | | | | |
| Hierar 3 | + | | | | | | | | | | | * | | | | | + | | | | |
| ÷(i) 1 | + | | | | | + | | | | | | * | | | | | | | | | |
| ÷(ii) 3 | + | | | | | + | | | | | | * | | | | | | | | | |
| ÷(iii) 9 | + | | | | | | | | | | | * | | | | | | | | | |
| Reloc (÷i) 1 | + | | | | | | | | | | | * | | | | | | | | | |
| Reloc (H) 4 | | + | | | | | | | | | | | | | | | | | | | |
| Hierar 4 | | | * | | | | | | | | | | | | | | | | | + | |
| ÷(i) — | | | | | | | | | | | | | | | | | | | | | |
| ÷(ii) — | | | | | | | | | | | | | | | | | | | | | |
| ÷(iii) — | | | | | | | | | | | | | | | | | | | | | |
| Reloc (÷i) 9 | | + | | | | | | | | | | | | | | | | | | | |
| Reloc (H) 5 | | | | | | | | | | * | | | | * | | + | | | | | |
| Hierar 5 | | | | | | | | | | * | | | | + | | | | | | | |
| ÷(i) 2 | | | | | | | | | | * | | | | * | | * | | | | | |
| ÷(ii) 8 | | | | | | | * | | | | | | | * | | * | | | | | |
| ÷(iii) 5 | + | | | | | | | | | + | | | | * | | | | | | | |
| Reloc (÷i) 10 | | | | | | | | | | * | | | | * | | + | | | | | |
| Reloc (H) 6 | | | | * | | | | | | | | | | + | | | | * | | | * |
| Hierar 6 | | | | * | | | | | | | | | | + | | | | * | | | + |
| ÷(i) 9 | | | | | | | | | | | | | | | | | | * | | | + |
| ÷(ii) 7 | | | | + | | | | | | | | | | | | | | * | | | + |
| ÷(iii) 8 | | | | + | | | | | | | | | | | | | | | | | + |
| Reloc (÷i) 2 | | | | * | | | | | | | | | | + | | | | + | | | * |
| Reloc (H) 7 | | + | | | | | | | | * | | | * | * | | | | | | + | |
| Hierar 7 | | + | | | | | | | | * | | | * | * | | | | | | + | |
| ÷(i) 3 | | + | | | | * | | | | * | | | * | + | | | | | | + | |
| ÷(ii) 10 | | + | | + | | * | | | | + | + | | * | | | | | | | + | |
| ÷(iii) 10 | | + | | | | * | | | | * | | | * | + | | | | | | + | |
| Reloc (÷i) 7 | | + | | | | | | | | * | | | * | * | | | | | | + | |
| Reloc (H) 8 | + | | | | | | | | | | | | + | | | * | | | | | |
| Hierar 8 | + | | | | | | | | | | | | + | | | * | | | | | |
| ÷(i) 7 | + | | | | | | | | | | | | | | | | | | | | |
| ÷(ii) 5 | | | | | | | | | | * | | * | | | | | | | | | |
| ÷(iii) 6 | + | | | | | | | | | | | | + | | | * | | | | | |
| Reloc (÷i) 8 | + | | | | | | | | | | | | + | | | * | | | | | |
| Reloc (H) 9 | | | | | | | | | | | | | | | * | | | | | | + |
| Hierar 9 | | | | | | | | + | | | | | | | * | | | | | | * |
| ÷(i) — | | | | | | | | | | | | | | | | | | | | | |
| ÷(ii) — | | | | | | | | | | | | | | | | | | | | | |
| ÷(iii) — | | | | | | | | | | | | | | | | | | | | | |
| Reloc (÷i) 5 | | | | | | | | | | | | | | * | | | | | | | + |
| Reloc (H) 10 | | | * | | | * | * | | | | | | | | | * | | | | | |
| Hierar 10 | | | * | | | * | * | | | | | | | | | * | | | | | |
| ÷(i) 8 | | | + | | | * | * | | | | | | | | | * | | | | | |
| ÷(ii) 4 | | | * | | | * | * | | | * | | | * | | | * | | | | | |
| ÷(iii) 7 | | | * | | | * | * | | | | | | | | | * | | | | + | |
| Reloc (÷i) 6 | | | * | | | * | * | | | | | | | | | * | | | | | |

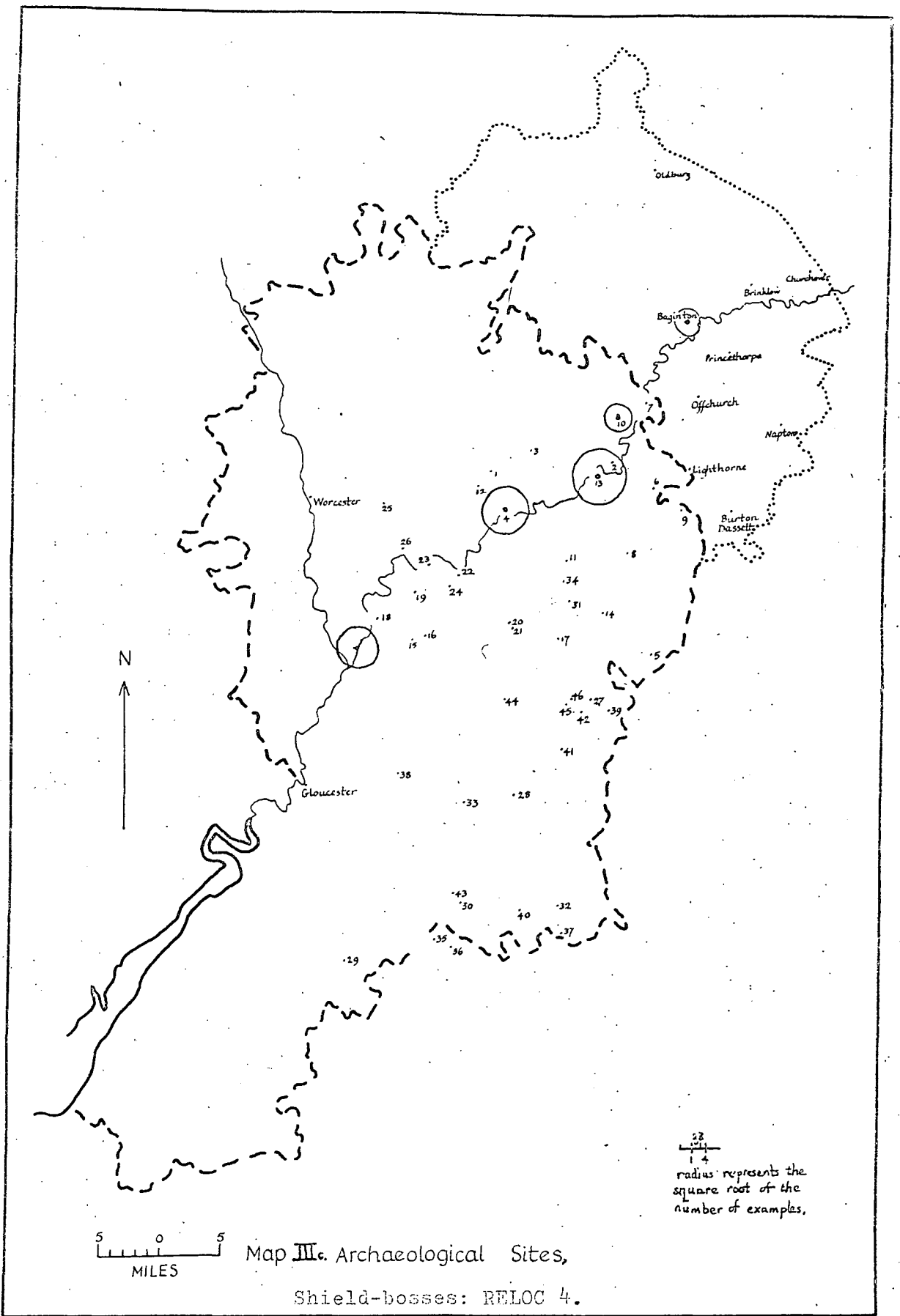
Table 10. Reloc. Clusters: 10 clusters.

| 7 clusters | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|------------|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 1 | | | | | | | * | | | | | | | | | | | | | | |
| | 4 | + | | | | | | | | | | | | | | | | | | | | |
| 2 | 2 | | | | | | | | | | | | | | | | | | | | | |
| | 7 | | * | | | | | | | | | | | | | | | | | | | |
| 3 | 3 | + | | | | | | | | | | | | * | | | | | | | | |
| | 6 | + | | | | | | | | | | | | | | * | | | | | | |
| | 5 | | | | | | | | | | + | | | * | | | | | | | | |

Table 1c. Shield-cores: 7 cluster dendrogram.







Oldbury

Brinkley Church

Baynton

Princethorpe

Offchurch

Napton

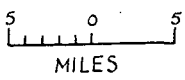
Lighthorne

Burton Dassett

Worcester

Gloucester

N



radius represents the square root of the number of examples.

Map IIIc. Archaeological Sites,

Shield-bosses: RELOC 4.

RELOC 7:1

- a) 2 (height $3\frac{3}{4}$ " - $5\frac{1}{4}$ "); 11(waist, straight); 17 (dome, straight);
- b) 15 (no carination);
- c) 2 (height $3\frac{3}{4}$ " - $5\frac{1}{4}$ "); 4 (dome diameter less than $4\frac{1}{4}$ ");
 7 (flange less than $\frac{5}{8}$ "); 15 (no carination); 21 (pointed or decayed spike terminal);

This type was defined at the five cluster level (Table Ib) and there is a high degree of correlation between five of the six methods of analysis at seven clusters, which gives it support (Table Ic). Some features are never found in this type, namely, the extremes of height (1,3), a sloping waist (12), a marked shoulder carination (13), a convex or concave dome (16,18) or a terminal spike with a large button (19). At the ten cluster stage (Table Id) this type is subdivided and some members of the group merge with some from RELOC 7:2 which suggests that the two types may be related but for this to be proved a larger sample must be examined.

Although this is a clearly defined archaeological type the distribution within the West Midlands is widespread (Map IIIa) being found at Fairford, Glos., (Table I: 1,9), Bidford-on-Avon, Wo., (Table I: 12,18) and Baginton, Wa., (Table I: 46).

"During the course of the sixth century the smiths tended to make the bosses narrower, about 5 in. wide [across which part is not stated - M.W.]; they emphasised the carination less until it sometimes became almost imperceptible, and the flange shrank to a narrow rim..." (Evison, 1963: 39).

Such a type is RELOC 7:1. This appears to be the second of three subtypes of the "tall straight cones" variety (Evison, 1963: 42) which

is discussed more fully later (RELOC 7:4) and because of the confusion apparent in Miss Evison's work at this point it is not possible to judge the geographical distribution of the type outside the West Midlands.

RELOC 7:4

- a) 2 (height $3\frac{3}{4}$ " - $5\frac{1}{4}$ ");
- b) 5 (dome diameter $4\frac{3}{8}$ " - $5\frac{1}{8}$ "); 8 (flange $\frac{3}{4}$ " - $1\frac{1}{4}$ "); 11(waist, straight);
17 (dome, straight); 19 (spike terminal, large button);
- c) 2 (height $3\frac{3}{4}$ " - $5\frac{1}{4}$ "); 9(flange over $1\frac{3}{8}$ "); 12(waist sloping);
19 (large button);

There is no change in the identifying features of this type at seven clusters from those seen at the five cluster level (Table Ib) and they are confirmed by four of the six cluster techniques. Table Ic shows that, in addition to the features which are common to this type, some features are rarely if ever found and these are the extremes of height (1,3); a dome diameter under $4\frac{1}{4}$ " (4), flange less than $\frac{5}{8}$ " (7), a concave waist (10), a concave dome (18) and a terminal with either a spike or a small button (20,21). It is possible to subdivide this type, as the ten cluster stage shows (Table Id), but the small number involved here is not good enough proof to be absolutely convincing and such subtypes must be studied when a larger sample is analysed.

No example of this type has been recorded at Fairford, Glos., and the distribution of the type seems to be confined to the Avon valley (Map IIIc) e.g. Bidford-on-Avon, Wo., (Table I: 13), Stratford-on-Avon, Wa., (Table I: 24) and Baginton, Wa., (Table I: 39). It is not possible at this stage to decide whether the distribution reflects a geographical territory, such as a migration route or perhaps a cultural zone which is an extension of a Middle Anglian one, or the fortuitous distribution of known pagan Anglo-Saxon burials within the West Midlands. This point may be answered by further study using all known shield-bosses.

Miss Evison's "tall straight cones" (1963:42) include this type and RELOC 7:1 although she does make three subdivisions, based mainly upon the degree of carination, and RELOC 7:4 has both the first and the third of these subtypes. My analysis has not shown that the type developed from RELOC 7:6 as Miss Evison claims (1963:42), but this is no conclusive proof that it did not, and as the precise criteria by which she chose her sample are not given it is difficult to use her distribution map (1963: 53) in conjunction with my sample - none of which she used. Her conclusions do not seem to be based on consistent criteria. "Tall straight cones" have a height of 4-6" (Evison, 1963: 42) and are forms of sugar-loaf (Evison, 1963:40, Fig. 1e) which have heights of 5" - 7.8" (Evison 1963: 46). The confusion arises from Miss Evison's imprecise use of the term "tall" which appears to have different meanings within her article and is not confined to those bosses with heights in excess of $5\frac{3}{8}$ ". What is meant by superlatives is equally vague as none is defined. If "tall" means anything over 4" (1963: 42) why was her sample so limited? A tiny limited sample drawn only from an undefined area cannot be used without reservations to draw conclusions about a national distribution (1963: 52ff. and map) or international links (1963: 57,65). These remarks about the difficulty of using so much work which is based on imprecise data can be applied to all aspects of Anglo-Saxon archaeology although the article cited demonstrates the abuse of terms better than most. My criticism in no way invalidates the type as I have defined it. If this type is a form of sugar-loaf shield boss or if a height of more than $3\frac{3}{4}$ " is "tall" this form may be dated to the sixth or seventh century.

RELOC 7:2

- a) -
- b) 4 (dome diameter under $4\frac{1}{4}$ "); 8 (flange $\frac{3}{4}$ " - $1\frac{1}{4}$ "); 20 (small button on spike);
- c) 4 (dome diameter under $4\frac{1}{4}$ "); 10 (waist, concave); 18 (dome, concave); 20 (small button);

This type, which was defined by the five cluster level (Table Ib), is confirmed at seven clusters by four of the six methods of analysis (Table Ic). Apart from the positive indicators some features are characteristically absent and these are the extremes of height (1,3), a dome diameter greater than $4\frac{3}{8}$ " (5,6), the extremes of flange width (7,9), a straight waist (11), no carination (15), a straight dome (17) and a terminal spike with a large button (19).

The attribute 14 (slight carination) subdivides this type at the ten cluster level (Table Id), when some members of the group merge with some from RELOC 7:1, and, as stated there, the significance of this needs to be tested by the study of a larger sample.

There does not appear to be one part of the West Midlands to which this type is confined (Map IIIa) and examples occur at Fairford, Glos., (Table I: 10) in the south and Stratford-on-Avon, Wa., (Table I: 22) in the northern burial group.

This type is not noted by Miss Evison but the narrow diameter (under $4\frac{1}{4}$ ") and the height in the medium range ($3\frac{3}{4}$ " - $5\frac{1}{4}$ ") are features which she dates (1963: 39) as sixth century ones. Within this sample the type is quite clearly defined by five of the clustering techniques (Table Ic) and therefore its omission by Miss Evison is not

easily explained unless it is a local West Midland form, in which case further study using a much bigger sample may help to define its distribution.

RELOC 7:7

- a) 16(dome, convex);
- b) 6 (dome diameter greater than $5\frac{1}{4}$ ");
- c) 3 (height more than $5\frac{3}{8}$ "); 6 (dome diameter greater than $5\frac{1}{4}$ ");
7 (flange under $\frac{5}{8}$ "); 16 (dome, convex);

This type, "the sugar-loaf", is produced by five of the six clustering techniques (Table Ic) although all six methods agree on many of the dominant features, and it is the only group with a height in excess of $5\frac{3}{8}$ ". The tightly defined positive features are matched by equally closely marked agreement about the attributes never found in the type: height under $5\frac{1}{4}$ " (1,2), dome diameter under $5\frac{1}{8}$ " (4,5), a flange wider than $\frac{3}{4}$ " (8,9), sloping waist (12), convex or straight domes (17,18), or small buttons or points on the terminal spikes (20,21).

This is a distinct type although there are not enough for any geographical distribution to be significant for the West Midlands alone (Map IIIa). Napton, Wa., (Table I: 58) is a good example of the type.

This type was the main one to be considered by Miss Evison, whose sample, although not containing all then known examples, was much larger than one made solely from material from the West Midlands, but the present study can contribute little more to its identification because we have so few examples. It is perhaps relevant to mention that the type is more closely linked to others with bosses over $3\frac{3}{4}$ " in height than are the various types of bosses subdivided by the dominant feature of a height of $3\frac{5}{8}$ " (Table Ie). The sugar-loaf type may be a more gradually evolved one than those. Because of the limited number in my sample I have not subdivided the types as Miss Evison has and the West Midlands ones are "tall curved cones" (Evison, 1963: 44) which are dated to the seventh century.

RELOC 7:3

- a) 1 (height under $3\frac{5}{8}$ "); 11 (waist, straight); 13 (marked carination);
- b) 8 (flange $\frac{3}{4}$ - $1\frac{1}{4}$ ");
- c) 1 (height under $3\frac{5}{8}$ "); 13 (marked carination);

Complete agreement for positive features and several negative ones, as indicated by all six methods of analysis, make this a well defined type. In addition to the attributes noted above, Table Ic shows that heights over $3\frac{3}{4}$ " (2,3) are not found and other features not present are concave or sloping waists (10,12), slight or no carination (14,15) concave domes (18) or small terminal buttons on the spike (20). So distinct is this type that it remains unaltered even at the ten cluster stage (Table Id).

The geographical distribution (Map IIa) is spread throughout the cemeteries of the West Midlands e.g. Fairford, Glos., (Table I: 15,31) and Baginton, Wa., (Table I : 55).

Miss Evison (1963: 40) identifies a type which she calls the "low curved cones" and my type RELOC 7:3 shows a close correlation with this. The dimensions and marked carination, which Miss Evison dates as late fifth to sixth century features (1963: 39), are good indicators of the type, which is illustrated (Evison 1963: 68,69), but as she has made no attempt to indicate its distribution no further conclusions can be drawn from present evidence on this point.

RELOC 7:6

- a) 1 (height under $3\frac{5}{8}$ "); 15 (no carination); 17 (dome, straight);
 b) 5 (dome diameter $4\frac{3}{8}$ " - $5\frac{1}{8}$ "); 8 (flange $\frac{3}{4}$ " - $1\frac{1}{4}$ ");
 c) 1 (height under $3\frac{5}{8}$ "); 12 (waist, sloping); 15 (no carination);

Five of the six clustering methods support the features characteristic of this type of shield-boss (Table Ic). Not found are the following features:- heights over $3\frac{3}{4}$ " (2,3), the extremes of dome diameter (4,6), the extremes of flange width (7,9), carination (13,14) convex or concave domes (16,18) and pointed spike terminals (21).

This type, like RELOC 7:5, has an easterly distribution (Map IIIb) with examples at Baginton, Wa., (Table I: 47) and Churchover, Wa., (Table I: 42) which again suggests that the fashion was either not one generally used by the settlers of the West Midlands or that it died out of favour soon after the settlers arrived in the region.

As this type has a height of less than $3\frac{5}{8}$ " it would be dated as one of the earlier forms by Miss Evison and there does appear to be some similarity between my type, RELOC 7:6, and Miss Evison's "low straight cones" (1963: 41). The "low straight cones" may include RELOC 7:5, which has a concave, rather than a sloping, waist, and taken together the two types include the characteristic features named by Miss Evison. She illustrates examples of the types from other parts of England and from this it seems that the type is widespread in its distribution (1963: 70, some 69). In view of this fact it may be significant that the type is only found on the eastern part of the West Midlands and that by the time the settlers had large enough

communities to be identified further west RELOC 7:6 had either gone out of fashion or was not used by them for some other reason. The type may be seen as a late form of those found in Norway (Evison, 1963: 67 - 2nd century) and Richborough, Kent (Evison 1963: 67 - 4th century).

RELOC 7:5

- a) 5 (dome diameter $4\frac{3}{8}$ " - $5\frac{1}{8}$ "); 14 (slight carination);
 b) 1 (height under $3\frac{5}{8}$ "); 8 (flange $\frac{3}{4}$ " - $1\frac{1}{4}$ "); 17 (dome, straight);
 c) 10 (waist, concave); 14 (slight carination);

Five clustering methods support the features characteristic of this type of shield-boss (Table Ic). Features not present in the type are heights over $3\frac{3}{4}$ " (2,3), the extremes of dome diameter (4,6), a flange wider than $1\frac{3}{8}$ " (9), a sloping waist (12) and a marked shoulder carination or no carination (13,15). Subtypes may be defined in future work with a larger sample.

These shield-bosses occur at Fairford, Glos., (Table I: 11,30) and in the east of Warwickshire at Bensford Bridge (Table I: 49) which is a much more easterly distribution than for the other types (Map IIIb) and therefore, if the migrants to the West Midlands arrived from the east, these may be the earliest type of shield-boss used by the pagan Anglo-Saxon settlers in this area. The type may have become obsolete before the colonisation was complete or may be a variety not used by the main settlers in the West Midlands.

This type is not identified by Miss Evison but some of the group may be a subset of RELOC 7:6. As five of the six cluster techniques produce this type it cannot be dismissed as invalid and its omission by Miss Evison may be either because she did not recognise the type or because she did not think it relevant to her subject, sugar-loaf shield-bosses. The type is related to RELOC 7:6 and may, therefore, be considered as one of the early pagan period bosses. It seems worthy of considerably more study in a wider geographical context than the present work.

Conclusion

My analysis suggests seven major types of shield-boss from the pagan Anglo-Saxon period in the West Midlands whose characteristic features have been noted in the preceding pages and illustrated (Fig. VI) and it is interesting to note the degree of agreement between these types, the product of six clustering techniques, and those given by Miss Evison (1963: 38-96). The results of a shield-boss typology produced by cluster analysis do not cause a major revision in the classification of these objects but, as I have mentioned in my typology, the greater precision in the definition of a type should be a great help to future students be they field workers or academics.

A major analysis of the shield-bosses of England, which might be extended to include continental examples, should be undertaken to provide a working classification for use in future excavations outside the West Midlands and my pilot experiment proves that means whereby such a project might be carried out are available. The characteristic features could be extended to include information about the rivets, grips and associated finds and the sequence dating of the types might be possible using multidimensional scaling (Kendall, 1970: 125-134) or Renfrew and Sterud's "Close-Proximity Analysis" (1969) method. We have also seen that there appears to be reason to suspect that height is an important feature which varies from type to type in different centuries.

This small sample of fifty eight shield-bosses from the West Midlands was used as an experimental set of data to test out the CLUSTAN 1A programs before using them on more complex data and I believe that the typology outlined above demonstrates clearly that the programs are valid when used for archaeological data.

4. The Saucer and Applied Brooch Sample

Two common brooch types, the small-long brooches (Part II: 5) and the saucer and applied brooches, have been studied in detail here because they are frequently found in pagan Anglo-Saxon burials and may be more useful indicators of cultural regions than the more exotic varieties of jewelry. Decorated bronzes and dress fasteners may have had a wide distribution within a culture group because women were more likely to move from one village to another when they married than were men who usually had agricultural ties in a village. By examining the more common brooch types affinities between the West Midlands and other regions are seen and similar cultural groupings may be observed for other areas once an acceptable typology has been established.

Leeds wrote the first major study of the saucer and applied brooches (1911-12) when he concluded that they occurred both in Wessex and in Middle Anglia before the battle of Bedford in 571, and, therefore, antedate any documentary evidence for contact between the two kingdoms. He studied the design elements of these brooches and divided them into an eastern group, mainly in East Anglia, Middle Anglia and Essex, which was characterised by zoomorphic, applied brooches, and a Western group, which included the Hwicce, Wessex and Kent, typified by geometrically-decorated saucer brooches. He suggested that the Middle Anglian brooches showed a closer link with Wessex than with East Anglia while Kentish influences could be seen in some late-sixth century brooches. Leeds stressed the distinction between the saucer and applied brooches. Åberg (1926) accepted Leeds' work on the geometric designs and concentrated more on the expansion of the types of zoomorphic design used on these brooches so his study does not pretend to be exhaustive. Bidder





and Morris (1959, "The Anglo-Saxon Cemetery at Mitcham.") continued to use the design elements as indicators of links between regions and as dateable features for these brooches but disagreed with the division of the brooches by the method of manufacture, i.e. saucer and applied. They point out the difficulty of dating the brooches because of the lack of dateable associated finds and examined parallels for the Mitcham examples which are also illustrated in this useful cemetery report.

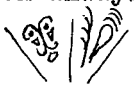
The basic problem with these typologies is the absence of a list of significant criteria by which the brooches may be classified either into the types selected by the author or in a new analysis. They also lack the most vital qualification of a classification scheme which is repeatability by others and the production of the same results (Part II: 12). Typologies based upon no known features cannot be checked and must be regarded as suspect until proved otherwise.

The χ^2 Results

At the outset it should be stressed that I have not taken for granted that saucer brooches are distinct from applied brooches as Leeds did (1911-12), but prefer to indicate the feature of saucer manufacture (cast) by the code 26, and the applied technique by 25 (Table IIa). Some features (Table II and Fig. VII) tend to occur frequently: 5, 6, 8, 10, 11, 19, 21, 23, 25, 26, and some infrequently: 1, 3, 12, 13, 16, 17, 20, 22, 24. Saucer brooches form 73.6% of the total and so dominate the classification. 60% of the sample have dots and bulls' eyes (19) in their decoration and so this is not a useful feature for classification purposes as it is too common. The zoomorphic design (11) is found on 38% of the sample with 33.8% of the brooches having the

design in a continuous band, as opposed to a sectional design, and it may be possible to sequence-date the zoomorphic styles. 66% of the brooches with masks arranged in the field of the brooch (5) are of the applied form (25) with four masks in a cross shape. The central mask (4) is almost entirely a feature of saucer brooches (26) as too are petals (7), light-and-shade (15), triangles (17), wedges (24) and, with rare exceptions, scrolls and spirals (8). Of the brooches with wedges (24), eleven divide the brooch into three sections and six divide the brooch into four sections. Each element needs further study in order that the evolution of the design may be known after which it may prove possible to sequence-date the stages of the evolution of the design. Changes in the styles, within each element, are briefly noted below and may provide the basis upon which more detailed studies can be built. (I have indicated to which cluster they have been assigned in my second classification).

The masks used on both saucer and applied brooches are full-face, with the rare exceptions of the profile figures on a pair of applied brooches from Barrington, Camb. (illustrated in Camb. Antiq. Soc., Communications, 1883, vol. 5: pl.III, fig. 2). There are, however, distinct styles of representation. (4), which occurs on button brooches and the centre of larger brooches (RELOC 17:12), is basically , although the lines may be straight, curved or a mixture of the two. Hair is sometimes indicated and the portrait varies from realistic (Table II: 293) to highly stylised (Table II: 126). The basic  feature continued to be the inspiration for some faces (5) (RELOC 17:16). A heart, (3), which may have developed from a cross elaborated by the addition of scrolls, , was gradually modified (Table II: 67) to become the basic outline of the Croydon, Sy., brooches,  (Table II:194)

(RELOC 17:4). A third distinct style is the Barrington-Kempston group, which always has a characteristic mask associated with an animal leg (10),  (RELOC 17:2). Each of these styles does, however, have many minor variations.

Legs (10) may occur as central 'wheels', varying from the realistically portrayed (Table II: 164 and Wylie, 1852: pl. V.2) to the highly abstract (Table II: 228 and Arch. LXXIII, pl. XIV.1). They were also used to fill spaces between other designs. It will be seen (RELOC 17:10) that this feature characterises a distinct type of brooch.

Scrolls, (8), are generally considered to be early motifs, being found on continental Anglo-Saxon sites (Bidder and Morris, 1959: 81) and the number of scrolls may indicate the approximate date of the brooch, with five scrolls being the earliest. These brooches are discussed in RELOC 17:13.

Star designs, (6), usually have five points, though four, six and seven points are also found, whilst twelve, fifteen and eighteen points are known from examples which combine the star with other elements (RELOC 17:8,3,14). However, it is not very common for the star to be found associated with other elements (Figs. VII and VIII).

Zoomorphic designs have been found on saucer and applied brooches (RELOC 17:1,5,7) and these should be the easiest types to sequence-date by their stylistic peculiarities.

The incidence of design elements tends not to be confined exclusively to one method of manufacture, which confirms Bidder and Morris (1959: 81) and the German school of thought but contradicts Leeds (1911-12). Manufacturing methods must be considered when classifying

these brooches, as too should rim depths and maximum diameters, but it seems that they might not necessarily form the primary division of this type of brooch. The importance of the method of manufacture apparently depends upon the classification used.

The values for features in the matrix of differences (Fig. VII) produced from the χ^2 test would be expected to occur in a normal distribution, which is characterised by a symmetric array of values about the mean, μ . 95.4% of the values in a normal distribution lie between $\mu \pm 2\sigma$, where σ denotes the standard deviation, and 99.73% of the values in a normal distribution lie between $\mu \pm 3\sigma$. The values in Fig. VII have been omitted but values outside the range $\pm 2\sigma$ have been shaded in order to indicate which associated features show an abnormally great variation from the mean. The positively associated pairs of features, those greater than 2σ , may characterise cluster nuclei features whilst the negatively associated pairs, those less than -2σ , indicate subdivisions between classes. Distinct groupings are suggested by the features with mutually positive and negative associations such as (1-6), (6-14). From the matrix of differences (Fig. VII) a diagram of associated features has been constructed (Fig. VIII) using the positively associated features only. Strong links (greater than 3σ) are indicated by a very thick line whilst lesser links (2σ) are shown by a thin line, but these are general rules and occasionally exceptions may occur.

The strongest groupings (Fig. VIII), with dominant features underlined, are listed below:

- | | |
|---------------------------------|--|
| (<u>1</u> ,6), (<u>6</u> ,14) | - no links with other features. |
| 13,21,23,25 | } - characteristics especially associated with applied brooches. |
| <u>11</u> ,21,23,25 | |
| <u>5</u> , <u>10</u> ,21,23,25 | |
| 18,23,25 | |

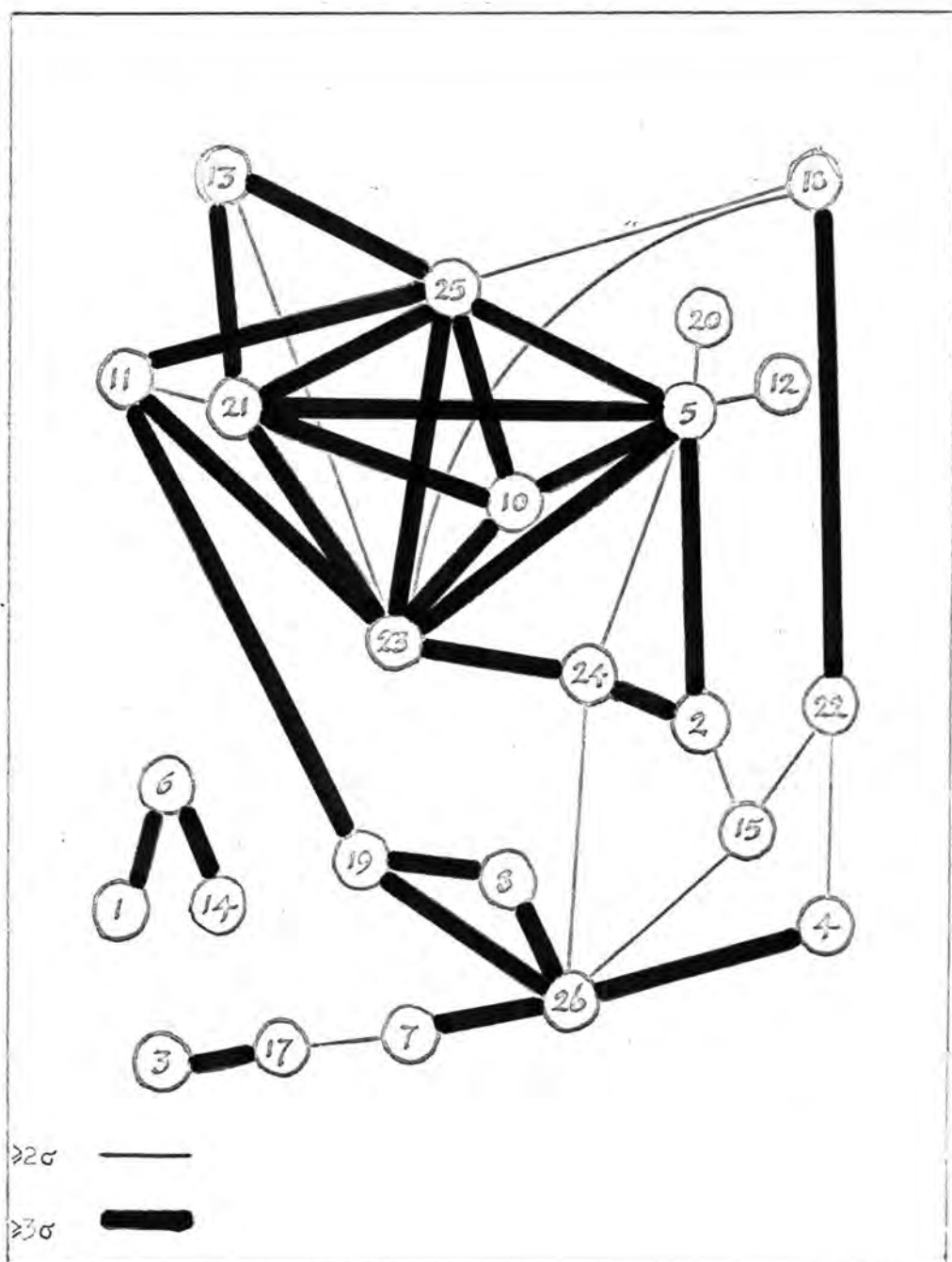


Fig.VIII. Saucer and applied brooches:
associated features.

| | | |
|------------------------|---|--|
| 8,19,26 | } | - characteristics of saucer brooches. |
| (3,17), (17,7), (7,26) | | |
| 5,23,24 | } | - no strong links with either form of manufacture. |
| 2,5,24 | | |

Having found which pairs of features are significant in a classification scheme I then found the differences between the associated pairs of features in the total population and those in the Hwiccian area. This is a means of defining a cultural grouping and its links with other regions and involved the construction of yet more (12) matrices. The characteristics with a 95% probability of being West Midlands ones are indicated by a cross on the figure (Fig. IX), while those rarely found in a West Midland site are marked thus, \ . Once the characteristics of the total population have been found any local grouping may be defined by this method, which technique may prove of immense value in Anglo-Saxon studies.

The distinctly Hwiccian characteristics are (11-4), (17-23), (2-10), (10-8) and (19-13), associations of pairs of features which do not occur in this sample outside the West Midlands. No associated features with a high incidence in the West Midlands are only found outside the region in Cambridgeshire or Middle Anglia, however, which argues against links in that direction. The central face in the (21-4) association occurs in Kent and the West Midlands while the cruciform design in (2-15) and (2-19) shows links with Buckinghamshire and Surrey. A wheel (9) round a central stud, as in (9-23) and (9-25), and the egg-and-tongue on saucer brooches, (18-26), are found in both Wessex and the West Midlands. A large number of brooches have the petal design (7) and, although there is no significantly associated feature with this, it is peculiar to Wessex,

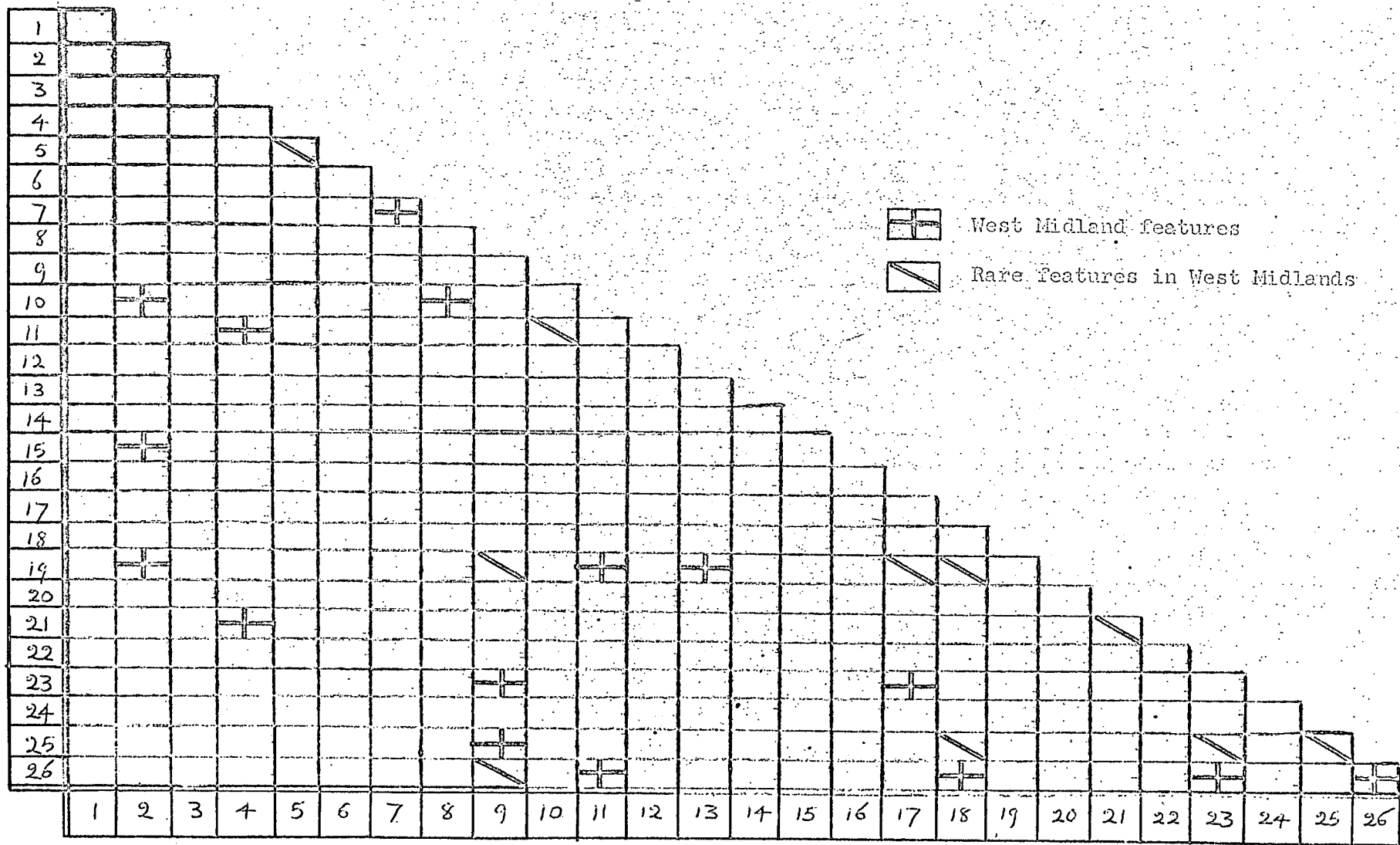


Fig. IX. Saucer and applied brooches: West Midland characteristics

the West Midlands and, to confute the lack of connection between the West Midlands and Cambridgeshire/Middle Anglia, is also known from Northamptonshire and Bedfordshire. Other West Midland characteristics link both Middle Anglia and Wessex but as each design element seems very localised it does not seem possible to draw any convincing conclusions for cultural affinities from this evidence.

Because this method has proved cumbersome to operate it is not appropriate here to expand upon the techniques in greater depth as much more precise results have been obtained from my second method of analysis. The use of associated pairs of features, which has not been tried by anyone before in Anglo-Saxon archaeology, has been shown, however, to define localised groups more clearly than the use of a single feature and also softens the division given by Leeds (1911-12) between the Eastern and Western parts of England. It may be stated quite clearly that the use of associated pairs of features improves on, and refines, classifications relying solely on single elements. It is fitting now to examine the differences made when the number of associated elements is increased from two to twenty-six.

The CLUSTAN 1A results

From the cluster analysis results the fusion coefficient values in HIERAR (Fig. X) suggest that the significant cluster levels are 2, 17-18 (Tables IIb, IIc, IIId). The first two groupings are briefly discussed before the full classification at 17 clusters is presented.

2 clusters

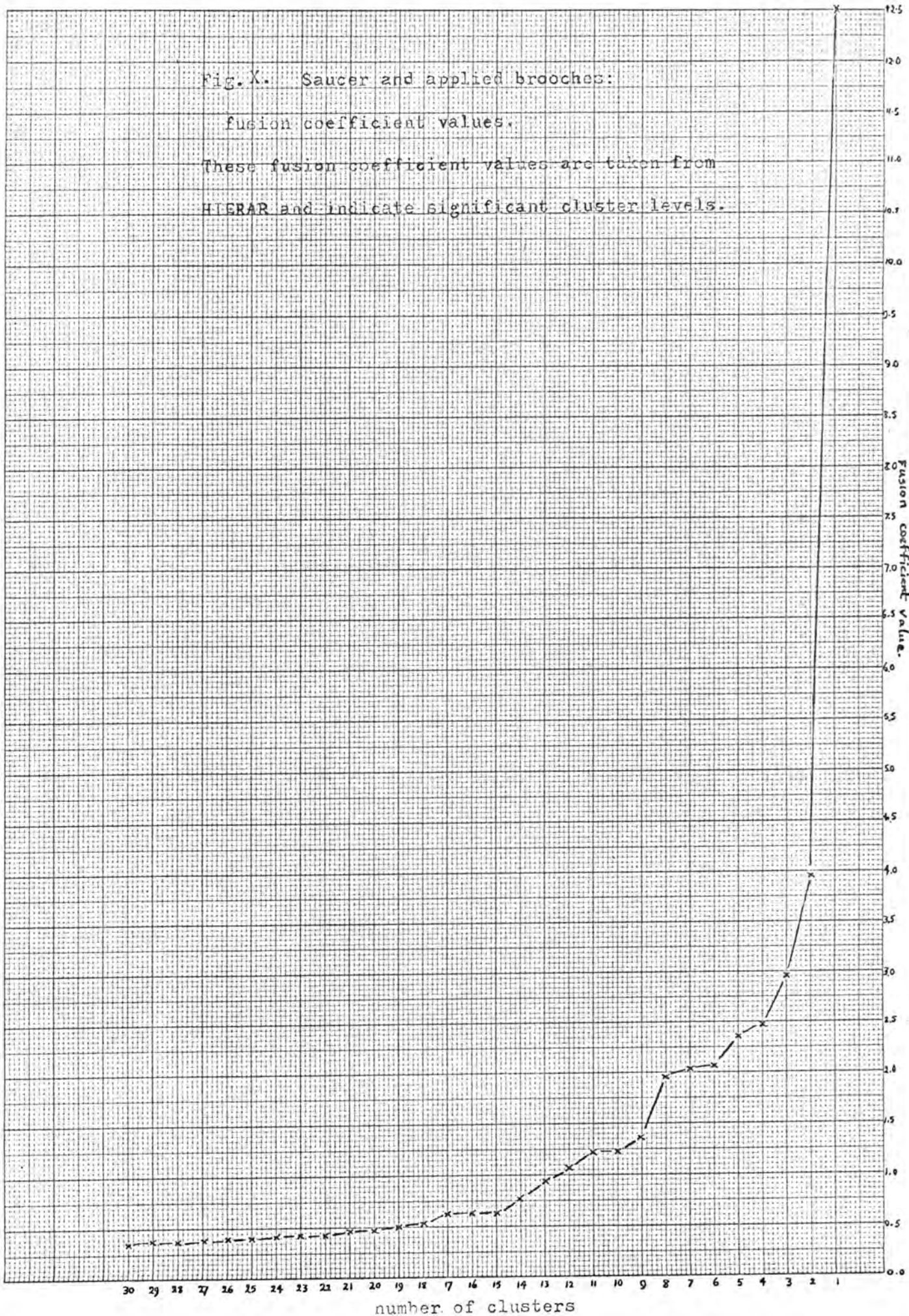
Five criteria form the basis for the initial subdivision of the total sample into two distinct clusters (Table IIb), namely, the presence of features 5 (mask in the field), 12 (plait), 13 (guilloche), 20(11(0)11(0)11),

Fig. X. Saucer and applied brooches:

fusion coefficient values.

These fusion coefficient values are taken from

HIERAR and indicate significant cluster levels.



and 25 (applied brooches) in RELOC 1 or the absence of all of them in RELOC 2. All but one of the clustering programs show a high degree of conformity and it therefore seems justifiable to state that the method of manufacture, i.e. applied brooches (25) or saucer brooches (26), is a fundamental criterion for the classification of these brooches, as Leeds (1911-12: 160, 196) suggested. I have already stated that this subdivision is not without its questioners, most notably those cited by Bidder and Morris (1959: 80 referring to the German scholar Roeder).

In addition to the five criteria referred to above some attributes are only rarely found in one group, although they may not be common in the second group either, and such features are:- 4 (mask in centre), 7 (petal), 8 (scroll), 15 (light and shade), 17 (triangles), 24 (imitation jewel as wedges, in the field). All these features are unusual in the applied brooch sample, RELOC 1. No such restrictions seem to apply to the saucer brooches, however. Features positively associated with RELOC 1, but which may also be found in a small proportion of RELOC 2, are 10 (leg designs), 18 (egg and tongue) and 23 (imitation central jewel) but the diversity of design found on the saucer brooch sample is so great that no feature stands out as positively associated with them.

A division of the total sample into two divisions is a very crude one and its value may be questioned, but future researchers may well use a sample based solely on the brooches manufactured by one method. Such a study is thus justified.

9 clusters

The fusion coefficient values in HIERAR (Fig. X) and the correlation of RELOC on HIERAR and RELOC on MODE indicated that nine

clusters was a significant cluster level, which was confirmed by the high degree of correlation between the results produced by all the programs used (Table IIc). I suggest that this division of the sample is the smallest feasible clustering for typological purposes because at this level all the major types are evident (e.g. RELOC 9:2, the masks/legs applied brooches; RELOC 9:8, the scroll design saucer brooches), although finer subdivisions of each type are possible and have been made. For all the clusters at least four different programs produced the same groupings, which is sufficient evidence to make the clusters acceptable, using the criteria selected.

Nine types were also produced by the χ^2 test (Part II: 14). It is interesting to compare the results produced by the two different clustering methods and, although there is not total agreement between the results, the nearest RELOC groups are given here:

| <u>χ^2 test results</u> (features) | <u>9 clusters</u> | <u>17 clusters</u> |
|--|-------------------|--------------------------|
| (1,6), (6,14) | RELOC 9, | RELOC 3,8,14, |
| 13,21,23,25, | RELOC 1, | RELOC 1, |
| 11,21,23,25, | RELOC 1,2, | RELOC 1,2, |
| 5,10,21,23,25, | RELOC 2, | RELOC 2, |
| 18,23,25, | RELOC 1, | RELOC 8 ? |
| 8,19,26, | RELOC 8, | RELOC 13,15, |
| (3,17), (17,7), (7,26), | RELOC 5, | RELOC (7), (17), (6,17), |
| 5,23,24, | RELOC 4 ? | RELOC 9, |
| 2,5,24, | RELOC 4 ? | RELOC 9. |

It is immediately obvious that several RELOC numbers are missing from the χ^2 results which is explained by the subdivision of the data set into finer types by cluster analysis than crude methods of analysis allow and so justifies the use of cluster analysis for the classification of these objects. The χ^2 test does give a crude typology but is not

worth doing if cluster analysis is possible because of the speed and greater information about each type which characterise the latter method. I will not elaborate upon these types in more detail because the key diagnostic features for the RELOC results are easily seen in Table IIc and I think that the results at seventeen clusters are much better for practical purposes. These are now discussed.

17 clusters

By far the most useful classification of saucer and applied brooches comes at the seventeen cluster level where there are five types of applied brooch and twelve types of saucer brooch (Table IIId). HIERAR fusion coefficient values had suggested that eighteen clusters, distinguished by a marked break in the curve when plotted on a graph, was an important point at which to examine the clusters, but analysis revealed that two of the clusters were better merged, which conclusion was supported by RELOC on HIERAR, and the typology produced at seventeen clusters is therefore presented here.

Once several subdivisions have been carried out very little agreement can be expected between cluster procedures which have no facility for moving objects from clusters already formed and as has been stated in the beginning of the chapter only RELOC can be relied upon to give a reasonably accurate subdivision at all levels. In view of this a surprisingly high degree of support is given to the clusters produced by RELOC on HIERAR. In many instances only one or two of the twenty-six features show marked disagreement (Table IIId) and these may be explained by the program used. The value of an iterative relocation process is most clearly demonstrated at this level of analysis although it may seem unduly complex for simple division of a sample of objects into not more

than four groups.

All of the types suggested by my classification have been listed in the order in which they occur on the dendrogram (Table IIb) together with their characteristics, spatial distribution as shown from the sample used, a sketch to illustrate the diagnostic features and, where possible, the dates postulated by others.

The saucer and applied brooch classification

In order to avoid any confusion with numbers no new names have been given to the clusters produced by RELOC on HIERAR and so the reference number given is the cluster number at seventeen clusters. The characteristic features, both positive and negative, for all seventeen clusters have been summarised and the ratio (percentage occurrence of the feature in the type:percentage occurrence of the feature in all the sample) is also indicated. A simplified dendrogram (Table IIb) is drawn to indicate at which cluster level fusion takes place between any of the seventeen clusters analysed.

A standard method of presentation has been adopted for each of the clusters (types) and this is:-

Idealised sketch of the type

- a. Characteristic features - 100% present.
- b. Characteristic features - 66-99% present.
- c. * ratio ≥ 3.00
 + ratio 2.00 - 2.99
 \ ratio $\leq .50$

Stylistic details.

Spatial distribution.

Comments on my typology when compared with Leeds' (1911-12) and Bidder and Morris' (1959) typologies, together with possible dating. What degree of support there is from CLUSTAN 1A for my typology.

| | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | |
|-------------|-----------|----------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|
| % incidence | Reloc 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Micras 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ±(i) 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ±(ii) 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ±(iii) 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Reloc(i)1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Reloc 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Micras 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ±(i) 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ±(ii) 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ±(iii) 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Reloc(i)2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Autios | Reloc 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Micras 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ±(i) 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ±(ii) 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ±(iii) 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reloc(i)1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reloc 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Micras 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ±(i) 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ±(ii) 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ±(iii) 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reloc(i)2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Dendrogram at 17 clusters.

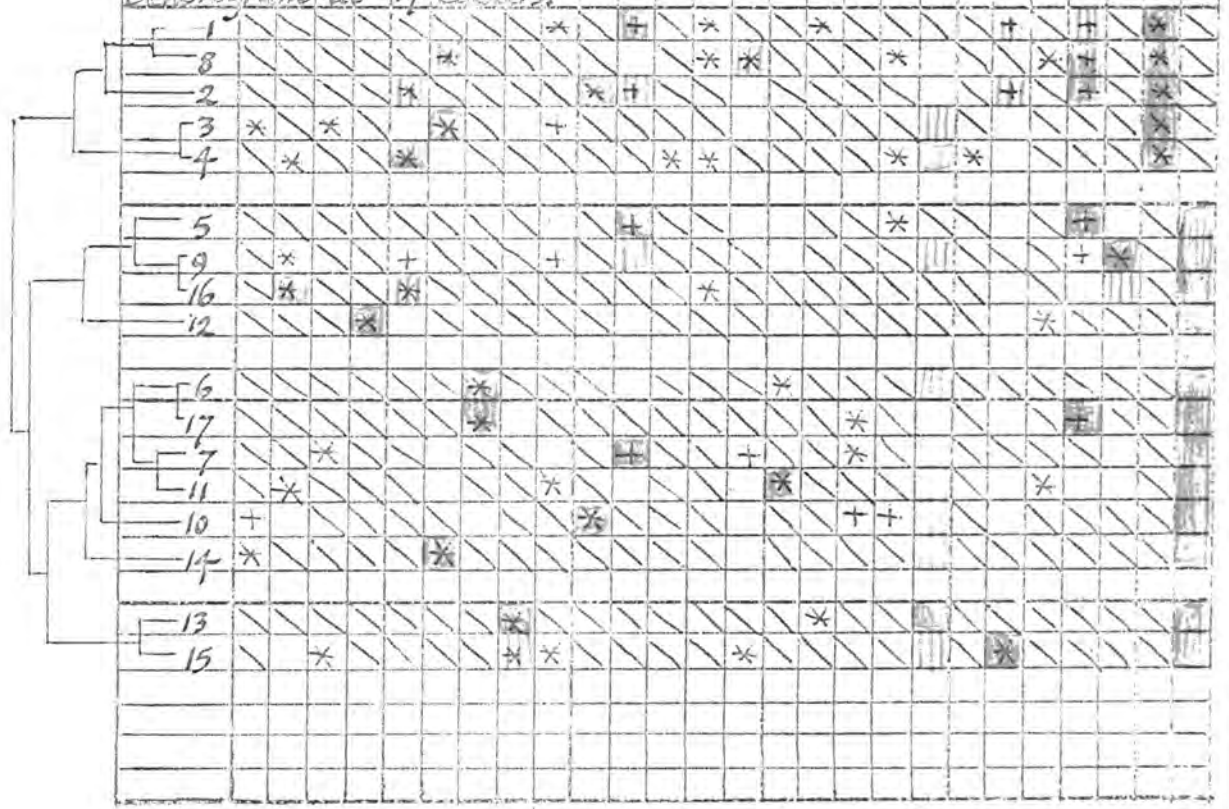


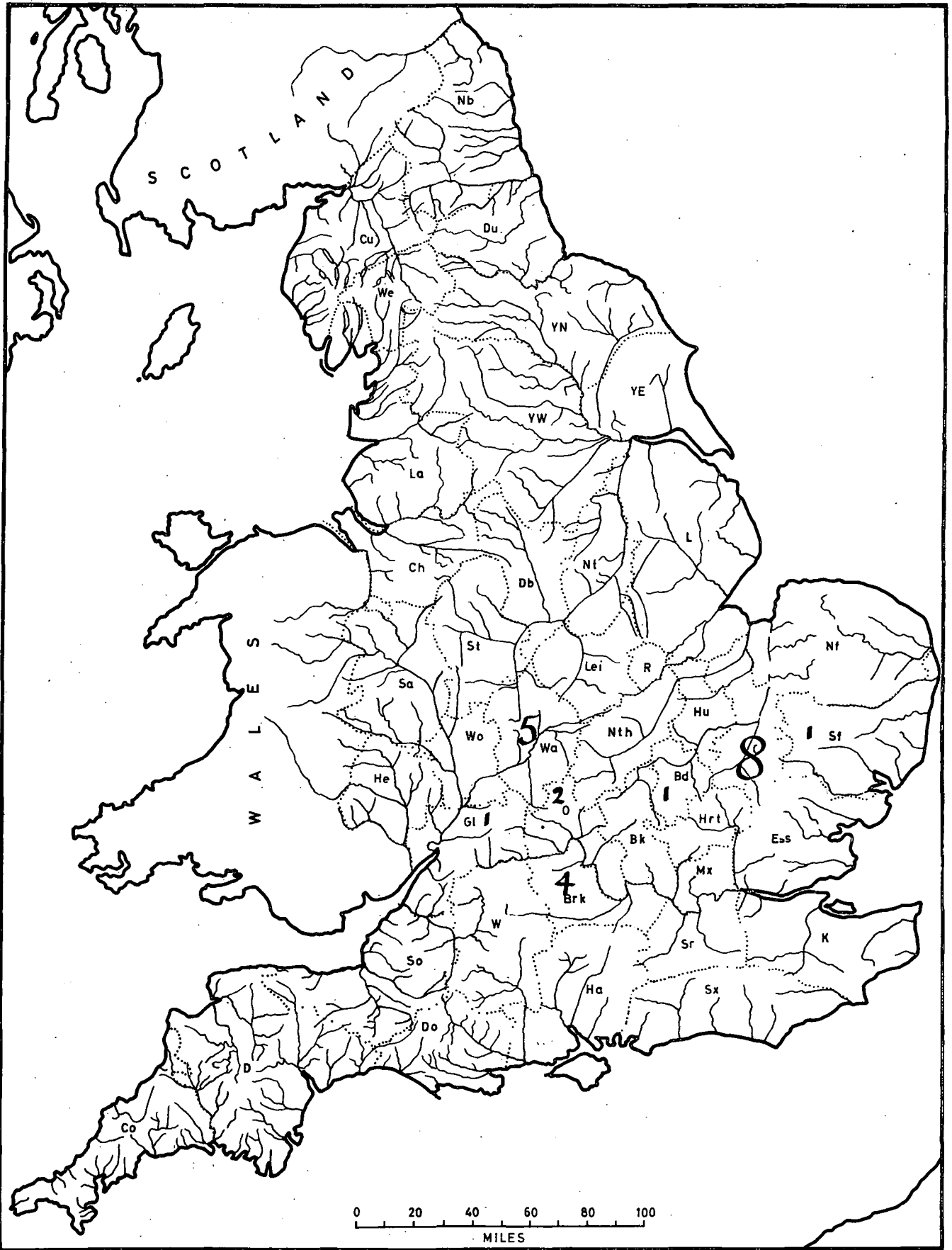
Table 11b. Taxes and supplies branches: 2 clusters and dendrogram.

| Cluster | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
|---------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| Place 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P(1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(1) 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(1) 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(1) 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Place 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P(2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(2) 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(2) 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(2) 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Place 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P(3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(3) 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(3) 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(3) 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Place 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P(4) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(4) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(4) 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(4) 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(4) 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Place 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P(5) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(5) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(5) 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(5) 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(5) 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Place 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P(6) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(6) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(6) 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(6) 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(6) 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Place 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P(7) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(7) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(7) 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(7) 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(7) 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Place 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P(8) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(8) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(8) 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(8) 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(8) 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Place 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P(9) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H(9) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(9) 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(9) 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| z(9) 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

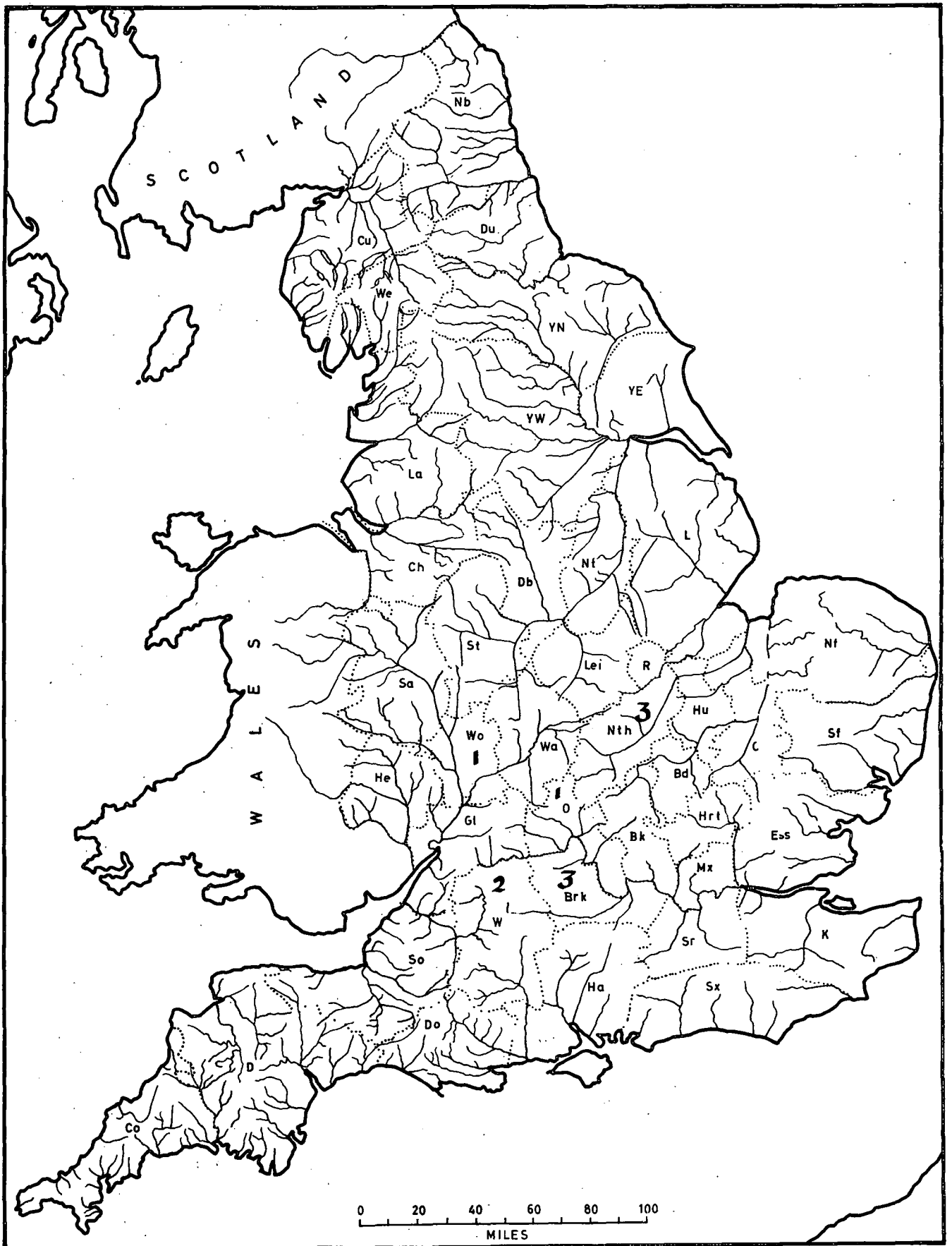
Table IIc. Number and location of clusters: 9 clusters.

| 17. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|-----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Reloc 11 | * | | | | | | | * | | | | | | * | | | | | | | | | | | |
| R(11) 6 | + | * | | | | | * | + | | | | | | * | | + | | | | | | | | | |
| H 11 | * | | | | | | | * | | | | | | * | | | | | | | | * | | | |
| ±(i) 12 | | * | | | | | * | + | | | | | | * | | * | | | | | | | | | |
| ±(ii) - | | | | | | | | | | | | | | | | | | | | | | | | | |
| ±(iii) 14 | + | * | | | | | * | * | | | | | | * | | + | | | | | | | | | |
| Reloc 12 | | | * | | | | | | | | | | | | | | | | | | | | * | | |
| R(12) 5 | | | * | | | | | | | | | | | | | | | | | | | * | * | | |
| H 12 | | | * | | | | | | | | | | | | | | | | | | | * | * | | |
| ±(i) 3 | | | * | | | | | | | | | | | | | | | | | | | * | * | | |
| ±(ii) 7 | | | * | | | | | | | | | | | | | | | | | | | * | * | | |
| ±(iii) 7 | | | * | | | | | | | | | | | | | | | | | | | * | * | | |
| Reloc 13 | | | | | | | | * | | | | | | | | * | | | | | | | | | |
| R(13) 3 | | | | | | | | * | | | | | | | | * | | | | | | | | | |
| H 13 | | | | | | | | * | | | | | | | | * | | | | | | | | | |
| ±(i) 11 | | | | | | | | * | | | | | | | | * | | | | | | | | | |
| ±(ii) 5 | | | | | | | | * | | | | | | | | * | | | | | | | | | |
| ±(iii) 17 | | | | | | | | * | | | | | | | | * | | | | | | | | | |
| Reloc 14 | * | | | | | | * | | | | | | | | | | | | | | | | | | |
| R(14) 17 | * | | | | | | * | | | | | | | + | | | | | | | | | | | |
| H 14 | * | | | | | | * | | | | | | | | | | | | | | | | | | |
| ±(i) 10 | * | | | | | | * | | | | | | | | | | | | | | | | | | |
| ±(ii) 14 | + | * | | | | | * | | | | | | | | + | | | | | | | + | | | |
| ±(iii) 4 | * | | | | | | * | | | | | | | | | | | | | | | | | | |
| Reloc 15 | | * | | | | | * | * | | | | | | * | | | | | | | | * | | | |
| R(15) 15 | | * | | | | | + | + | | | | | | | | | | | | | | * | * | | |
| H 15 | | * | | | | | * | | | | | | | * | | | | | | | | * | * | | |
| ±(i) - | | | | | | | | | | | | | | | | | | | | | | | | | |
| ±(ii) - | | | | | | | | | | | | | | | | | | | | | | | | | |
| ±(iii) 2 | | | | | | | * | | | | | | | | + | | | | | | | * | | | |
| Reloc 16 | * | | | * | | | | | | | | | * | | | | | | | | | | | | |
| R(16) 15 | * | | | | | | * | | | | | | | * | | * | | | | | | * | + | * | |
| H 16 | * | | | + | | | | | | | | | * | | | | | | | | | * | + | * | |
| ±(i) 13 | * | | | | | | | | | | | | | + | | * | | | | | | * | + | * | |
| ±(ii) 13 | * | | | + | | | | | | | | | * | | | | | | | | | * | + | * | |
| ±(iii) 15 | * | | | + | | | | | | | | | * | | | | | | | | | * | + | * | |
| Reloc 17 | | | | | | | * | | | | | | | | | * | | | | | | | | | |
| R(17) 16 | * | | | | | | * | | | | | | | * | | * | | | | | | * | + | * | |
| H 17 | | | | | | | * | | | | | | | | | * | | | | | | * | + | * | |
| ±(i) 13 | * | | | | | | * | | | | | | | + | | * | | | | | | * | + | * | |
| ±(ii) 15 | * | | | | | | * | | | | | | | * | | * | | | | | | * | + | * | |
| ±(iii) 12 | * | | | | | | * | | | | | | | * | | * | | | | | | * | + | * | |

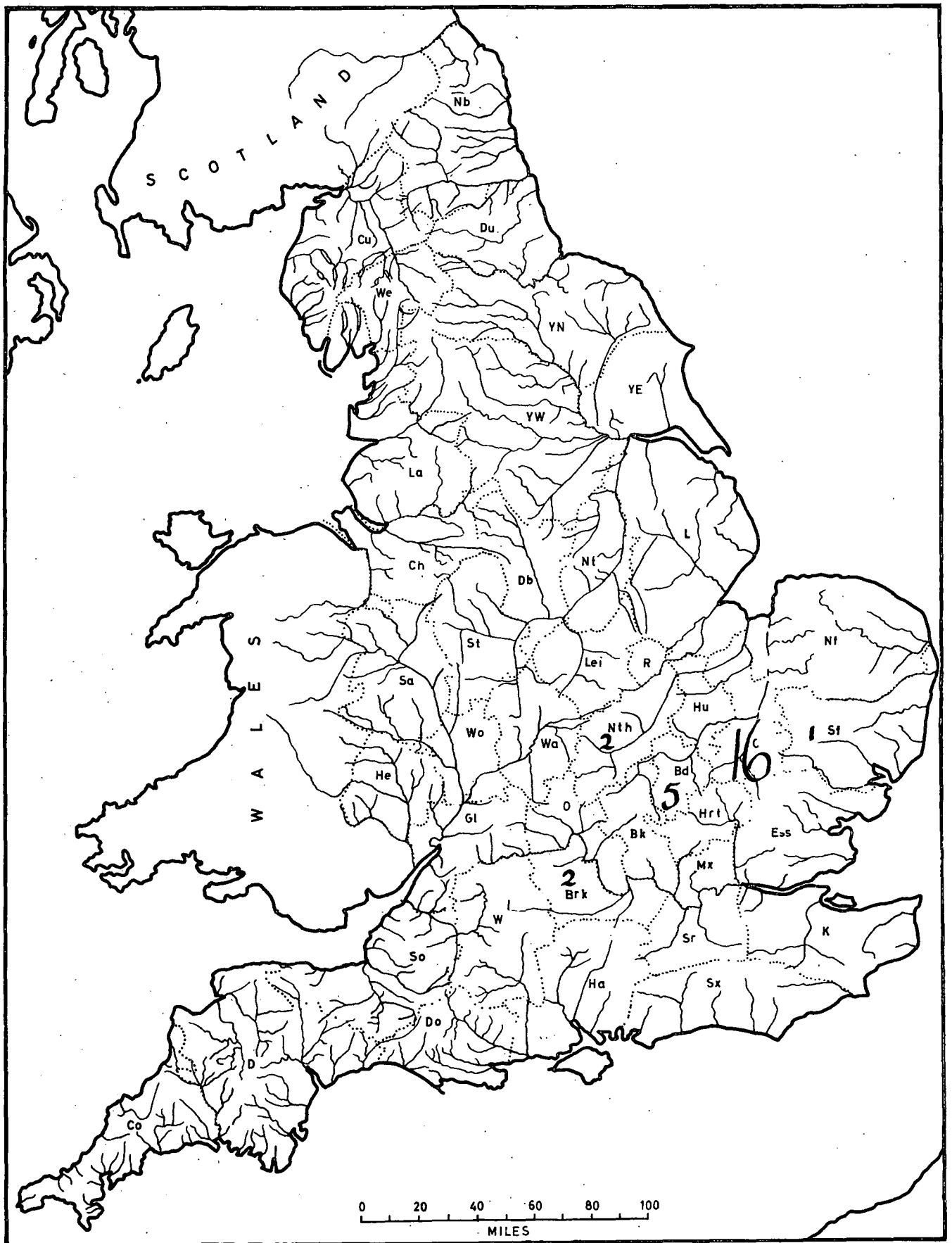
Table IId. Saucers and up-lined brooches: 17 clusters.



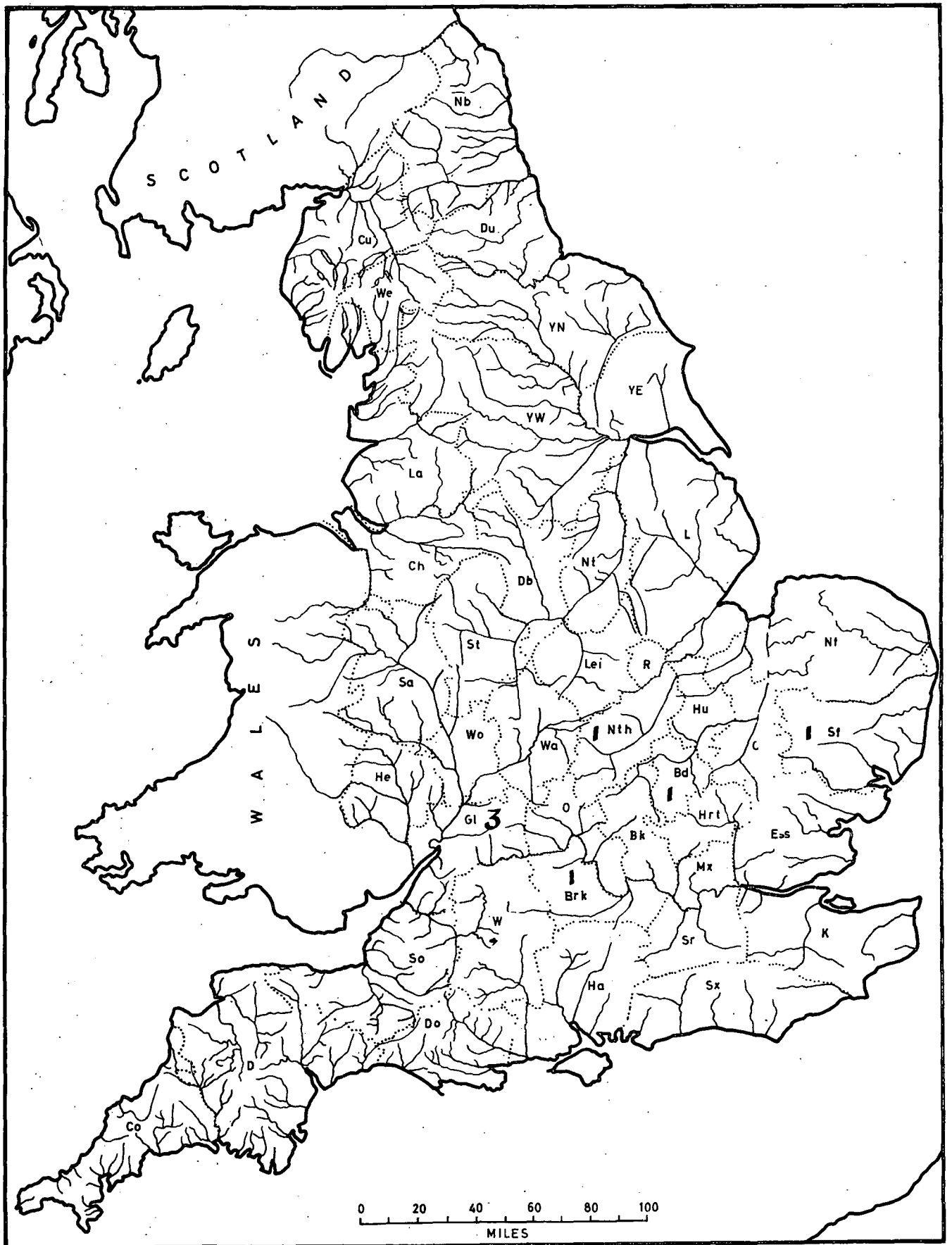
Map IVa. Saucer and applied brooch: RELOC 17:1.



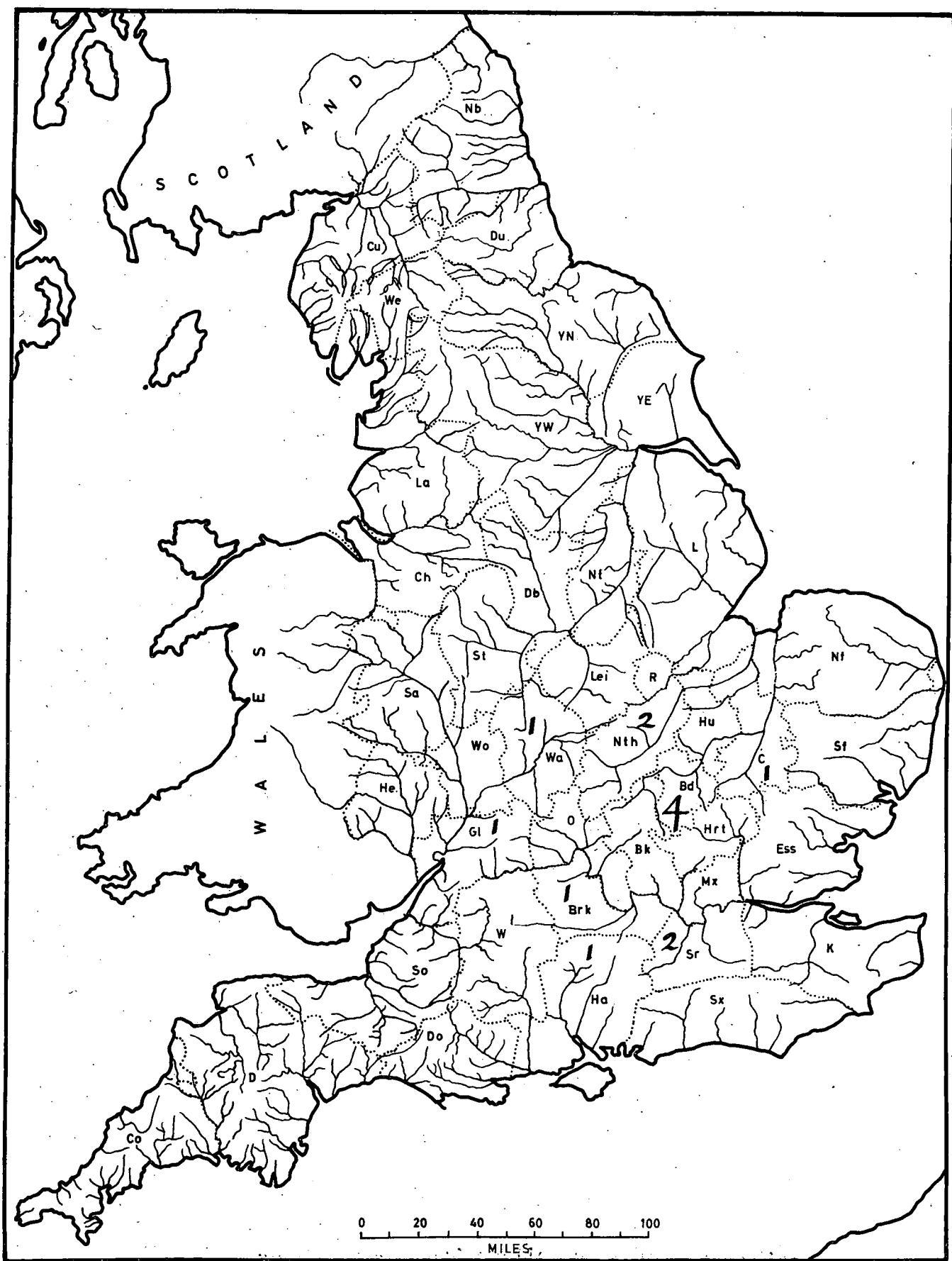
Map IVb. Saucer and applied brooch: RELOC 17:8.



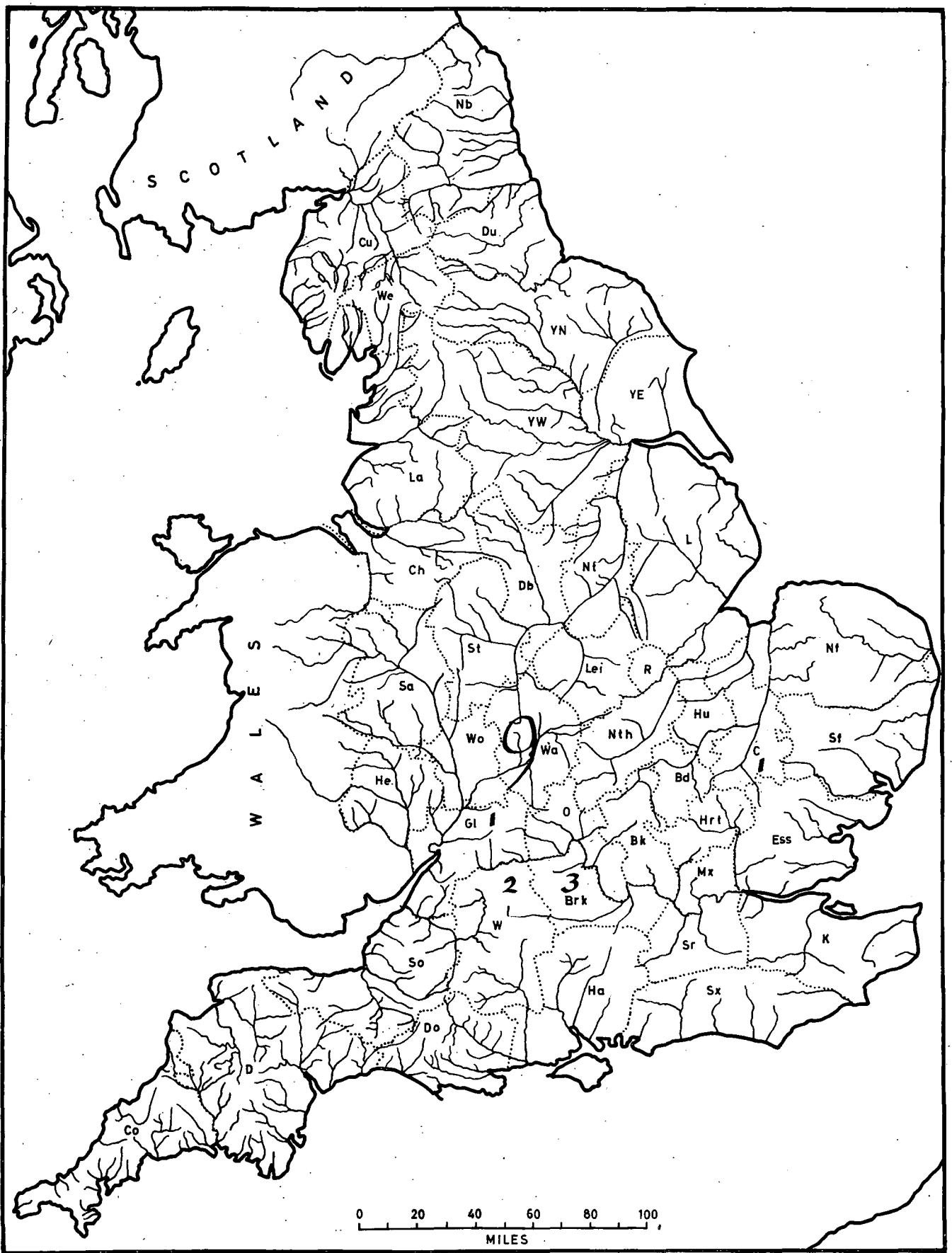
Map IVc. Saucer and applied brooch: RELOC 17:2.



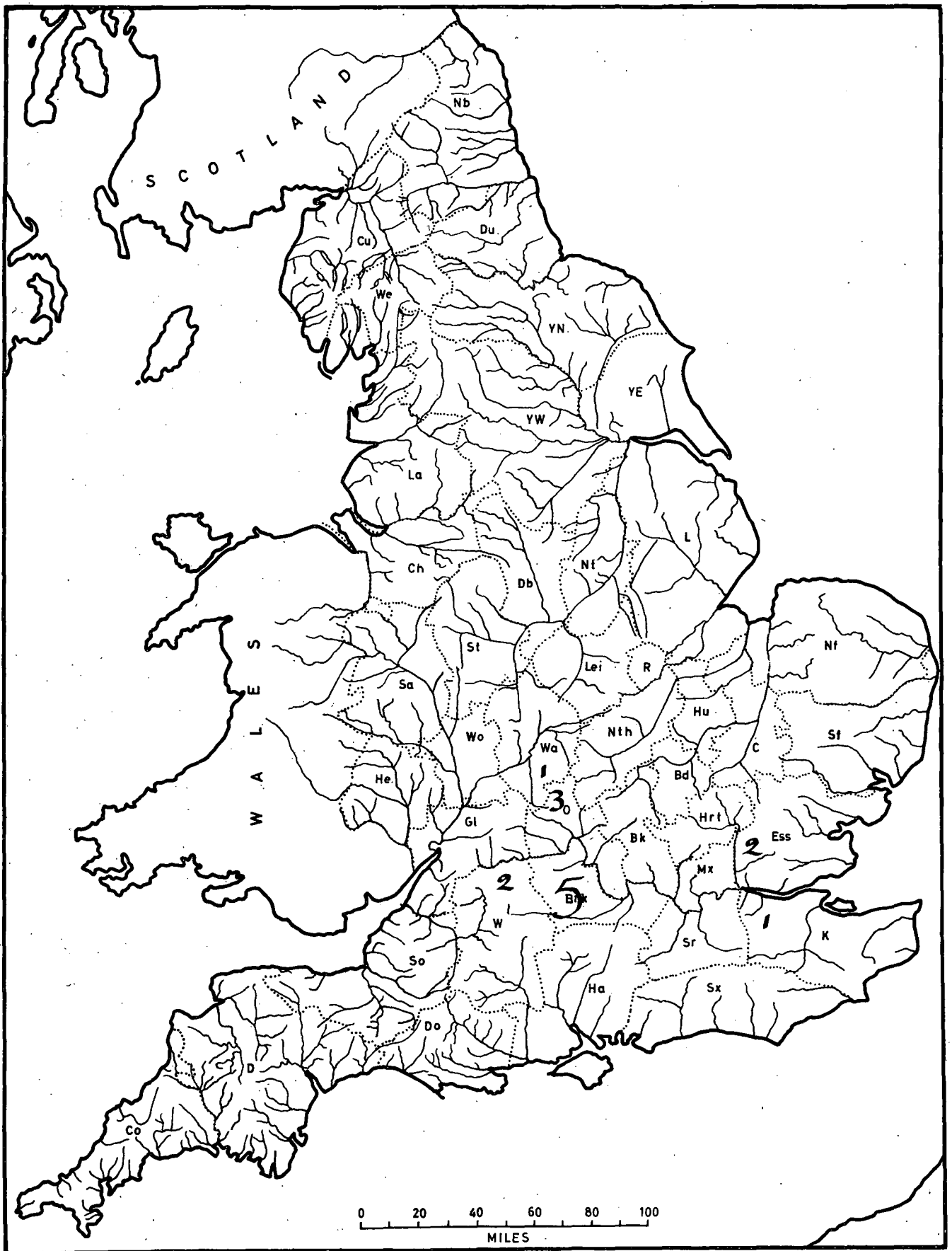
Map IVd.Saucer and applied brooch: RELOC 17:3.



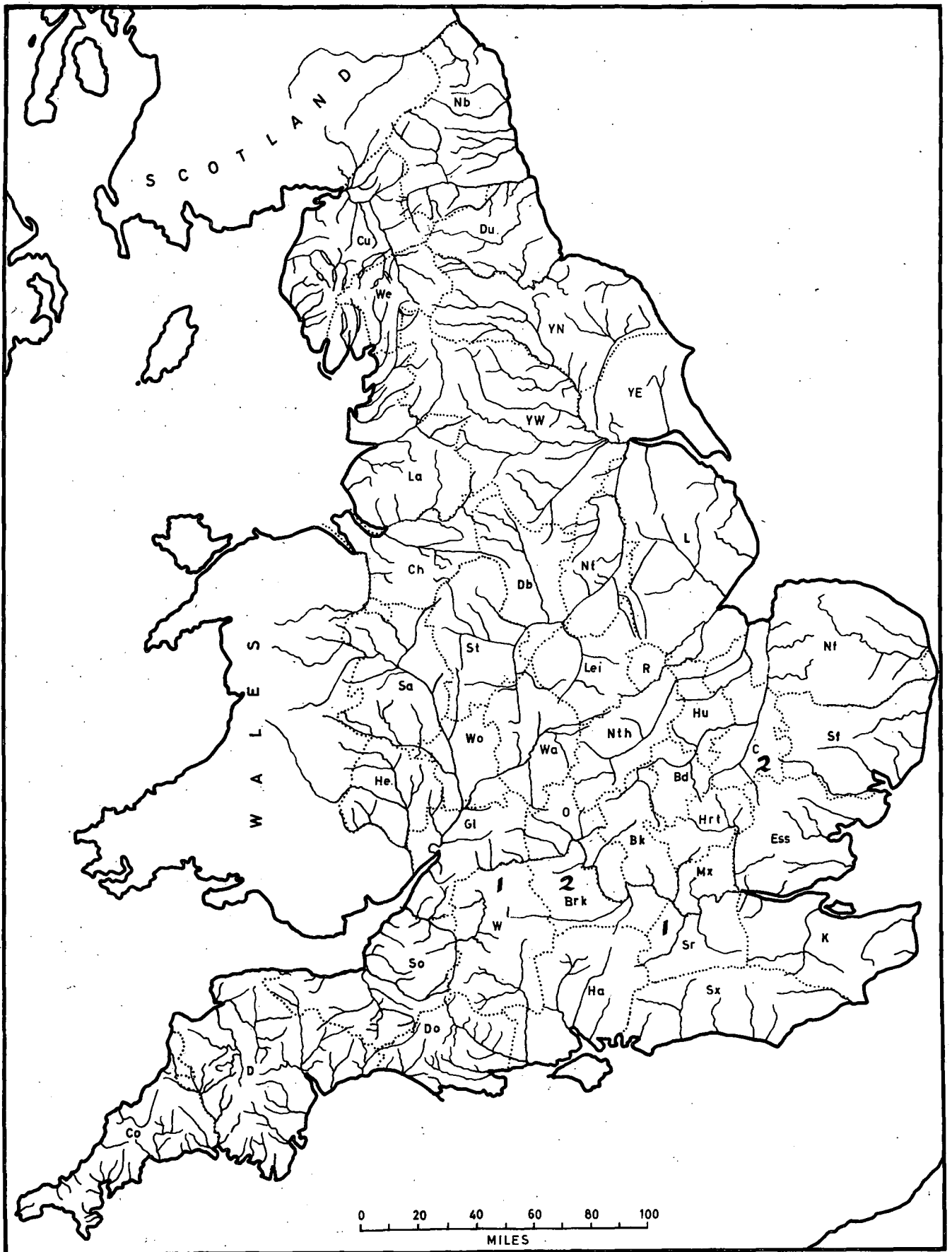
Map IVe. Saucer and applied brooch: RELOC 17:4.



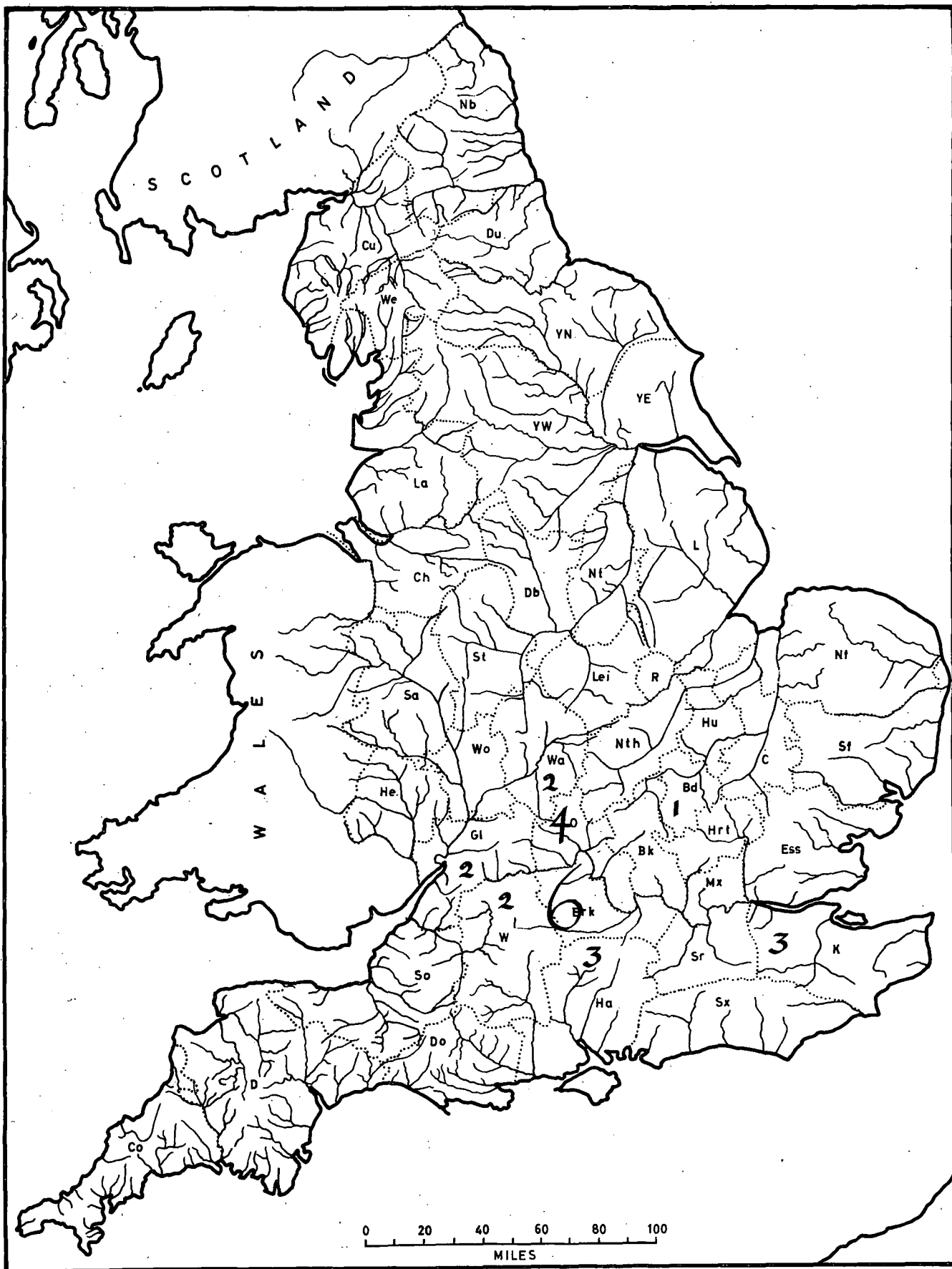
Map IVf. Saucer and applied brooch: RELOC 17:5.



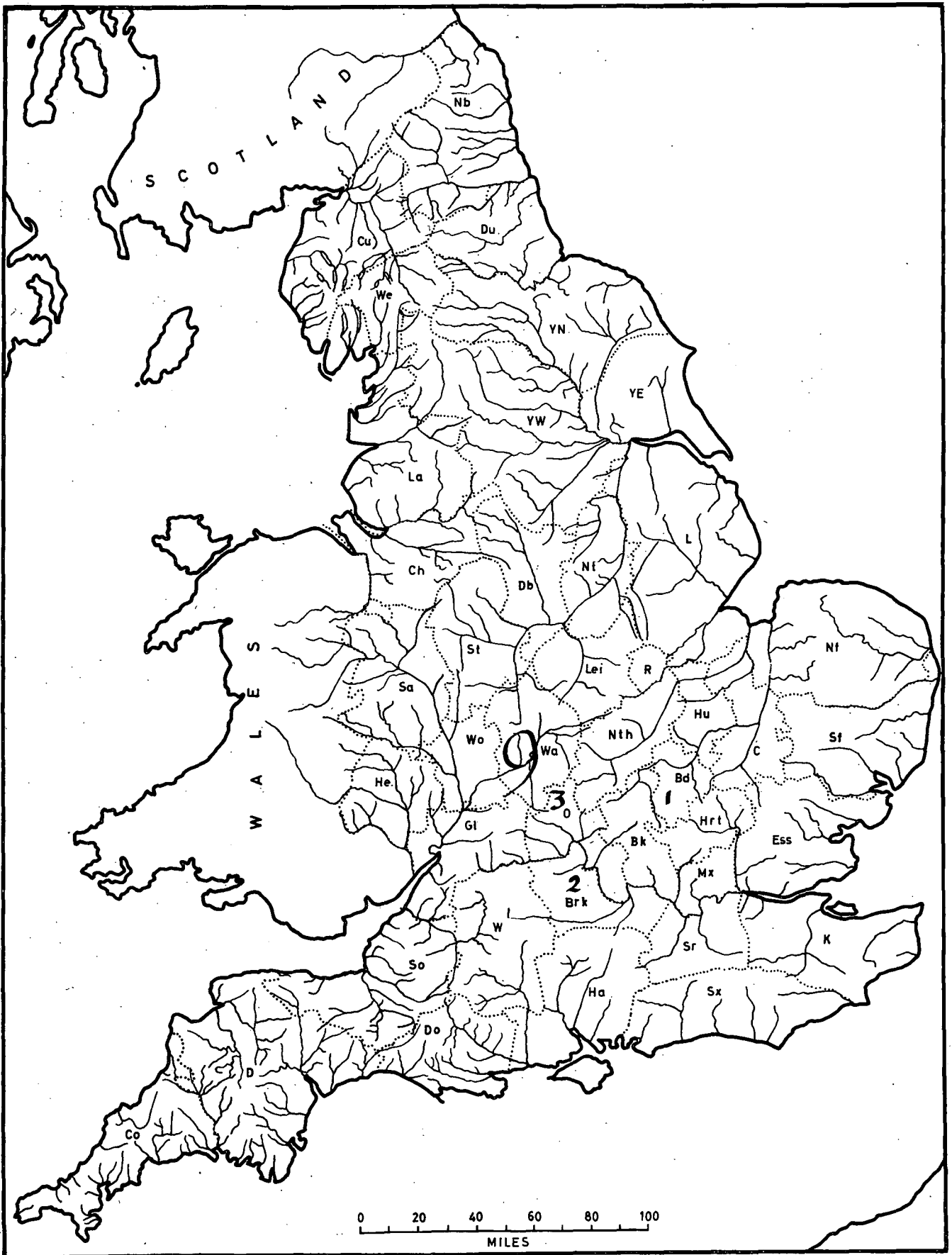
Map IVg.Saucer and applied brooch: RBLOC 17:9.



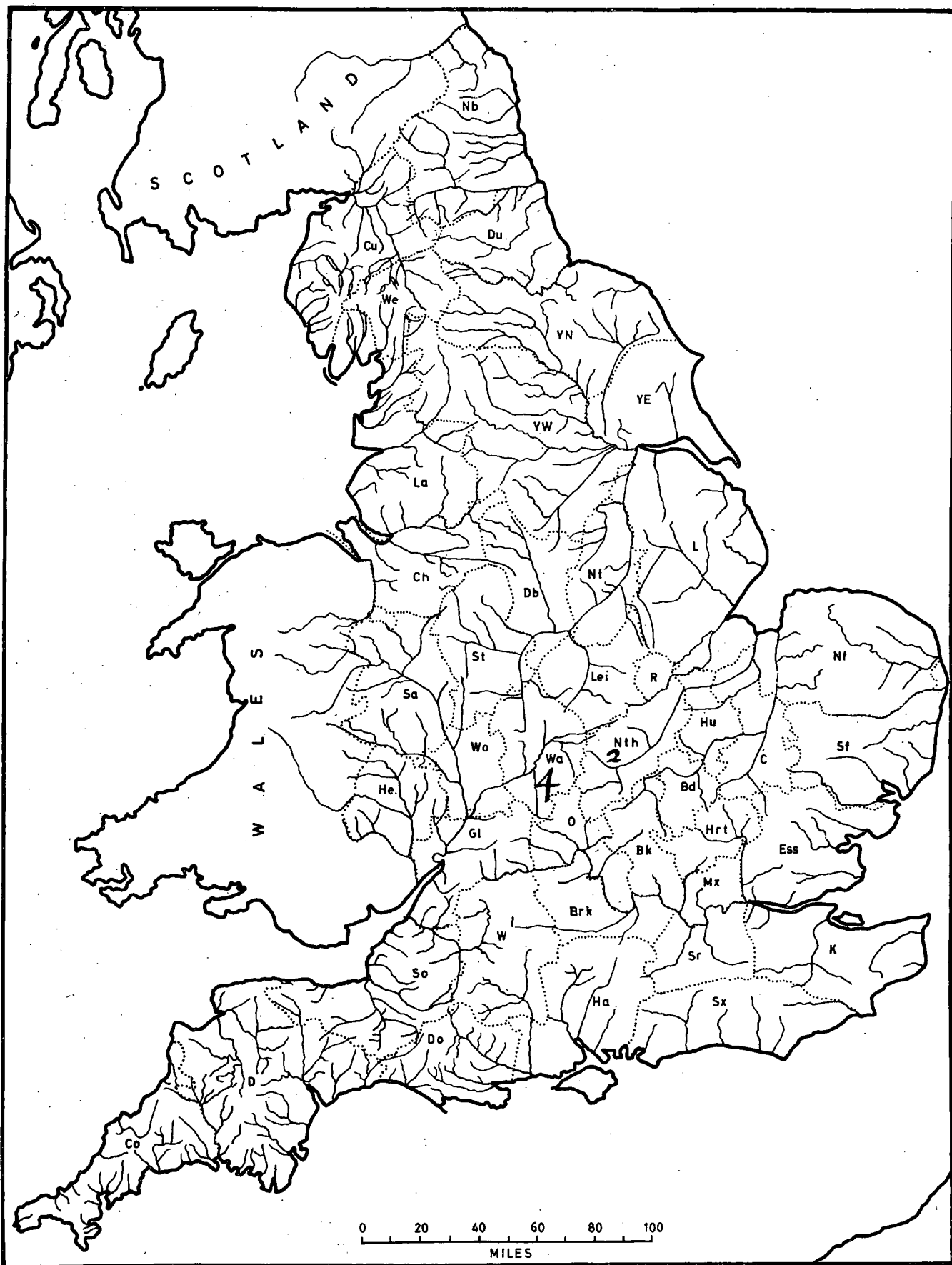
Map IVh. Saucer and applied brooch: RELOC 17:16.



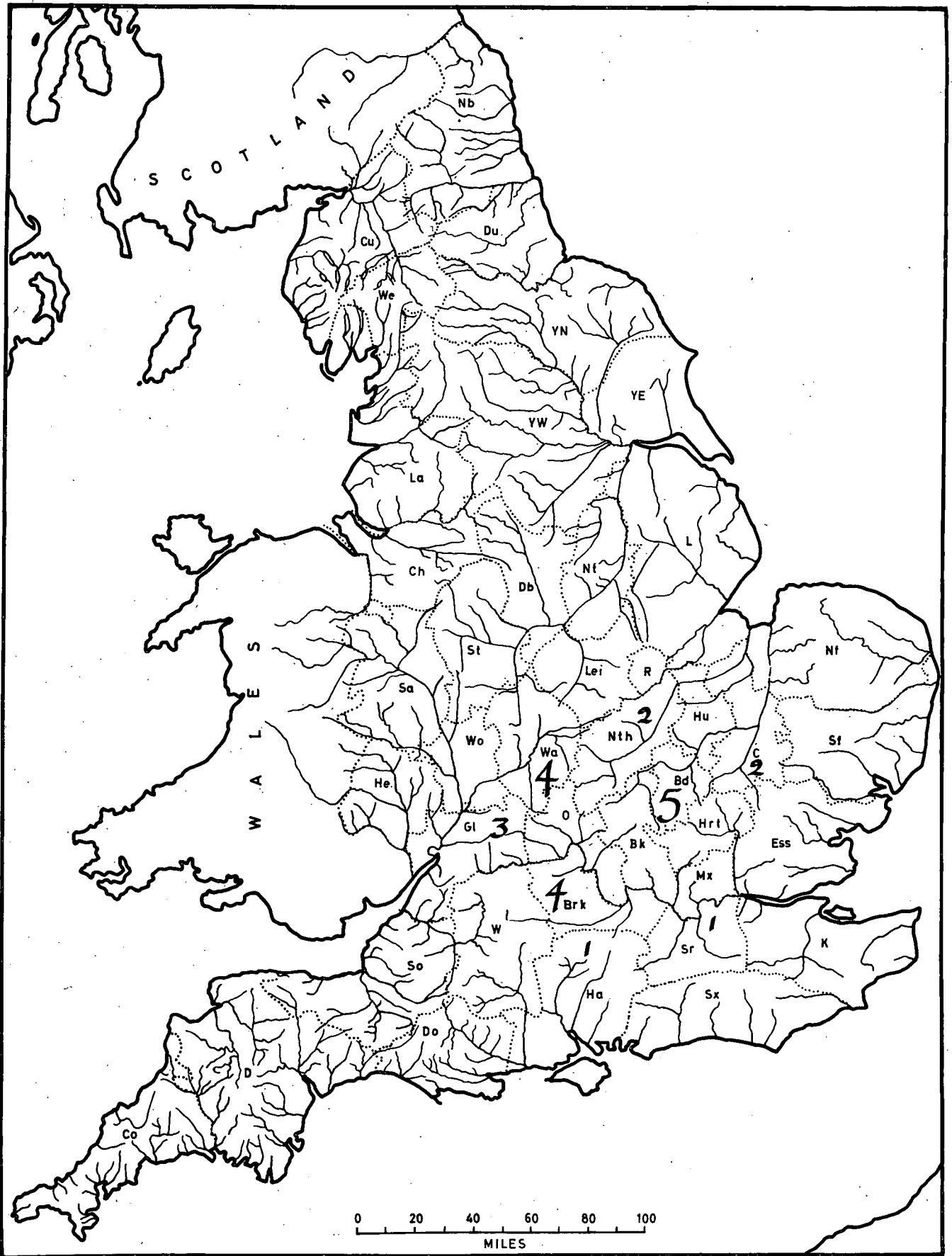
Map IVi. Saucer and applied brooch RELOC 17:12.



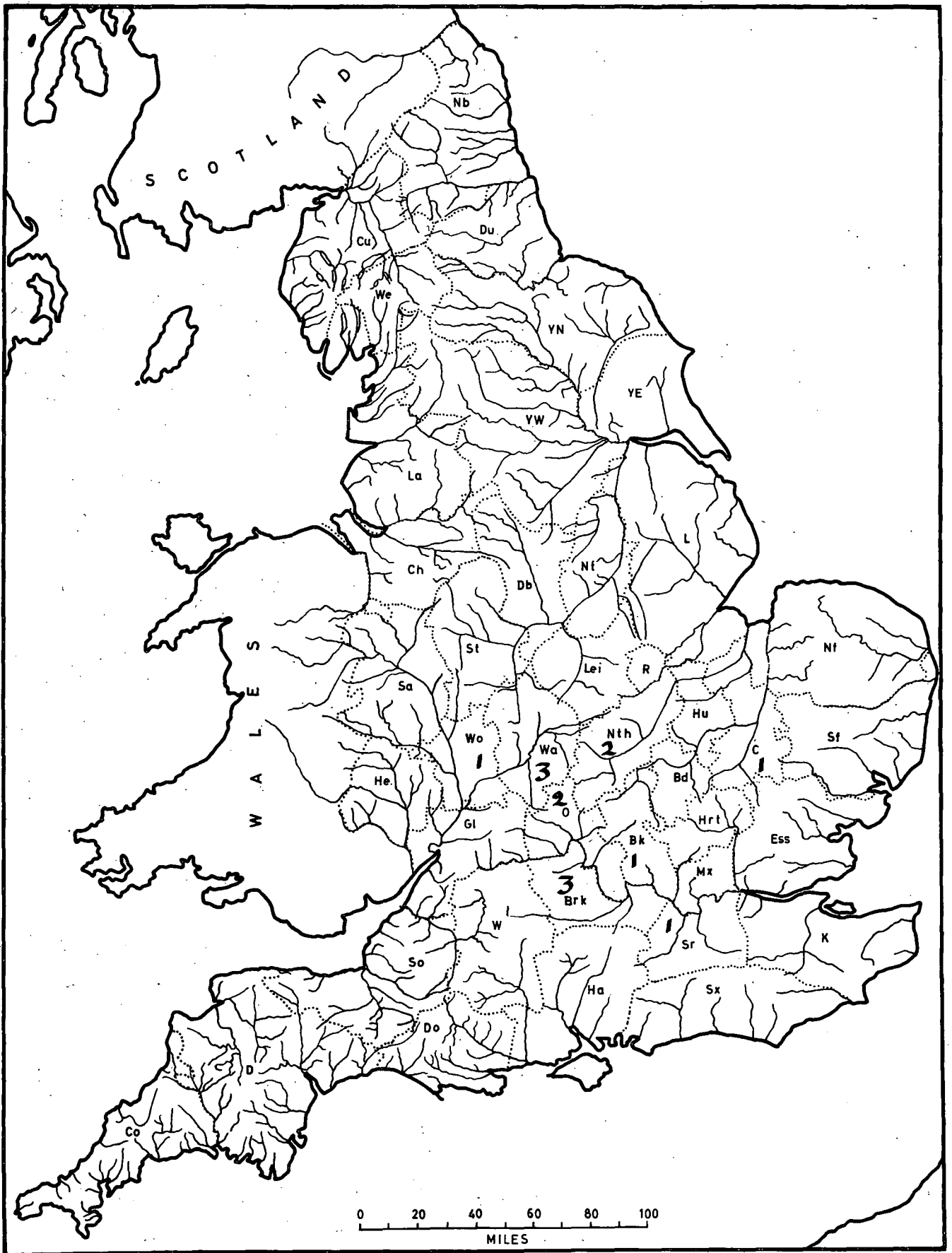
Map IVj.Saucer and applied brooch: RELOC 17:6.



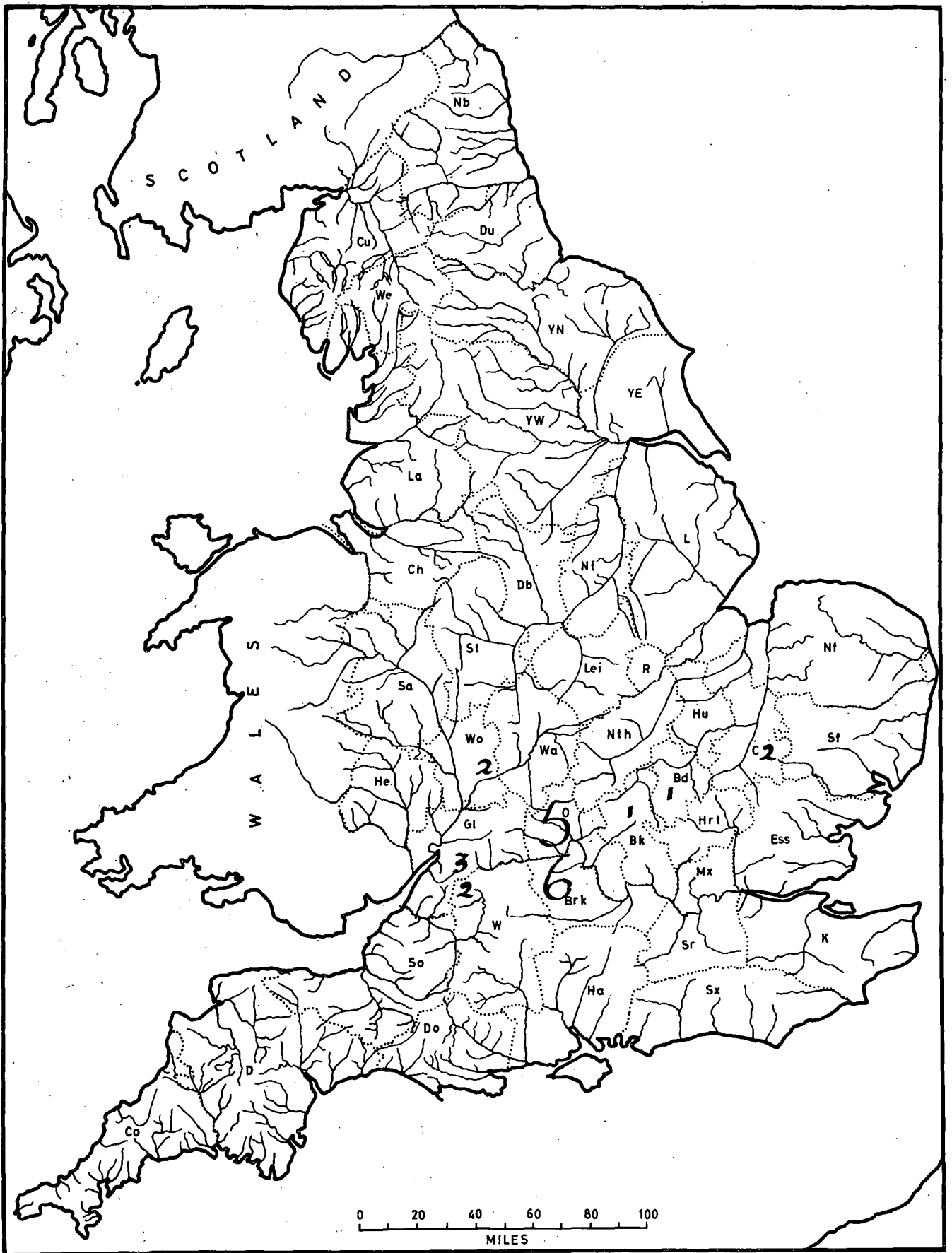
Map IVk.Saucer and applied brooch: RELOC 17:17.



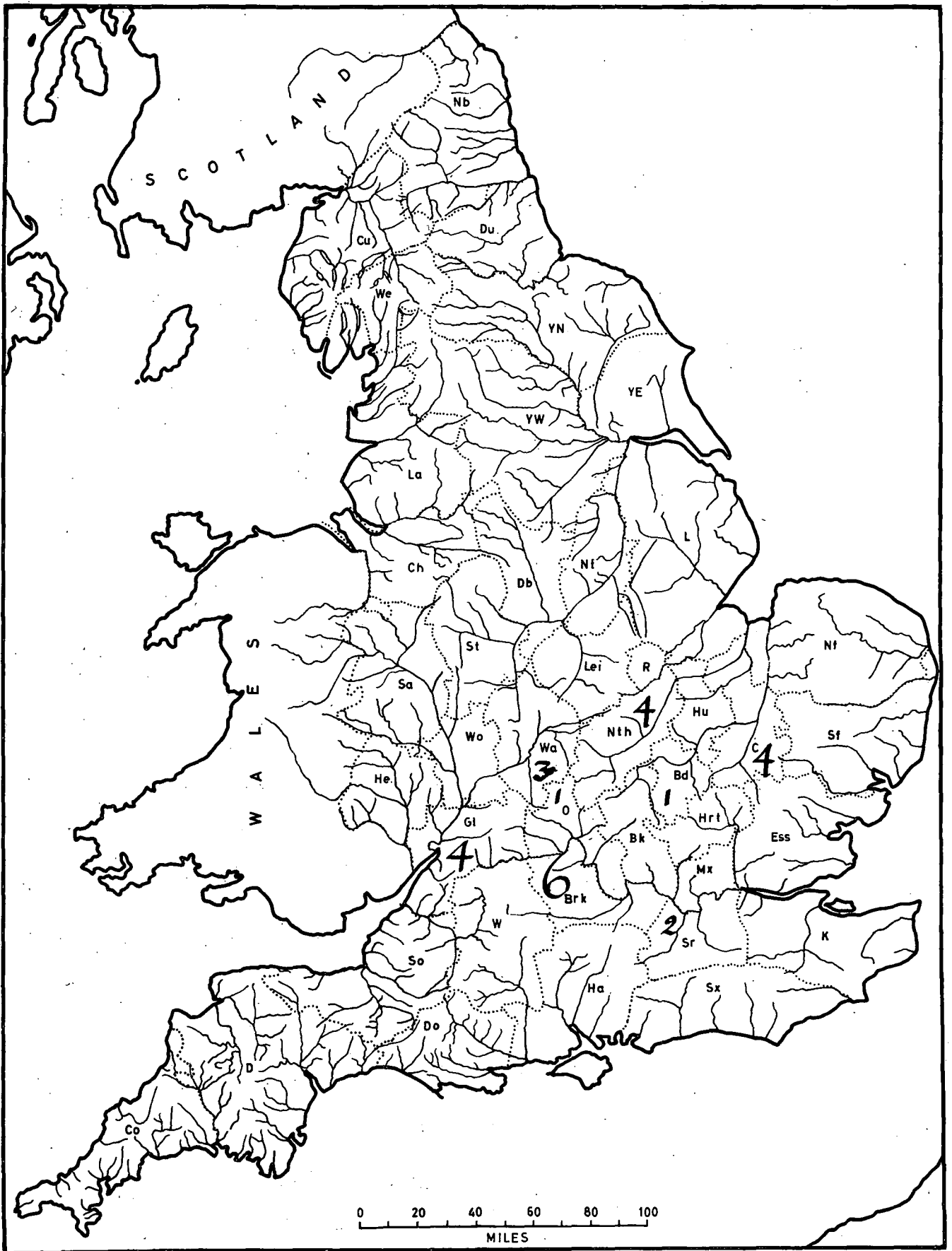
Map IV.1. Saucer and applied brooch: RELOC 17:7.



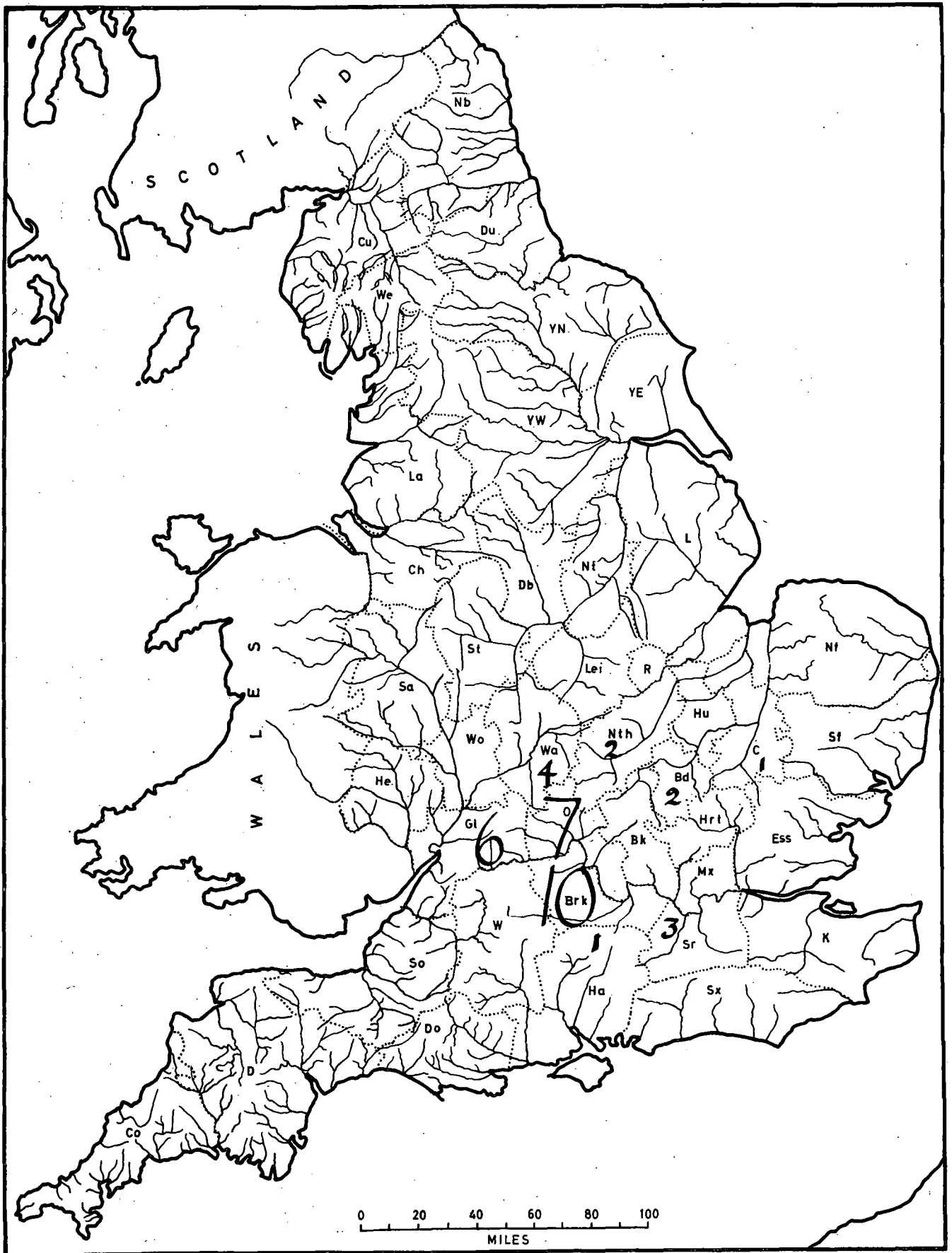
Map IVm. Saucer and applied brooch: RELOC 17:11.



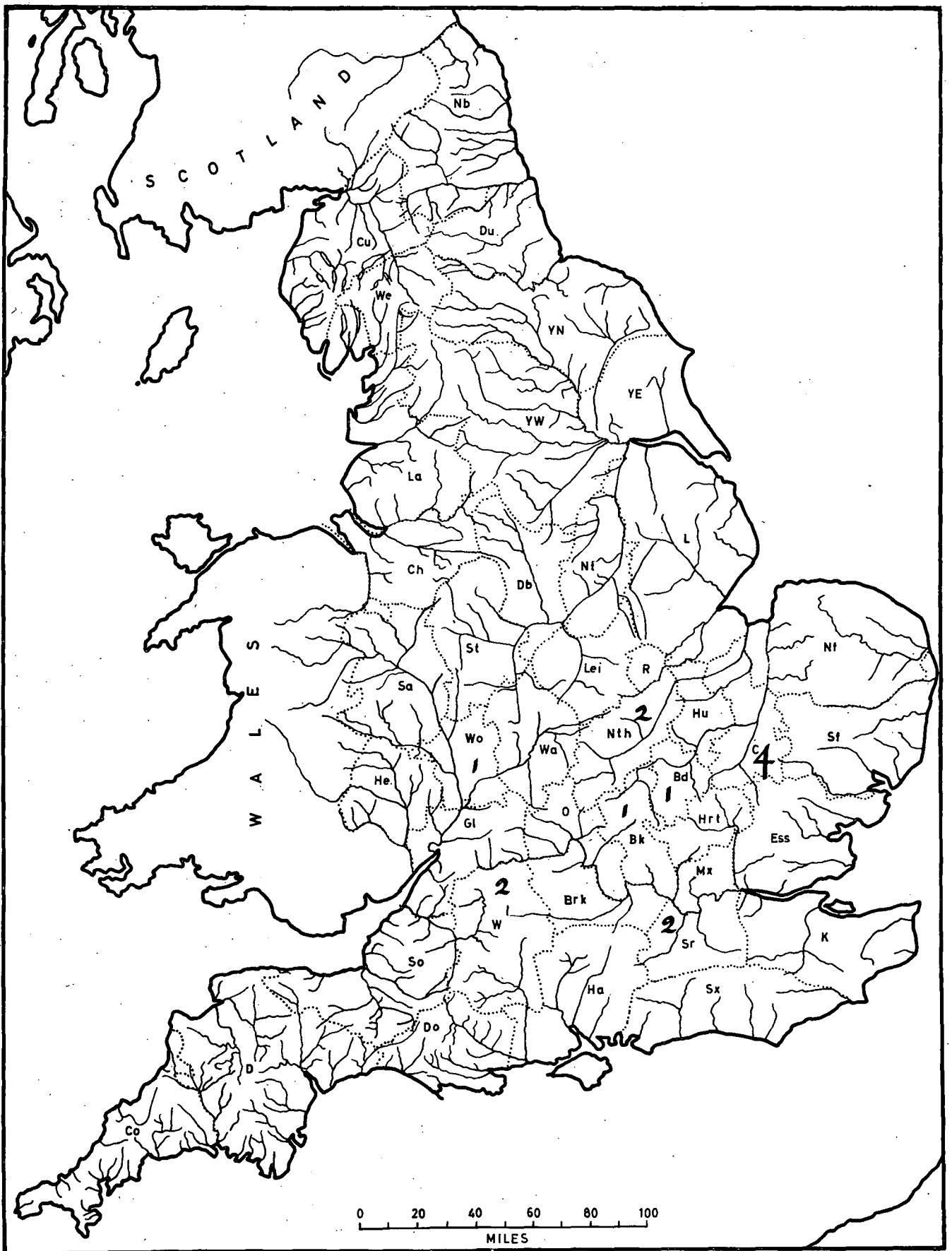
Map IVn. Saucer and applied brooch: RELOC 17:10.



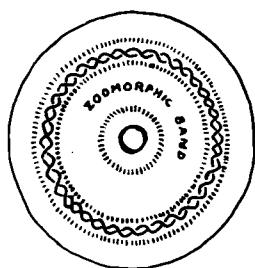
Map IVo.Saucer and applied brooch: RELOC 17:14.



Map IVp. Saucer and applied brooch: RELOC 17:13.



Map IVq.Saucer and applied brooch; RELOC 17:15.



RELOC 17:1

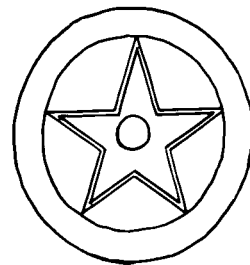
- a. 11 (zoomorphic; 25 (applied brooch);
- b. 21 (ribbing); 23 (central imitation jewel);
- c. 9 (catherine wheel); 13 (guilloche); 16 (∩); 21 (ribbing);
23 (jewel in centre); 25 (applied);

The key feature of this type is the wide band of zoomorphic interlace decoration which occurs on every brooch, nearly all of which also have a jewel or imitation jewel at the centre. Two or three lines or dots decorate the contorted animal bodies and many brooches have the bands of decoration edged by a narrow band of ribbing. In addition to these distinctive characteristic features decoration occurring more commonly than would be expected in a random sample, although not of major significance, is worth noting and is therefore included in the diagnostic list as these help distinguish the several types of applied brooch with zoomorphic decoration.

The distribution of this type has two main centres: the Bidford-on-Avon and Stratford-on-Avon area of Warwickshire and Haslingfield, Cambs., but other areas where the type has been found (Oxon., Berks., Beds., Glos., and Suffolk) suggest that there was a Hwiccian/Middle Anglian link (Map IVa). If this type is subdivided according to the style of zoomorphic interlace it might be possible to suggest dates at which the type was in use.

As this type does not occur in the Mitcham, Sy., cemetery Bidder and Morris (1959) do not refer to it but Leeds (1911-12: 171, 176) considers it to be a major group which can be dated by the animal style ornament. If Salin I is late fifth century and Salin II is early seventh century in England these dates give the wide range of time when the type was popular. The type was selected (Table IIId) by all six cluster methods with a high degree of agreement and thus supports Leeds.

RELOC 17:8

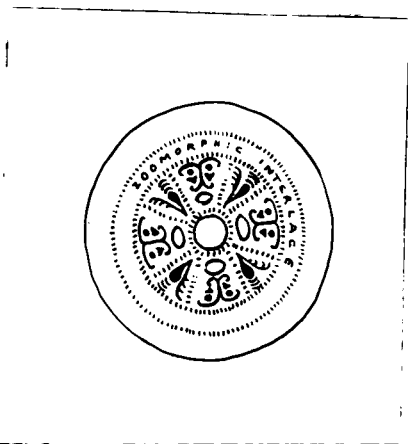


- a. 23 (central imitation jewel); 25 (applied brooch);
- b. -
- c. 6 (star); 13 (guilloche); 14 (tooth, zig-zag); 18 (egg and tongue);
22(••⊕••⊕••⊕); 23 (jewel in centre); 25 (applied);

A central imitation jewel is surrounded by a star design which is usually formed by raised double lines. Five or six points, generally sharply defined, radiate from the central jewel in this type and dominate the decorated part of the brooch although a border of guilloche, or a simple geometric design, may edge the applied disc.

This type of applied brooch occurs in Northants. and the Wilts./Berks. area and has a more markedly western distribution than many of the other types (Map IVb).

Bidder and Morris (1959) do not discuss this type but Leeds (1911-12: 179) gives a brief reference to it without adding any opinions as to date or distribution. It may be an early variety if Leeds' opinion that the star motif (1911-12: 166, 193) and the applied technique of manufacture be correct. There is strong support for the type from the results of the cluster methods (Table IIId) with RELOC on both HIERAR and MODE and HIERAR giving identical characteristics. The three DIVIDE programs show small discrepancies which may be due to the inflexibility of their systems but the overall picture is one of support for the significant features of this type.



RELOC 17:2

- a. 10 (legs); 23 (imitation jewel in centre); 25 (applied brooch);
- b. 5 (masks in the field); 11 (zoomorphic); 21 (ribbing);
- c. 5 (masks in field); 10 (legs); 11 (zoomorphic); 21 (ribbing);
23 (jewel in centre); 25 (applied);

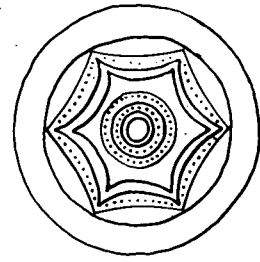
This large group is characterised by a cross of stylised full-face masks alternating with a bent animal's leg, which normally has three lines over the pear-shaped hip joint. Even the small subtype without the four masks has the same animal leg design within a V of ribbing and the masks are replaced by a band of zoomorphic interlace. These are very similar if not identical, and show a link between Duston, Northants., and Barrington B, Camb. All the brooches have a central imitation jewel and a narrow band of zoomorphic interlace generally surrounds the mask/legs design.

Although often referred to as the "Kempston type" of brooch almost three times as many have been found in Cambridgeshire, especially at the two Barringtons, as have been found in Bedfordshire (Map IVc) but the type extends to Berks., Northants. and Suffolk giving a fair indication that this is a Middle Anglian type.

This distinctive type is recognised by both Bidder and Morris (1959: 89) and by Leeds (1911-12: 179) as well as being identified by all six cluster programs (Table IIId). Leeds suggests that this type may be later than mid-sixth century, on animal-stylistic evidence mainly, while Bidder

and Morris claim that two of the type have been found associated with mid or late sixth century great square-headed brooches. A date in the second half of the sixth century, therefore, seems likely for the group although the pear-shaped hip joint may put the group earlier in the century.

RELOC 17:3



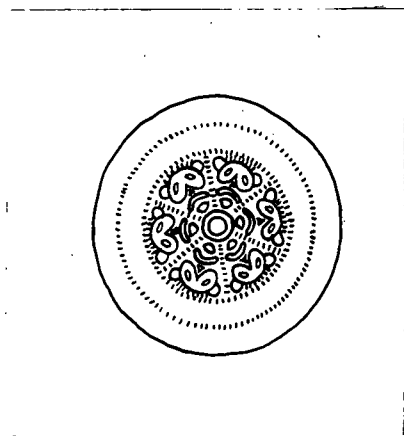
- a. 25 (applied brooch);
- b. 6 (star); 19 (bull's eye);
- c. 1 (square); 3 (heart); 6 (star); 9 (catherine wheel); 25 (applied);

The central bull's eye, rather than an imitation jewel, distinguishes this type of star-decorated applied brooch from RELOC 8. While the star dominates the decorated part of the brooch it is much more fussy than those of RELOC 8, having ornamental bands both within and outside the star.

Fairford, Glos., has the largest proportion of this type of brooch but it is not a very common group with only slight evidence for its distribution through Berks., Beds., Northants. and Suffolk (Map IVd).

Although there is a dearth of dateable evidence for this type Bidder and Morris (1959: 91) consider it to be mid to late sixth century and contemporary with RELOC 17:8 and 14 but there is no proof of this theory. Leeds' work was too early to take account of excavations carried out during the twentieth century (1911-12: 166) but he mentions that there was one applied brooch with a star decorated with a band of dots from the Fairford, Glos., cemetery. If it is true that designs degenerate and become fussy then I would hazard a guess at a later date for this type than the simpler, clean-cut star types but this is pure conjecture and the type needs further study. The significant features for the type (Table IIId) show an interesting split between the agglomerative programs and the

divisive ones (e.g. feature 9,14,18) which is due to the peculiarities of the various methods used and emphasises the anomalies which may arise when a purely divisive technique, with no provision for adjustment between clusters, is used.



RELOC 17:4

- a. 5 (mask in field); 19 (bull's eye); 25 (applied brooch);
- b. -
- c. 2 (cross); 5 (mask in field); 12 (plait); 13 (guilloche);
18 (egg and tongue); 20 (|| (o) || (o) || (o) || (o) || (o) ||); 25 (applied);

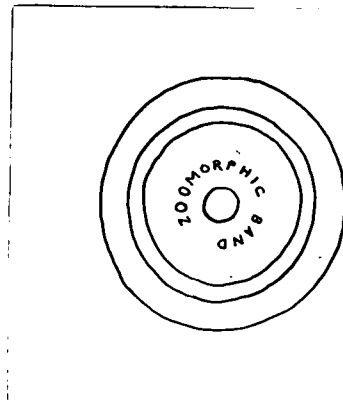
This group is characterised by a central bull's eye around which are four or six full-face masks, often formed from a heart-shaped outline. The pattern thus created has a narrow band of geometric decoration around it. Typical brooches have no other decorative features but there is a subgroup which has zoomorphic interlace between the four masks thereby emphasising the cruciform nature of the design.

Kempston, Beds., is the primary centre for this group (Map IVe) but it also occurs in the West Midlands, Northants., and Wessex.

In Bidder and Morris (1959: 86) it is suggested that this type of applied brooch is derived from the scroll or spiral design, RELOC 17:13, which may date from Roman-British times until the early sixth century. If this is correct then the "mask in field" type was presumably late in the period and although they do not state clearly any particular date for this type it seems that an early or mid-sixth century one is possible. Bidder and Morris do not have such a small group as I have for this type, for they put RELOC 17:16 and some of the late RELOC 17:13 with the group. I do not think their lack of subdivision very helpful and prefer my type

which all six cluster programs have produced with an extremely high degree of agreement (Table IIId). Leeds (1911-12; 166) puts a possible date for the type as late fifth century but he suggests that the Roman-British design was executed by native craftsmen. As he gives no complete list of brooches for any particular type it is difficult to reconcile the claim by Leeds (p.166) that the design is restricted to the Fairford, Glos./Reading, Berks. area with the distribution produced from my sample (Map IVe) which shows a Middle Anglian core area. The difficulty in correlating the groups produced by all three typologies is an excellent illustration of the problems caused by the imprecise methods traditionally used in Anglo-Saxon archaeology because, while the key types match, there is confusion about the indeterminate examples.

RELOC 17:5



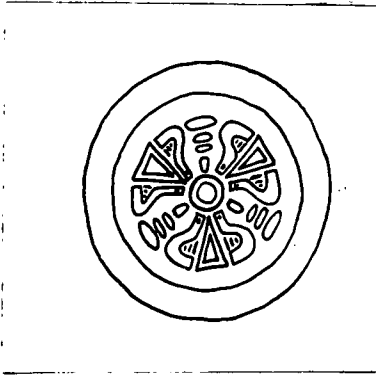
- a. 11 (zoomorphic); 23 (central imitation jewel); 26 (saucer brooch);
- b. -
- c. 11 (zoomorphic); 18 (egg and tongue); 23 (central jewel);

The central jewel of this saucer brooch type is surrounded by a wide band of zoomorphic decoration - sometimes the animals are separated but the body may be defined by interlace and in other brooches no division is made between the maze of twisting animal bodies. The importance of the zoomorphic element in the design is emphasised by the insignificance of secondary bands of lines or simple geometric motifs.

Bidford-on-Avon, Wa., is the major site for this group of brooches which is essentially a Warwickshire type (Map IVf) with a few samples from Glos., Berks. and Wilts. indicating a Hwiccian/Wessex link. One example is known from Barrington, Camb., but this is far from all the other examples and may be a rare export from the West Midlands.

Leeds (1911-12: 170ff) refers to the large class of zoomorphic saucer brooches which may be dateable by Salin I and II animal typology and there is ample scope for work on sequence dating within this interesting type. Neither Leeds nor Bidder and Morris (1959) subdivide the zoomorphic brooches as much as I have done: they seem to put them all into one type whereas I have RELOC 17:1,2,5,7,9,10, which allows a geographical distribution of subtypes to be seen and this, I think, is useful. Four of

the six cluster analysis programs agree on the significant features of this type (Table IIId) and there are only minor discrepancies between these and the other two program results which suggest that the type is justifiable.



RELOC 17:9

- a. 23 (central jewel); 24 (imitation jewel in field); 26 (saucer brooch);
- b. 19 (bull's eye);
- c. 2 (3 arm cross); 5 (mask in field); 9 (catherine wheel);
 23 (jewel in centre); 24 (jewel in field);

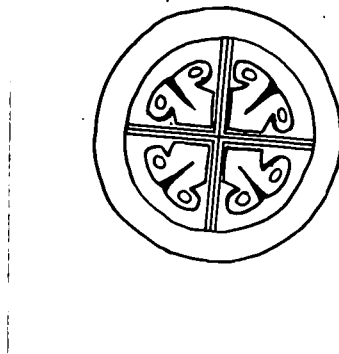
This type may be influenced by Kentish garnet and gold jewelry (Leeds, 1945: 61) for all brooches have the field subdivided by three wedges or imitation jewels radiating from a central jewel or bull's eye. Two subgroups within the type are distinguished by the three decorated panels between the wedges which are either masks or extremely debased interlace animals but both subtypes may have two or three lines around the edge of the main design.

This type has a wide distribution from Kent and Essex to Wessex, Middle Anglia and Warwickshire but Berks., Oxon. and Wilts. seem to form the major area and the type may therefore be a West Saxon one (Map IVg).

As the Mitcham, Sy., excavation did not produce any examples of this type Bidder and Morris (1959) have ignored it, but Leeds (1911-12: 192) makes a point of noting it and he dates it to the late sixth century. He gives an unusually clear list of characteristic features - "three panels of debased zoomorphic design separated by three plain wedges, an undoubted imitation of the Kentish jewelled brooches ornamented with three or more wedge-shaped garnets ..." . The cluster programs correlate well

on most features but leave others (Table IIId, notably nos. 2,9,22,23) in some doubt. Such features may have a high probability of being within the type but are not very common in actual numbers or they may produce positive or negative results because of the cluster analysis program's limitations. These discrepancies are not sufficiently important to invalidate the type however.

RELOC 17:16



- a. 5 (mask in field); 26 (saucer brooch);
- b. 2 (4 arm cross);
- c. 2 (4 arm cross); 5 (mask in field); 13 (guilloche);

This type has a cruciform subdivision of the field which may be made either by lines or by plain wedges between four full-face masks. The masks are highly stylised and developed from a heart-shaped outline. A small subgroup does not have the masks but has instead a very simple linear motif and these may be a later development produced when the mask had gone out of fashion, possibly because of some pagan significance.

This type is found south of the Thames, especially in the Berks. area although some also have been discovered in Cambridgeshire (Map IVh).

A fifth or early sixth century date is given to this type which Bidder and Morris (1959: 86ff) suggest is a derived form of the scroll design, RELOC 17:13 and a parallel development of RELOC 17:4. Like the scroll, Leeds (1911-12: 168f.) thinks this to be inspired by Roman-British designs and therefore agrees on a fairly early date. The two RELOC results do not show much agreement about significant features for this type (Table II d) but RELOC on HIERAR, HIERAR, DIVIDE (ii) and DIVIDE (iii) have sufficient attributes in common for the type to be accepted. RELOC on MODE and DIVIDE (i) have much in common and it might be useful to study this type with more features (e.g. rim depth, diameter, height of the pin-catches) to see if a greater agreement than four out of six methods can be achieved.

RELOC 17:12



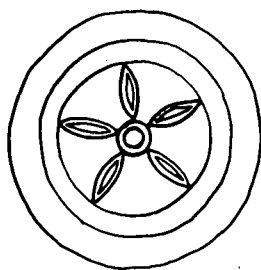
- a. 4 (mask in centre); 26 (saucer brooch);
- b. -
- c. 4 (mask in centre); 22 (o o ≡ o o ≡ o o);

This type may be subdivided according to the diameter of the brooch - the larger being the saucer brooch proper and the small ones (of 1" diameter or less) being the button brooch - but a central full-face mask characterises the group. The face has a distinctive nose and eyebrows based on a T with close-set, prominent eyes. No other decoration is found on the button brooch but the larger, saucer brooch may have varied designs around the face including geometric ones, zoomorphic interlace or other masks.

The button brooch occurs in Kent, Wessex and Oxon., while the saucer brooches are found in Wessex, Glos., Wa., and Beds., which suggests a Hwiccian/Wessex link (Map IVi).

In order to test the reliability of the clustering programs with archaeological data and to test the feasibility of the data I had selected the button brooches were included in the original sample. From Table II d it can be seen that both tests were successful for all programs placed all of these distinctive brooches in the same class, which places credence on my method. There is, of course, no question in either Leeds (1011-12: 165, 192) or Bidder and Morris (1959: 91) that these brooches form a distinct type and both date them to the early phase of Anglo-Saxon settlement, the fifth century.

RELOC 17:6



- a. 7 (petal); 26 (saucer brooch);
- b. 19 (bull's eye);
- c. 7 (petal); 15(light and shade);

Around the central bull's eye lines, or petals, radiate and give the characteristic feature of this type. It is possible to subdivide it into three subtypes according to the presence of other decorative features.

i. One subtype has large petals with lines connecting the six petals and so the decorated surface is covered by a very simple geometric design.

ii. A second subtype has a band of 'light and shade' around the petals.

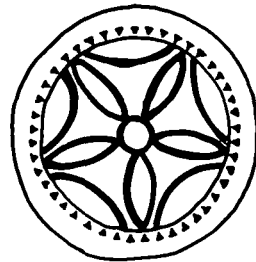
iii. The largest subtype has a band of zoomorphic interlace around the petals.

This is a West Midland type (Map IVj). Longbridge, Wa., and Kempston, Beds., provide examples of the first subtype while the second subtype is found at Stratford-on-Avon, Wa., and Cassington, Oxon. The largest subtype, the third, is found mainly in Warwickshire with outliers in Berks. and Oxon., and so the links seem to extend from the Hwicce to Middle Anglia and Wessex.

There does not appear to be much support for this type in the work

of Leeds (1911-12) or Bidder and Morris (1959). It is also the least well supported type in the cluster analysis program results (Table IIId) but there are enough examples to warrant a further study of it. There may be a need to alter the list of features in the data set in the hope that future work might produce an answer to the question of the acceptability of this type. Bidder and Morris (1959: 91) briefly acknowledge that such brooches do exist with mid-sixth century objects.

RELOC 17:17

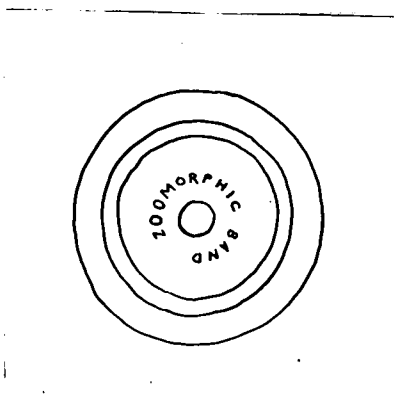


- a. 7 (petal); 23 (central jewel); 26 (saucer brooch);
- b. -
- c. 7 (petal); 17 (triangles); 23 (jewel in centre);

This is a variant of RELOC 6, subtype i, and in addition to the petal motif has very simple decorated edging bands, often of small triangles, around six large or many tiny petals. It is distinguished from the Longbridge, Wa., and Kempston, Beds., subtype by the imitation jewel at the centre in place of a bull's eye.

The Warwickshire cemeteries provide most evidence for this type of decoration with some examples in Northamptonshire suggesting Hwicce/Middle Anglian links. The compact distribution area is noteworthy as such a small one is unusual (Map IVk).

The comments made about the identification of this type are much the same as those made about RELOC 17:6 for it too is ignored by Leeds (1911-12) and Bidder and Morris (1959) but it may be mid-sixth century if it was a contemporary of RELOC 17:6. The cluster analysis program results show a greater degree of agreement about this type than RELOC 17:6 although there is doubt about certain features (Table IIId, notably nos. 2,15,22) and any future study on the petal type should include both types produced in my typology.



RELOC 17:7

- a. 26 (saucer brooch);
- b. 11 (zoomorphic); 19 (bull's eye);
- c. 3 (hearts); 11 (zoomorphic); 14 (tooth zig-zag); 17 (triangles);

A broad band of zoomorphic interlace dominates the decorated part of this brooch type and surrounds a central bull's eye. Because the surface of the brooch is almost entirely covered by the zoomorphic ornament any secondary decoration is very simple and is limited to lines of triangles as edging bands to the main pattern.

There appears to be a wide distribution for this common type (Map IV1): Warwickshire, Berks. and Beds. have many. A meaningful analysis must subdivide this type according to the details of the zoomorphic ornamentation and such future work might reveal geographical nodal points for specific decorations.

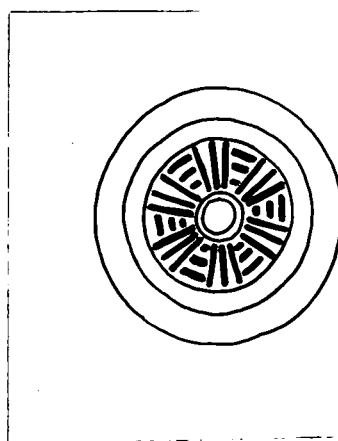
Bidder and Morris (1959: 91) claim that

"such ornament is the most consistent feature of the great square-headed brooches of the middle and late sixth century, and is reproduced in limitless different varieties of saucer brooches, found all over the country, but [is] especially popular in the midlands, of much the same date".

Leeds (1911-12: 170) does not seem to think of this as a type but the animal decoration may be dated to the sixth century. It is a type which has proved difficult to find much agreement about in the cluster

analysis program results (Table IIId) there being little correlation between the two RELOC results and may, therefore, be questioned. It seems that once the major zoomorphic element has been identified on a saucer brooch other features are too insignificant to warrant much attention at this stage in the production of a typology although they are significant when looking for exact parallels or subtypes.

RELOC 17:11

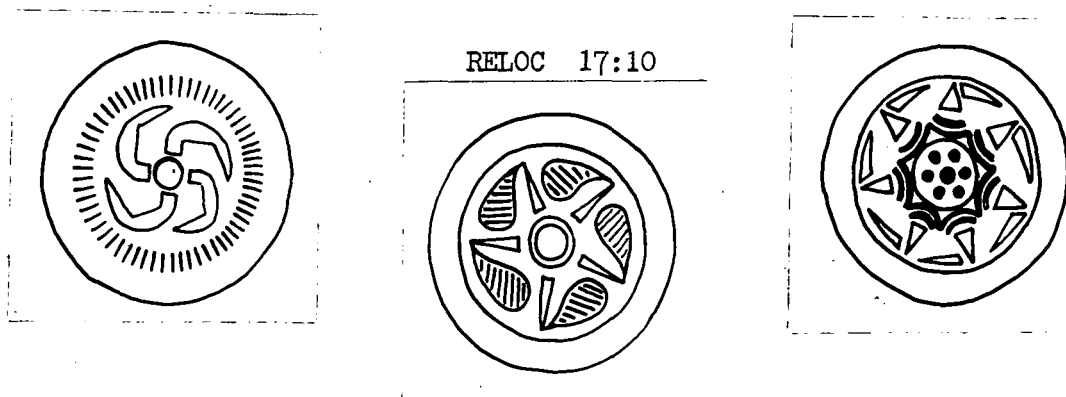


- a. 15 (light and shade); 26 (saucer brooch);
- b. 19 (bull's eye);
- c. 2 (cross); 9 (catherine wheel); 15 (light and shade); 22 (oo ꝛ oo ꝛ oo);

This type may have the 'light and shade' effect carved in a skilled, carefully controlled circular band or the 'light and shade' decoration may be rather irregularly done and be a means of infilling a cruciform design. The secondary decoration may be either zoomorphic interlace or geometric designs but some brooches only have several bands of 'light and shade'.

The cruciform design with 'light and shade' decoration is a West Midland subtype (Map IVm) being found in Wa., and Wo., but the type as a whole is also found in Northants., Camb., Oxon., Berks. and Surrey.

Bidder and Morris (1959) do not consider this a significant feature for defining a type and nor does Leeds although he mentions the technique when executed on applied brooches (Leeds 1911-12: 178). There is not a high degree of support for the type, or rather for all the significant features which characterise it, in the results of the six cluster programs (Table IIId) but there is enough evidence, when all results are correlated, to indicate that a not very homogeneous group of brooches do have several features in common. The design is thought by Leeds to be late sixth century and derived from Kentish originals which may explain the lack of conformity in the group.

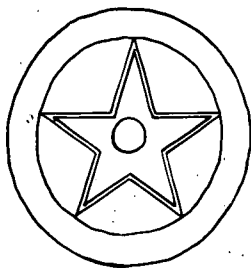


- a. 10 (legs); 26 (saucer brooch);
- b. 19 (bull's eye);
- c. 1 (square); 10 (legs); 17 (triangles); 18 (egg and tongue);

Disjointed legs swirling out from a central bull's eye are the distinctive features of this type which may be subdivided according to the number of legs and it is a significant fact that the style used for the leg decoration differs for each of these suggested subtypes. Four legs, making a swastika, are extremely simple in execution, being formed rather like an L and the secondary designs are of a simple geometric form such as the egg and tongue or ribbing motif. The five or six leg subtype has legs with a distinct pear-shaped hip which may have decorative ribbing within the leg outline but like the previous subtype any other decoration present is limited to simple geometric patterns. The third subtype is composed of those brooches with seven or more legs which are normally an L shape with two semi-circular bars over the hip. This distinctive group may have a zig-zag edging.

The four leg/swastika subtype is found in Berks., Oxon. and the Wilts./Glos. border but a stray example has been found in Wo. The distribution pattern of the five-six leg subtype is less common than the four leg subtype, being found in more peripheral areas such as Beds., Wo., Bucks. and Berks. Glos., Berks. and Oxon. are the main seven-plus leg subtype centres although examples are also known from Camb. (Map IVn).

The 'legs' design is seen by both Leeds (1911-12: 172ff.) and Bidder and Morris (1959: 90f.) and is indeed most distinctive. The distribution according to Leeds is in the Western area (although as this includes Kent his 'geographical' nomenclature is suspect!) but from my sample I have shown (Map IVn) that although the main centres of production were probably in the Oxon./Berks. region there are samples from East and Middle Anglia. Unlike Leeds, Bidder and Morris claim that the type began in Sx., which has produced two such brooches (neither included in my sample), but it seems strange to have so few examples from the area which is claimed as the originator of the type. The number of legs and the number of their representation might be used to date the subtypes which Bidder and Morris think started in the early sixth century and was elaborated upon to include more legs by the late sixth century. Leeds uses Salin I and II to date the stylistic representation of the animal hip joint on the brooches and by this means the type (but not necessarily in the same sequence as Bidder and Morris) may have existed from the early sixth century until the early seventh century. The dating by association of these brooches is difficult as the evidence is very poor. The significant features for the type are almost identical when produced by the six cluster programs (Table IIId) and they can therefore be accepted.



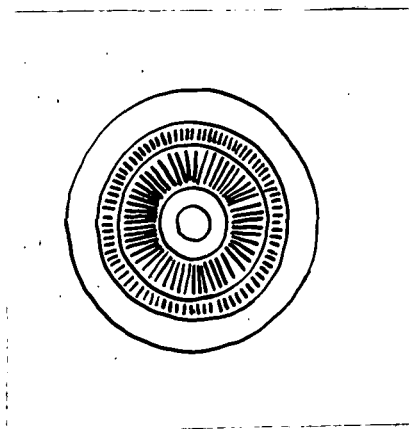
RELOC 17:14

- a. 6 (star); 26 (saucer brooch);
- b. 19 (bull's eye);
- c. 1 (square); 6 (star);

Four, five and six pointed stars with a central bull's eye form a distinct saucer brooch type and usually there is no secondary decoration present other than simple lines. The star, which usually has clearly defined points, is normally formed by double raised lines.

The distribution of the star type decoration is centred on Fairford, Glos., and Abingdon, Berks., (Map IVo) but examples have also been found in Wa., Northants., Oxon., Beds., Camb. and Surrey.

Bidder and Morris (1959: 91) state that the star design is common in Wessex but this is not born out by my study and although the type is accepted there is need for the distribution to be inspected more thoroughly. Lack of dateable associated finds hampers the placing of the type in a chronological sequence but Bidder and Morris would put them in the mid to late sixth century. Leeds (1911-12: 167) thinks that the design is a survival from the Roman tradition and that those brooches with very fine workmanship may be from late fifth century burials but evidence on this point is meagre. That this type of brooch is seen as a distinct type by both Bidder and Morris and in Leeds, shows that it must be readily identifiable and this is supported by the high degree of agreement in significant features produced by all clustering methods used (Table IIId).



RELOC 17:15

- a. 21 (ribbing); 26 (saucer brooch);
- b. 19 (bull's eye);
- c. 3 (heart); 8 (scroll); 9 (catherine wheel); 14 (tooth, zig-zag);
21 (ribbing);

All of this type of brooch has at least one broad band of ribbing as a dominant decorative feature but it is very closely related to RELOC 13, many of the brooches having five, six or seven-plus scrolls. It is only a small group but if many more brooches of this type are found it might be wise to subdivide the type in the same manner as RELOC 13, that is, by the number of spirals present.

The distribution of the ribbing only or spiral with ribbing brooches is quite different from RELOC 13 for they are found in peripheral areas to the simple scroll brooches (Map IVq). Examples occur in Northants., Wilts., Camb., Beds., Bucks., Surrey and Wo. Such a wide-spread distribution indicates that these may be derived forms of RELOC 13 and if this be true they are later in date.

Leeds (1911-12: 168) suggests that this design is early, being derived from Roman patterns found on mosaics. Bidder and Morris (1959) do not consider it as it is not relevant to their report on Mitcham, Sy. Both RELOC results produced this type but two of the DIVIDE programs did not (Table IIId) and this is probably due to the inflexible system used by DIVIDE whereby objects once assigned to a group cannot later be reassigned to a more appropriate one and so I think the type is acceptable.

Conclusion

Two methods, a simple but time consuming manual one, χ^2 , and a faster, more detailed computer program, have been used to analyse the saucer and applied brooch sample, which was collected in 1968 and kept for both techniques in order to compare their results (Part II: 49). It must be admitted that the manual method is not worth following if it is at all possible to use a computer, purely because of the thousands of small but extremely tedious computations which have to be made and I have included it here mainly to indicate the saving in time and the extra amount of detail for each type which the cluster analysis programs in CLUSTAN 1A make possible. The significant features of each type as produced by the computer program have been listed, commented upon, compared with the results produced by Leeds (1911-12) and Bidder and Morris (1959) and then the distributions mapped.

A most striking difference between the two methods is the importance of the technique of manufacture in the classification of the brooches because the χ^2 method gives a little support to Bidder and Morris (1959: 80ff.) and the German school of thought in claiming that this is an artificial division and not justifiable by itself as a diagnostic feature in a typology, whereas the initial splitting of the sample into saucer and applied brooches was made by Leeds (1911-12: 160) and CLUSTAN 1A. It is difficult to reconcile these conclusions. Perhaps too rigid a distinction between manufacturing methods should not be followed when classifying by decorative type and at the moment it would be unwise to claim that either case is true. Future studies are needed into this problem and if the data used is extended to include rim depth, base diameter and depth of pin-catch more light might be shed on this central

problem to the acceptability of a typology for the saucer and applied brooches.

A second obvious difference between the two analysis methods I have used is the greater detail allowed in the seventeen types produced by CLUSTAN 1A, for which we also know which types are most closely related (Table IIb). The fact that several programs have been used to produce the types also gives some support for this typology, whereas χ^2 , although based upon quantitative data, is as unsupported as the subjective methods of earlier writers. χ^2 did, however, isolate the common design types produced by CLUSTAN 1A.

From the distribution maps it seems that the clusters have a geographical significance. It might be possible, in future work, to give a chronological sequence within each type and this would provide a most useful aid to the interpretation of pagan Anglo-Saxon burial material.

5. The Small-long Brooch Sample

The reason for this more detailed analysis of the very common small-long brooch sample has been given (Part II: 41). The major classification of the brooch-type in England is that by Leeds, "The Distribution of the Angles and Saxons Archaeologically Considered" (1945) in which he produced a detailed, stylistic study based, generally, on head-plate forms but occasionally on foot-plate peculiarities too. This is a very useful corpus of the small-long brooches and their many variations which were probably produced in the sixth century, at the earliest, as an imitation of the more elaborate Anglian cruciform brooch. The numerous illustrations are a vital part of Leeds' work and it would probably be

convex, (4: 44.6%) and straight, (5: 42.2%). Finials, (2), are not very common.

In this simple classification the major distinction was between those brooches with convex-sided head-plates and those without, although complex modifications to the shape of the head-plate, (16), sub-divide both the convex and straight sided groups. Therefore, this sample and classification appears to support Leeds (1945) in selecting the head-plate as the best characteristic upon which to sort these brooches. The indeterminate shape of the foot makes it a difficult feature to classify in many instances and it can be seen from the high percentage of the sample with concave feet that there is a marked uniformity in this feature which also makes it a poor feature for classification purposes. The foot may be of some help, however, in sub-dividing the many brooches with simple, straight-sided head-plates. Holes, (14), in the head-plate may serve as characteristic features of a distinct group, as in Leeds (1945: Figs. 10,14,16), where they may either be part of the cross potent derivatives or the cross pattee derivatives. The appendages, (12), are mainly confined to the radiates, which were included as test objects to check the effectiveness of the classification, and to very small scale replicas of the cruciform brooch. From the results of this study it would seem that useful information about the types of small-long brooch would be found in a detailed analysis of the types of decorations used, especially those brooches with large circles on the head-plate which may be derived from the 'hole' (14) varieties, but at the moment, the complex, usually chip-carved, technique (21) is the only attribute used to distinguish different decorative motifs and this clearly separates the simple brooches from the more elaborate ones.

After a brief look at the actual incidence of the criteria selected within this sample a χ^2 test was performed (as in Part II:45) and Fig. XI produced to show which associated pairs of attributes have an incidence $\pm 2\sigma$. Such characteristics have an abnormal variation from what might be expected in a random distribution and serve to indicate positively associated features ($+2\sigma$) which might form cluster nuclei, or negatively associated pairs of features (-2σ), which might indicate significant divisions between groups. As an example of strong negative associations are such mutually exclusive features as the various bow types, (9,10,11) which never occur together. Each bow type has certain strongly associated features which may provide the data for a classification scheme although the very large group of brooches with the plain bow, (11), need to be further subdivided. Notches and holes (13,14), are strongly associated, as too are appendages with panels (12,15), but notches and holes are rarely found with appendages and panels.

From the matrix of differences (Fig. XI) a diagram of associated features has been constructed (Fig. XII) which shows only the positively associated pairs of features. There are exceptions to these results but the main pattern is given and misfits will be few. Some tightly knit clusters can be seen from Fig. XII and these are listed below:

1,3,12,15

1,2,3,

- association of late features.

3,6,21

- (3,21) is especially marked.

3,10,12,15

3,10,19,21

- the small 'square-headed' group

3,10,15,21

with elaborate decoration.

7,10,19

- note that 7 and 10 are very common elements.

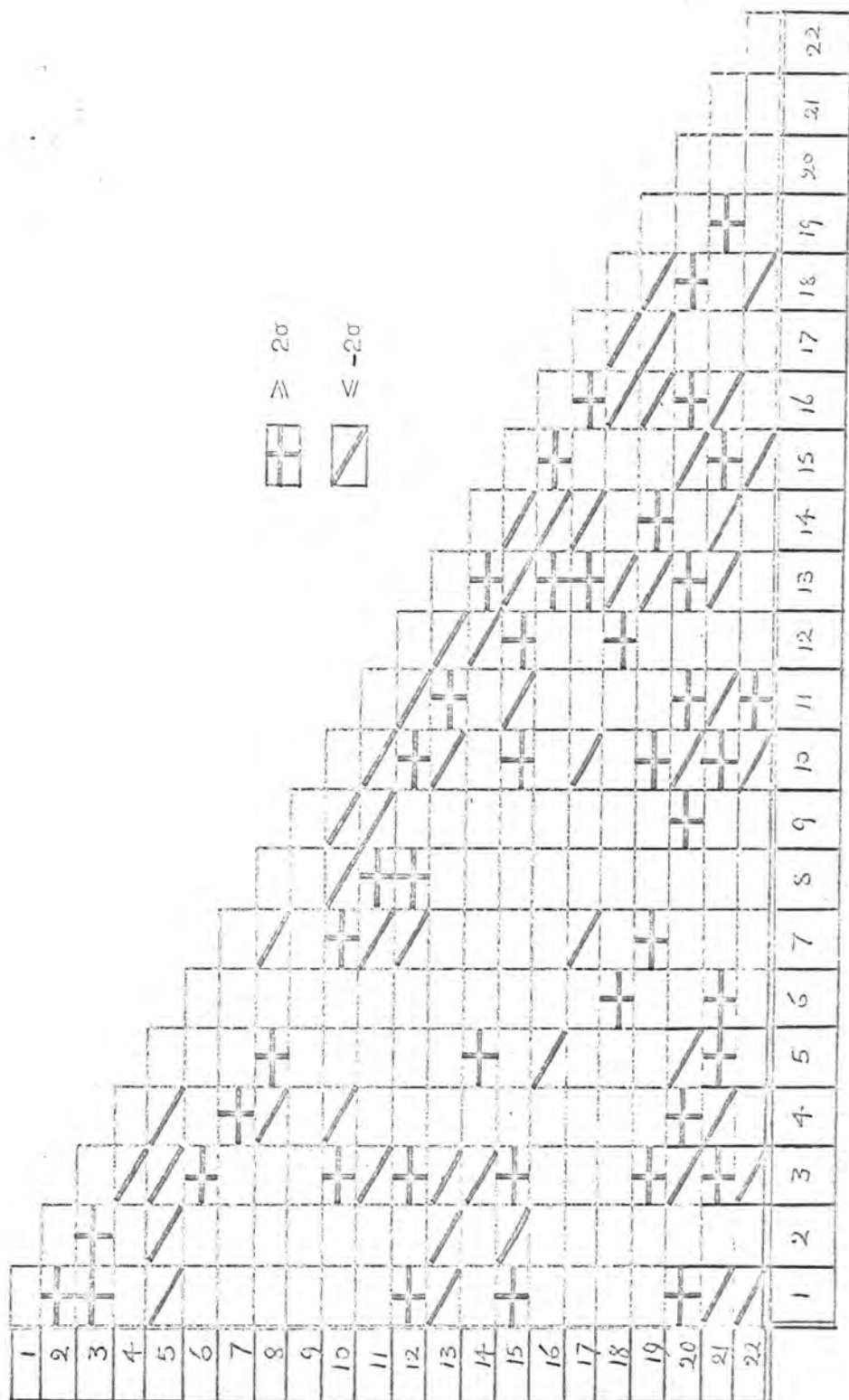


FIG. XI. Small-long branches: matrix of differences.

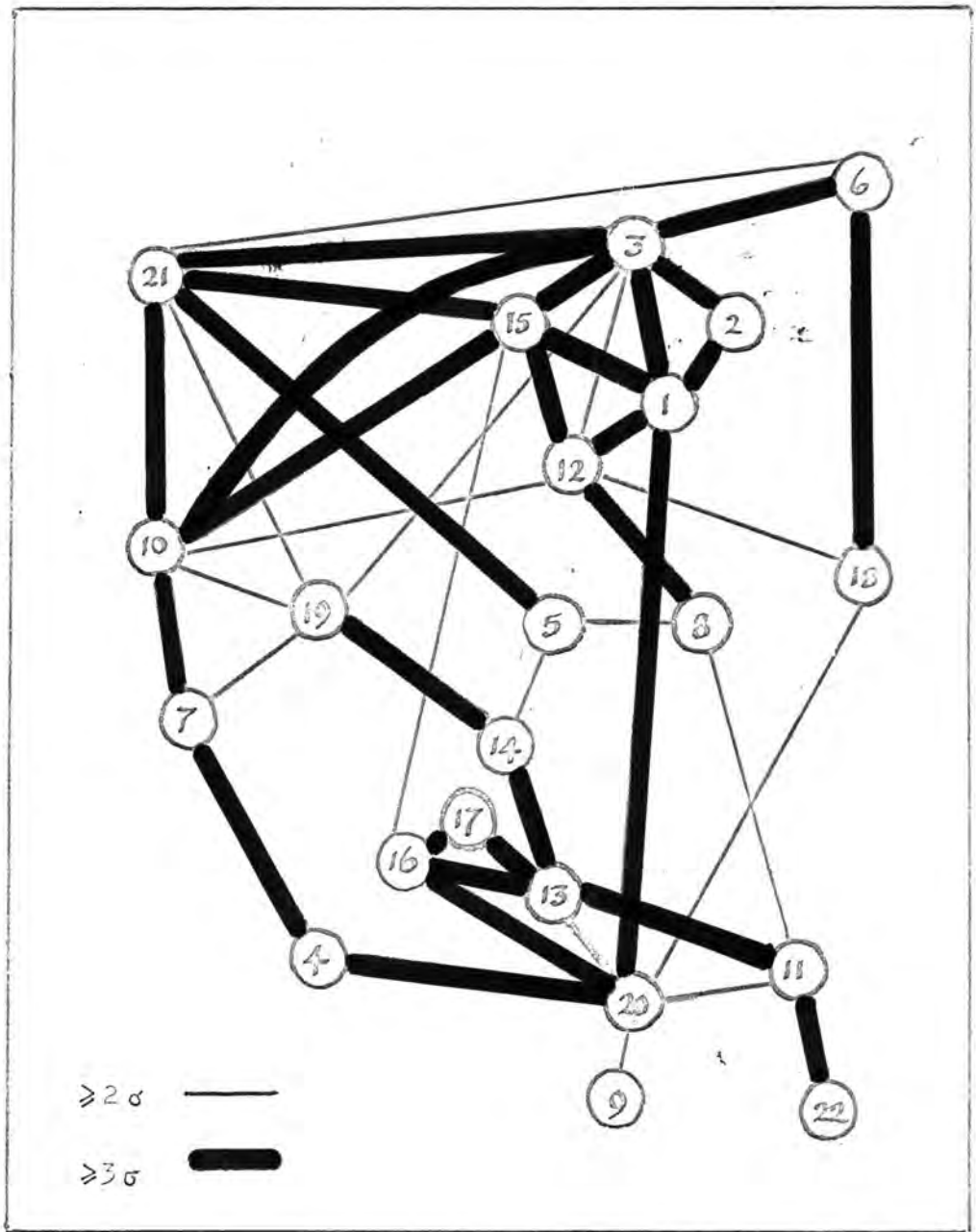


Fig. XII. Small-long brooches:
associated features.

| | | |
|----------|---|---|
| 13,16,17 | } | - convex-headed brooches and their various subdivisions. |
| 11,13,20 | | |
| 13,16,20 | | |

How closely these clusters agree with the cluster analysis results will be seen later in this section (Part II. 87).

The associated features discussed so far have applied to the total population in England and I wished to know which pairs of features were peculiar to the West Midlands and I therefore used the same method to discover this as I had for the saucer and applied brooch sample (Part II:14). Twelve more matrices were constructed and my results summarised in Fig. XIII, where all associated pairs characteristic of the West Midlands (95% probability) are indicated by a cross and those rarely found in the West Midlands (again 95% probability against) are marked thus, \.

The most important associated pairs of features for indicating cultural affinities are those occurring only within the West Midlands and one other area and so the distribution of each pair of significant associated features was mapped. This showed that many of the features are found in several areas (e.g. 5-13 and 7-11 have been discovered in the West Midlands, Middle Anglia, East Anglia, Durham - all Anglian areas - and Wessex). All the features occurring in such West Saxon areas as Berkshire (1-3, 3-4, 11-20) were also found in Middle Anglia and East Anglia as well as in the West Midlands and these show a widespread distribution of cultural ties. Many of the remaining features were known in Oxfordshire, an area which was peripheral to several kingdoms and so is best considered by itself, and in Middle Anglia and East Anglia in addition to the West Midlands (e.g. 1-2, 2-3, 2-4, 2-7, 2-19,

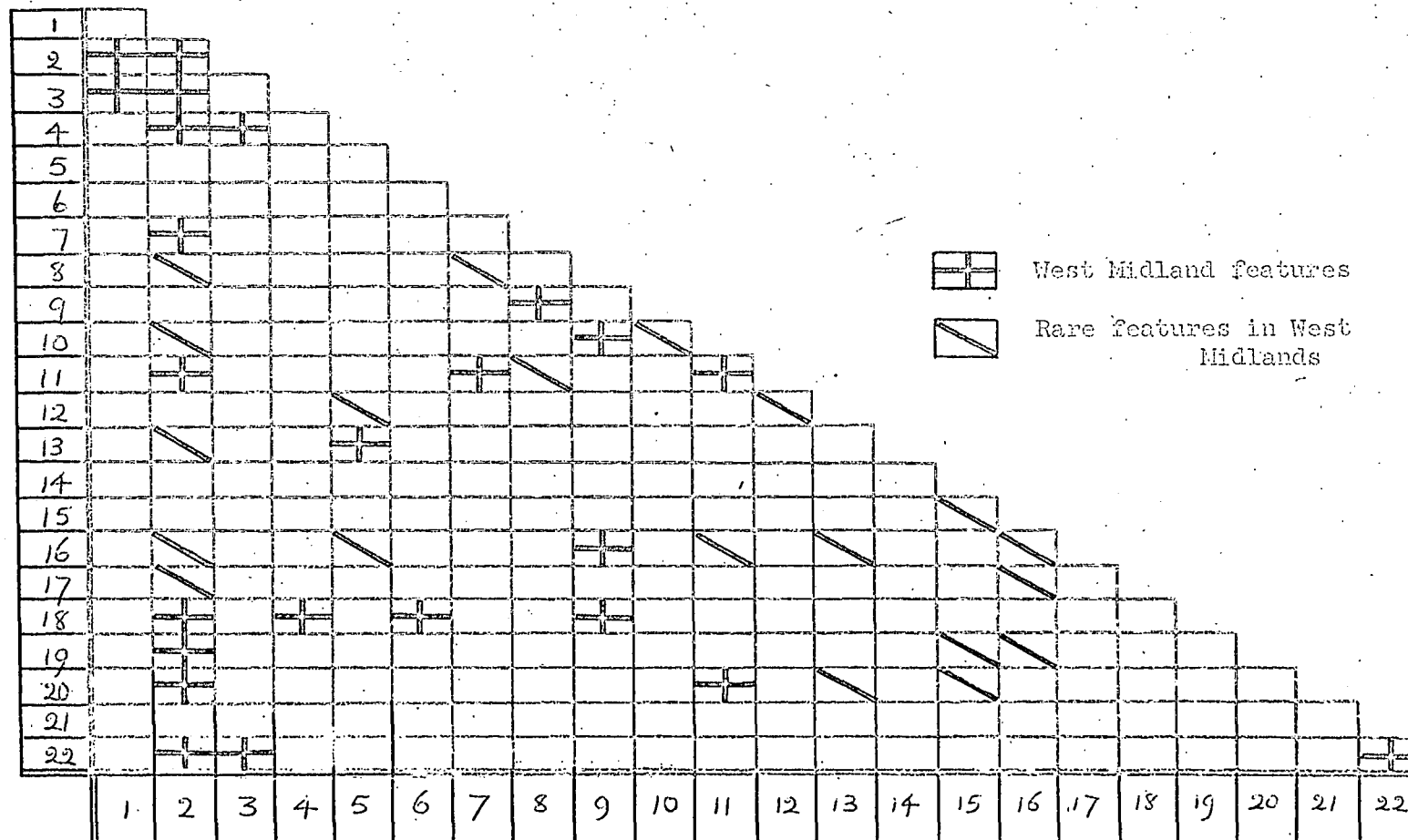


Fig. XIII. Small-long brooches: West Midland characteristics.

2-20) and so this group of features may be indicative of Anglian influences. Features which are only found in Anglian contexts (e.g. 2-11, 4-18, 6-18, 9-16, 9-18) link the West Midlands to the Northamptonshire-Cambridgeshire region, a pattern which was also shown by all the other distributions. Some features are peculiar to the West Midlands (e.g. 2-18, 3-22, 8-9) but the general trend is for styles used in one area to spread to others and this study has shown that the interchange of ideas was particularly strong between the West Midlands and Middle Anglia.

CLUSTAN 1A Results

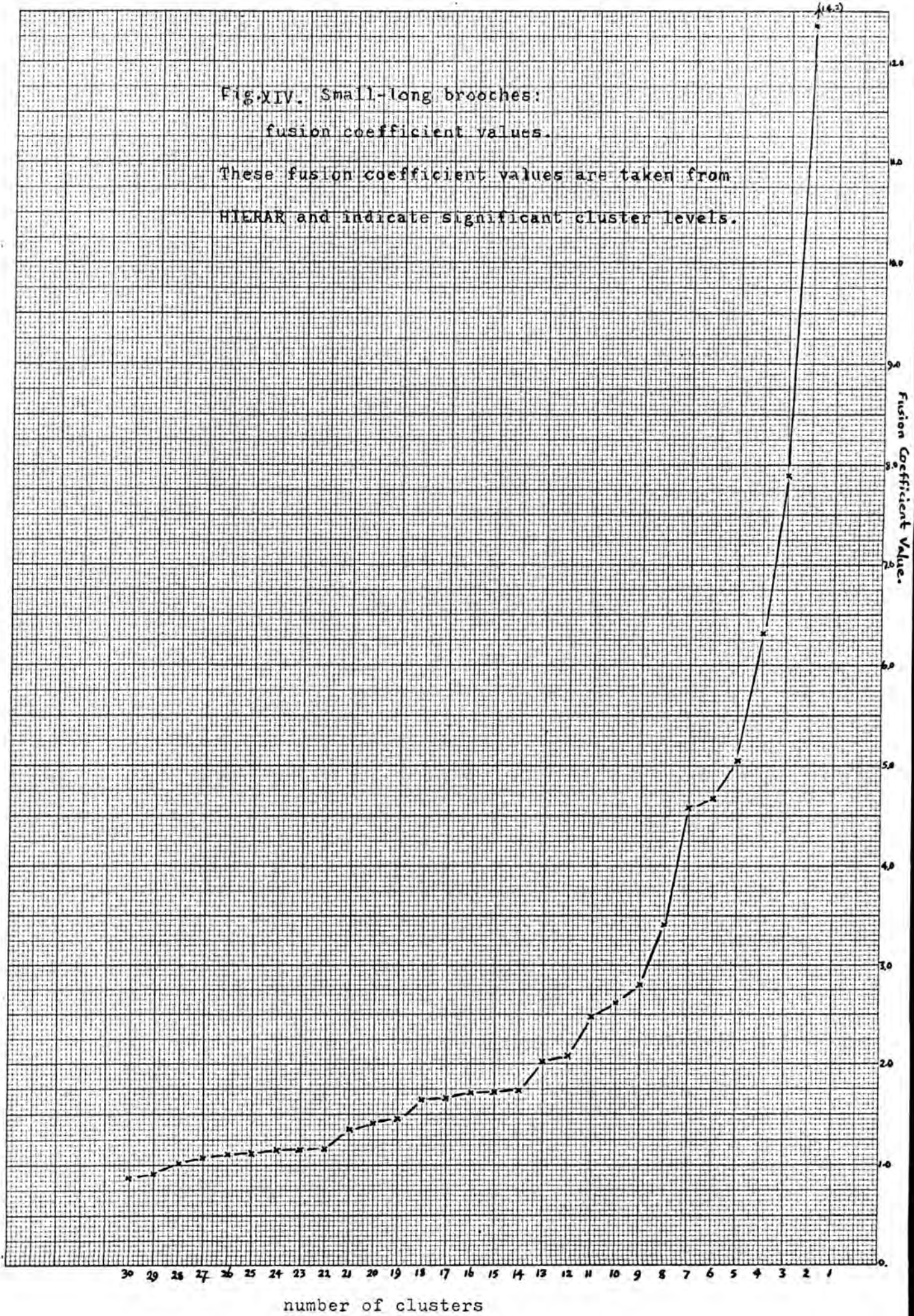
Significant cluster levels for the CLUSTAN 1A results were looked for in the fusion coefficient values from HIERAR (Fig. XIV). The optimum divisions appear to be at 3, 8 and 17 clusters (Tables IIIb, IIIc, III d) and these are now discussed. After the classification at 17 clusters the difficulties of correlating various results for non-optimum cluster levels are shown using 12 clusters (Table IIIe).

3 clusters

The total sample of 431 small-long brooches, which included radiates as a check on the clustering procedures, seems to subdivide clearly into three groups. This statement is supported by RELOC on HIERAR and RELOC on MODE which produced identical clusters at the two and three cluster levels. Table IIIb shows that the three groups may be briefly described as (a) the brooches with straight or concave sides to the head-plate and any decoration restricted to the simplest, repetitive punched designs, (b) brooches with straight sides to the head-plate but complex, chip-carved surface ornamentation, (c) the

Fig. XIV. Small-long brooches:
fusion coefficient values.

These fusion coefficient values are taken from
HIERAR and indicate significant cluster levels.



brooches with convex or complex sided head-plates, many with notches, and also decorated only with simple, repetitive punched designs. These three subdivisions are extremely crude and serve only as a rough guide for further research but the degree of correlation between the clusters produced by different methods makes them worthy of consideration when a large body of material is to be subjected to analysis.

8 clusters

The next most significant cluster level indicated by the breaks in the fusion coefficient graph (Fig. XIV) from HIERAR was at eight clusters. When these clusters are examined (Table IIIc) it can be seen that only one of the original three clusters (Table IIIb) has been subdivided and that is the first one, which had the straight or concave sides to the head-plate and had simple decoration, within which seven subgroups have been found. There is, however, less correlation between clusters produced by different methods of cluster analysis for this sample than was found either for the saucer and applied brooches or for the shield-bosses and this may be due to the many difficulties experienced in the processing of such a large body of material. It seems, therefore, that the most significant diagnostic features at this eight cluster stage are the forms of decoration, the shape of the head-plate, the presence of a panel (real or imitation) and the bow type.

It is possible to compare the results at this level of the cluster analysis program with those from the χ^2 test for which ten important groupings have been defined (Part II: 84). It is immediately apparent that the χ^2 results have been refined and that there is no complete correlation between the two sets of clusters. In order that it may be seen quite clearly that there is an overlap between χ^2 types and those

from CLUSTAN 1A, and also that only very distinctive types are defined by X^2 , the clusters are given again here with the RELOC cluster they most clearly resemble:

| <u>X^2 results</u> (features) | <u>8 clusters</u> | <u>17 clusters</u> |
|--|-------------------|----------------------|
| 1,3,12,15 | RELOC 1,7 | RELOC 1,14, |
| 1,2,3, | RELOC 7 ? | RELOC 14. |
| 3,6,21, | RELOC 8 | RELOC 17. |
| 3,10,12,15, | RELOC 1,7, | RELOC 1,11. |
| 3,10,19,21, | RELOC 8, | RELOC 17. |
| 3,10,15,21, | RELOC 8, ?7, | RELOC 17. |
| 7,10,19, | RELOC 3,8, | RELOC 1,2,3,5,12,17. |
| 13,16,17, | RELOC 2, ?7, | RELOC 7,9,10,11. |
| 11,13,20, | RELOC 2,4,6, | RELOC 2,4,7,8,10. |
| 13,16,20, | RELOC 2, | RELOC 2,7,10,11. |

This emphasises the difficulty of finding any but the very unusual types from an examination relying on individual or associated pairs of features and shows how the cluster analysis results give a more precise definition of key features, for any one type, than the cruder methods.

17 clusters

The most useful working division of this sample of small-long brooches seems to be at the seventeen cluster level although neither the fusion coefficient values from HIERAR (Fig. XIV) nor those from either RELOC program made the division at this level very clear-cut and the optimum division could only be discovered after a detailed analysis of all cluster levels between sixteen and twenty. Perhaps an analysis based only on shape and decorative features is not sufficient for these brooches and future experiments might profitably be made using a series of continuous variables (e.g. ratios of length:breadth, angles

at selected points on the head-plate and foot, proportion of the brooch forming the head-plate, bow and foot etc.).

The degree of correlation between the different methods of clustering varies from all six methods giving the same results to clusters with only two programs producing the same results (Table IIIId). The more distinctive the cluster, or type, the more likely is it that the clustering programs will produce total agreement and the difficulty in interpreting the typology arises, as it does with the older method of "inspired intuition", with the slightly different but very closely related objects. As at least two different programs have produced each type at this level there is however a little more support for them than I could claim if the typology were based purely upon my personal whims. The types are listed in the following pages in the order in which they occur in the dendrogram (Table IIIb) so that the most closely related types are grouped together.

The small-long brooch classification

The standardised layout has been followed for each of the seventeen clusters produced by RELOC on HIERAR and to avoid any possible confusion with new numbering, the RELOC numbers have been retained. The characteristic features, both positive and negative, for all seventeen clusters have been summarised (Table IIIId) together with the ratio (percentage occurrence of a feature in that cluster:percentage occurrence of the feature in all the sample). A dendrogram has been given first to show a possible relationship between the types (Table IIIf).

The page layout is:-

idealised illustration.

- a. characteristic features - 100% present.
- b. characteristic features - 66 - 99% present.
- c. * ratio \geq 3.00
 + ratio 2.00 - 2.99
 \ ratio \leq .50

Stylistic details of the type.

Spatial distribution of the type.

Comments on my results when compared with those of Leeds (1945), any dating suggested by him and the amount of support for the type from CLUSTAN 1A.

| 3 clusters. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|----------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|
| Reloc 1 | | / | | | | | | | | | | | | | | | |
| Reloc (Mode) 1 | | / | | | | | | | | | | | | | | | |
| Hicrar 1 | | / | | | | | | | | | | | | | | | |
| ÷(i) 1 | | / | | | | | | | | | | | | | | | X |
| ÷(ii) 3 | | / | | | | | | | | | | | | | | | |
| ÷(iii) 1 | | / | | | | | | | | | | | | | | | |
| Reloc 2 | | | | | | | | | | | | | | | | | |
| Reloc (Mode) 2 | | | | | | | | | | | | | | | | | |
| Hicrar 2 | | | | | | | | | | | | | | | | | |
| ÷(i) 3 | | | | | | | | | | | | | | | | | * |
| ÷(ii) 2 | | | | | | | * | | | | | | | | | | |
| ÷(iii) 3 | | | | | | | | | | | | | | | | | |
| Reloc 3 | | | | | | | | | | | | | | | | | |
| Reloc (Mode) 3 | | | | | | | | | | | | | | | | | |
| Hicrar 3 | | | | | | | | | | | | | | | | | |
| ÷(i) 2 | | | | | | | | | | | | | | | | | |
| ÷(ii) 1 | | | | | | | | | | | | | | | | | |
| ÷(iii) 2 | | | | | | | | | | | | | | | | | |

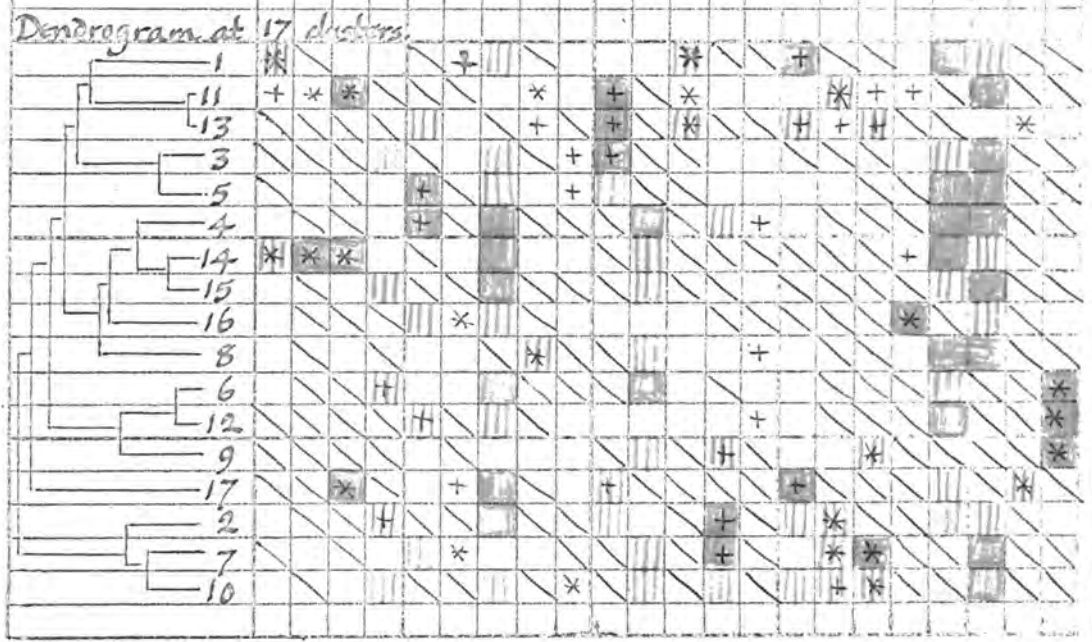


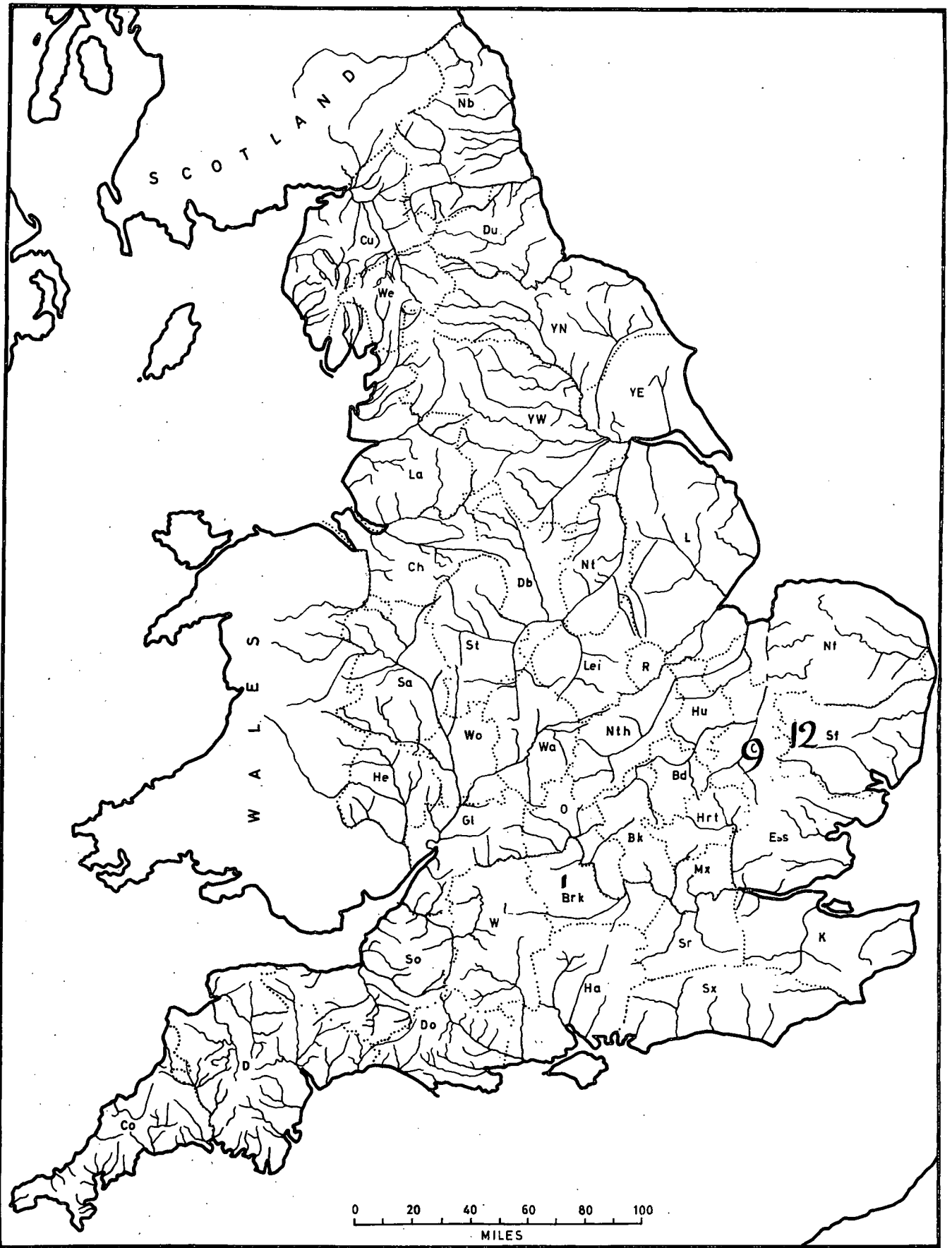
Table IIIb. Small -long reaches: 3 clusters and dendrogram.

| 8 clusters | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|-------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Reloc 1 | * | | | | | + | | | | | | * | | | + | | | | | |
| Reloc (Mod) | 8 | * | | | | | | | | | | * | | | + | | | | * | |
| Hierar | 1 | * | | | | | | | | | | * | | | + | | | | | |
| ±(i) | 6 | | | | | | | | | | | * | | | + | | | | | * |
| ±(u) | 1 | + | | | | | | | | | | + | | | + | | | | | |
| ±(w) | - | | | | | | | | | | | | | | | | | | | |
| Reloc 2 | | | | | | | | | | | | | + | | | * | * | | | |
| Reloc (Mod) | 4 | | | | | | | | | | | | + | | | + | * | | | |
| Hierar | 2 | | | | | | | | | | | | + | | | + | * | | | |
| ±(i) | - | | | | | | | | | | | | | | | | | | | |
| ±(u) | - | | | | | | | | | | | | | | | | | | | |
| ±(w) | 1 | | | | | | | | | | | | + | | | + | * | | | |
| Reloc 3 | | | | | | | | | + | + | | | | | | | | | | |
| Reloc (Mod) | 6 | | | | | + | | | + | + | | | | | | | | | | |
| Hierar | 3 | | | | | | | | + | + | | | | | | | | | | |
| ±(i) | - | | | | | | | | | | | | | | | | | | | |
| ±(u) | 8 | | | | | | | | | * | | | | | | | | | * | |
| ±(w) | 3 | | | | | + | | | | + | | | | | + | | | | | |
| Reloc 4 | | | + | | | | | | | | | | | | | | | | | + |
| Reloc (Mod) | 5 | | | | | | | | + | | | | | | | + | | | | + |
| Hierar | 4 | | * | | | | | | | | | | | | | | | | | * |
| ±(i) | - | | | | | | | | | | | | | | | | | | | |
| ±(u) | 4 | | * | | | | | | | | | | | | | | | | | |
| ±(w) | 4 | | | | | | | | | | | | | | + | + | | | | |
| Reloc 5 | | | | | | | | | | | | | | | | | | | | * |
| Reloc (Mod) | 2 | | | | | | | | | | | | | | | | | | | * |
| Hierar | 5 | | | | | | | | | | | | | | | + | | | | * |
| ±(i) | 4 | | | | | | | | | | | | | | | | | | * | * |
| ±(u) | 3 | | | | | | | | | | | | | | | + | + | | | * |
| ±(w) | 5 | | | | | | | | | | | | | | | | | | | * |
| Reloc 6 | | | | | | | | | * | | | | | | | | | | | |
| Reloc (Mod) | 5 | | | | | | | | + | | | | | | | + | | | | + |
| Hierar | 6 | | | | | | | | * | | | | | | | | | | | |
| ±(i) | - | | | | | | | | | | | | | | | | | | | |
| ±(u) | 2 | | | | | | | | * | | | | | | | + | | | | |
| ±(w) | - | | | | | | | | | | | | | | | | | | | |
| Reloc 7 | | | + | + | | | | | + | + | | | * | | | | | | + | + |
| Reloc (Mod) | 3 | | | | | | | | | + | | | + | | | | | | * | + |
| Hierar | 7 | | * | + | | + | | + | + | + | | | * | | | | | | | |
| ±(i) | 1 | + | | | + | | | * | | | | | + | * | | | | | * | * |
| ±(u) | - | | | | | | | | | | | | | | | | | | | |
| ±(w) | - | | | | | | | | | | | | | | | | | | | |
| Reloc 8 | | | * | | | + | | | | + | | | | | | + | | | | * |
| Reloc (Mod) | 7 | | * | | | + | | | | + | | | | | | + | | | | * |
| Hierar | 8 | | * | | | + | | | | + | | | | | | + | | | | * |
| ±(i) | 2 | | | | | | | | | | | | | | | | | | | |
| ±(u) | 6 | | * | | | + | | | | + | | | | | | + | | | | * |
| ±(w) | 2 | | * | | | + | | | | + | | | | | | + | | | | * |

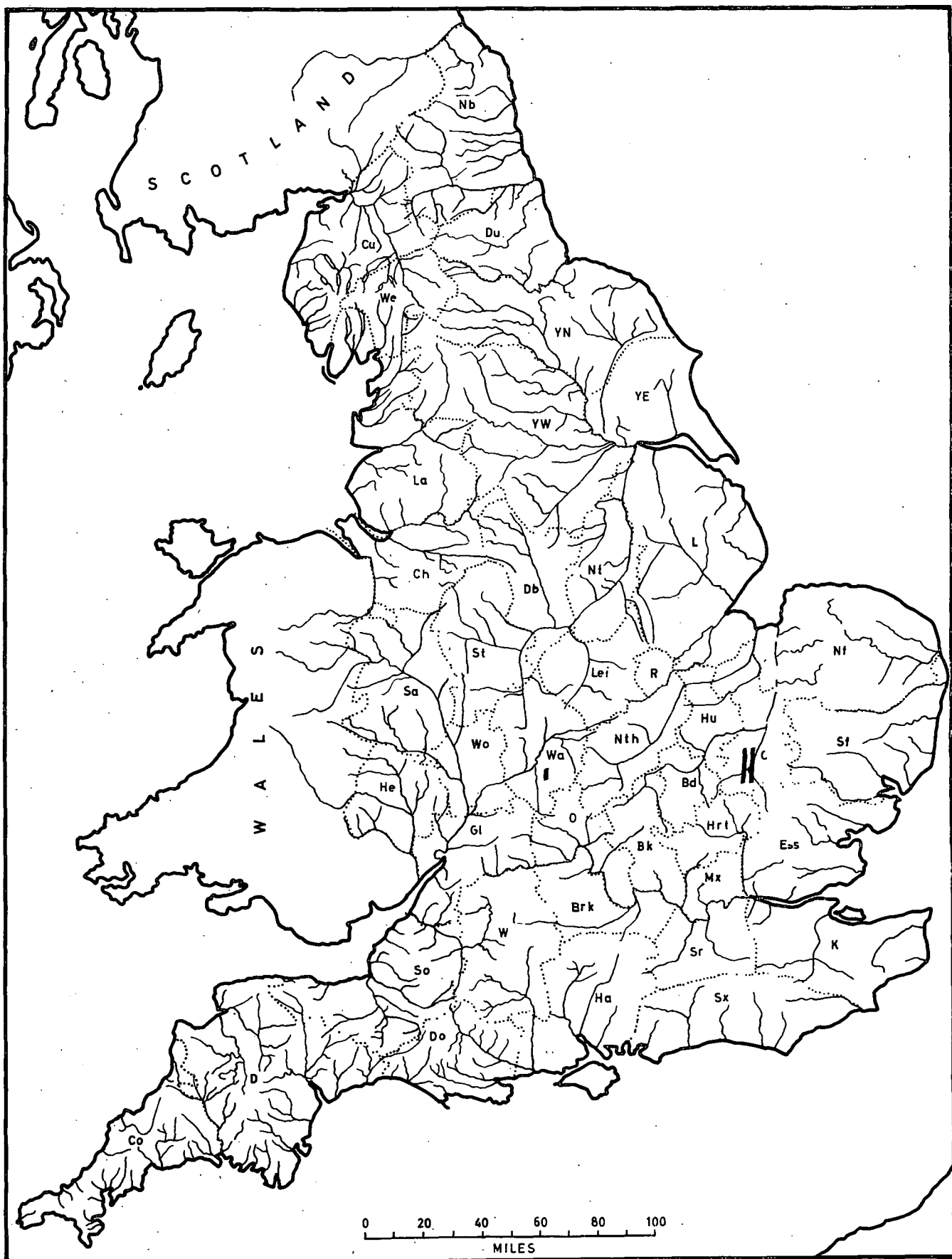
Table IIIc. Multi-Long branches: 8 clusters.

| 17 Clusters | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|-------------|----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|
| Reloc | 11 | + | * | * | | | | * | + | | * | | | | * | + | + |
| Reloc (M) | 3 | + | * | * | | | | * | + | | * | | | | * | + | |
| Hierar | 12 | | * | * | | + | + | + | | | * | | | | | | + |
| ±(i) | 14 | | | | | | | | | | | + | | | * | | |
| ±(ii) | 14 | | * | | | | | * | + | | * | | | | + | + | |
| ±(iii) | - | | | | | | | | | | | | | | | | |
| Reloc | 12 | | | | | - | | | | | | | | | + | | |
| Reloc (M) | 4 | | | | | | | | + | | | | | | * | | |
| Hierar | 13 | | | | + | | | | | | | | | | * | | |
| ±(i) | 6 | | | | | | | | | | | * | | + | | | |
| ±(ii) | 7 | | | | | | | | | | | + | | + | | | |
| ±(iii) | 3 | | | | + | | | + | + | | | | * | | | | |
| Reloc | 13 | | | | | | | + | + | + | | + | | + | + | + | |
| Reloc (M) | 15 | | | | | + | * | * | + | * | | | | | * | | * |
| Hierar | 16 | | | | | * | + | + | + | * | | | | | + | | * |
| ±(i) | - | | | | | | | | | | | | | | | | |
| ±(ii) | - | | | | | | | | | | | | | | | | |
| ±(iii) | 2 | | | | | * | * | + | * | | | + | * | | | | * |
| Reloc | 14 | * | * | * | | | | | | | | | | | | | + |
| Reloc (M) | 5 | * | * | * | | | | | | | | | | | | | + |
| Hierar | 14 | | * | + | | | | | | | | | | | | | |
| ±(i) | - | | | | | | | | | | | | | | | | |
| ±(ii) | - | | | | | | | | | | | | | | | | |
| ±(iii) | - | | | | | | | | | | | | | | | | |
| Reloc | 15 | | | | | | | | | | | | | | | | |
| Reloc (M) | 1 | | | | | | | | | | | | | | | | |
| Hierar | 10 | * | | + | | | | | | | * | | + | | | | |
| ±(i) | 13 | | | | | | | | | | | | | | | | |
| ±(ii) | - | | | | | | | | | | | | | | | | |
| ±(iii) | - | | | | | | | | | | | | | | | | |
| Reloc | 16 | | | | | * | | | | | | | | | | | * |
| Reloc (M) | 6 | | | | | + | | | | | | | | | | | * |
| Hierar | 15 | | | | | * | | | | | | | | | | | * |
| ±(i) | 11 | | | | | * | | | | | | | | | | | * |
| ±(ii) | 8 | | | | | | | * | | | | | | | | | * |
| ±(iii) | 7 | | | | + | + | | | | | | | | | | | * |
| Reloc | 17 | | * | | | + | | | + | | | | + | | | | * |
| Reloc (M) | 9 | | * | | | + | | | + | | | | + | | | | * |
| Hierar | 17 | | * | | | + | | | + | | | | + | | | | * |
| ±(i) | 2 | | * | | | + | | | + | | | | + | | | | * |
| ±(ii) | 6 | | * | | + | | | | + | | | | + | | | | * |
| ±(iii) | 11 | | * | | + | | | | + | | | | + | | | | * |

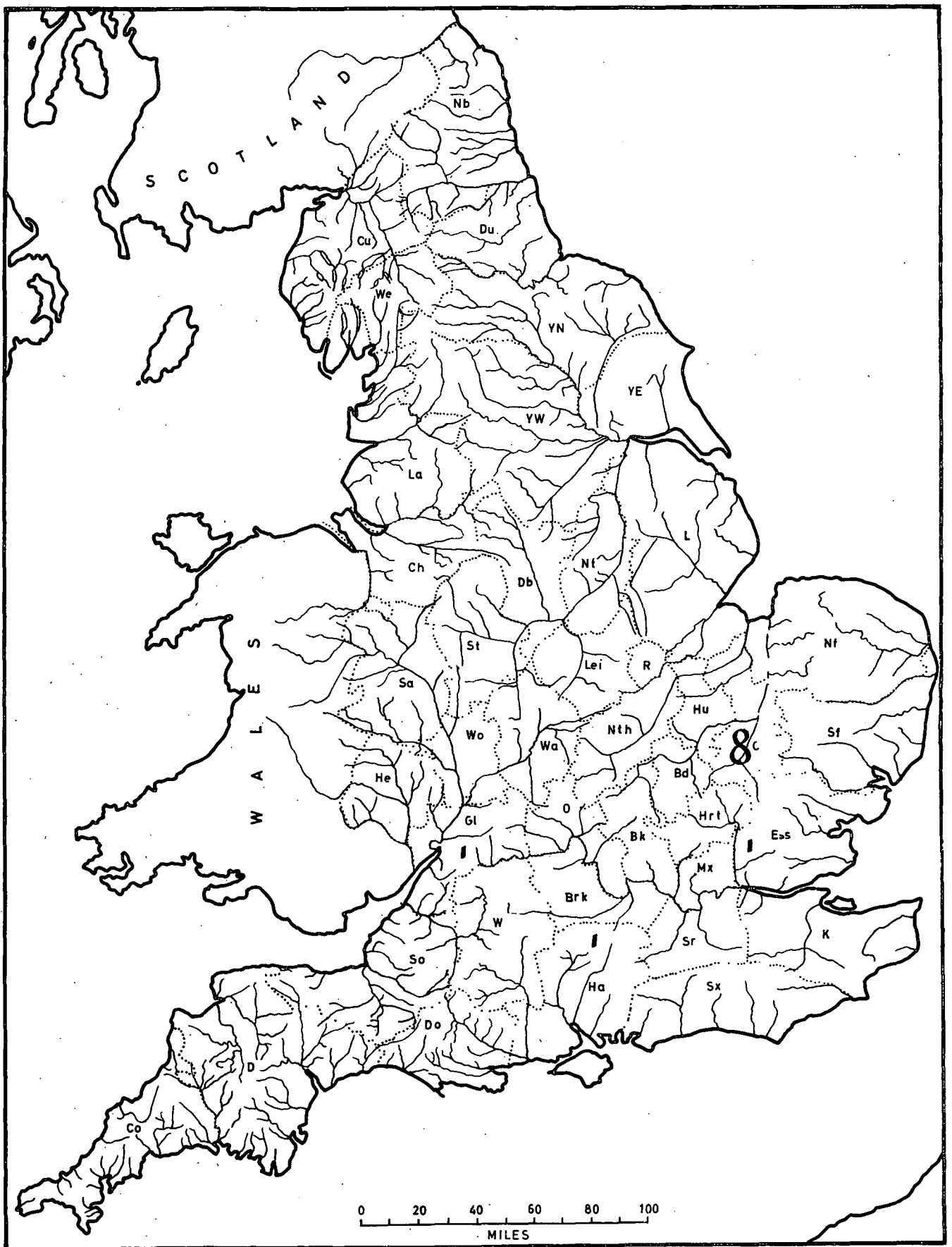
Table VIII. Cluster schemes: 17 clusters.



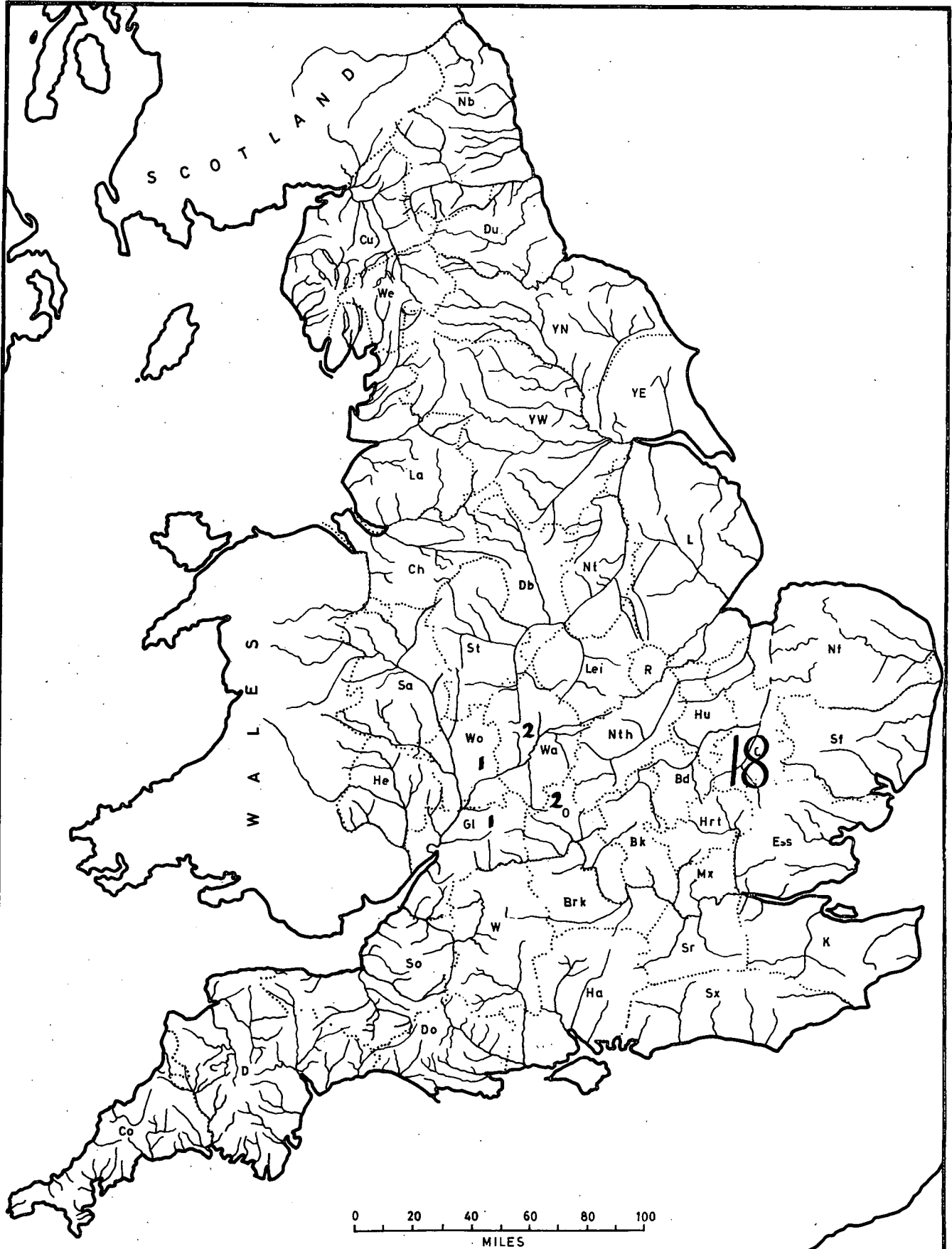
Map Va. Small-long brooch: RELOC 17:1.



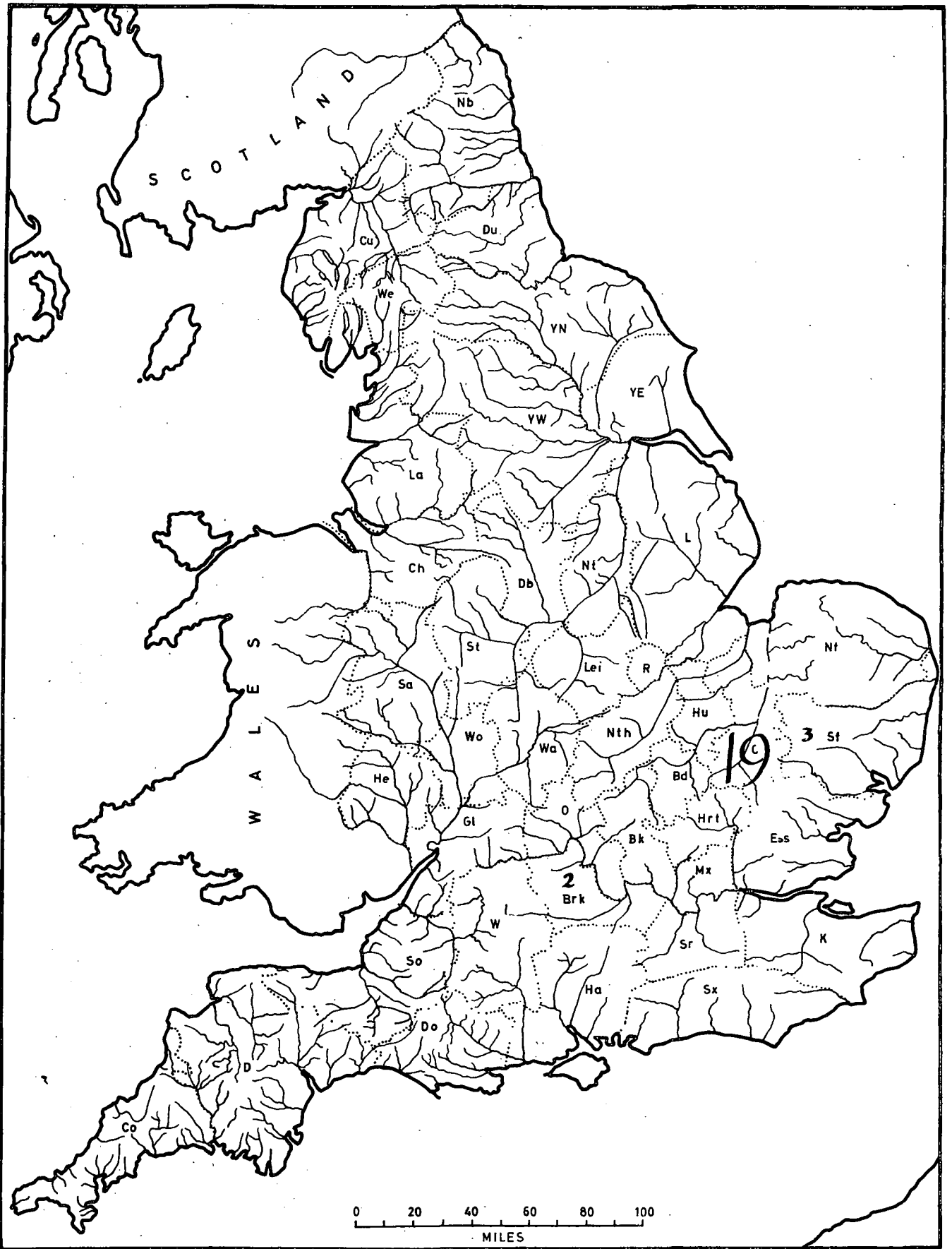
Map Vb. Small-long brooch: RELOC 17:11.



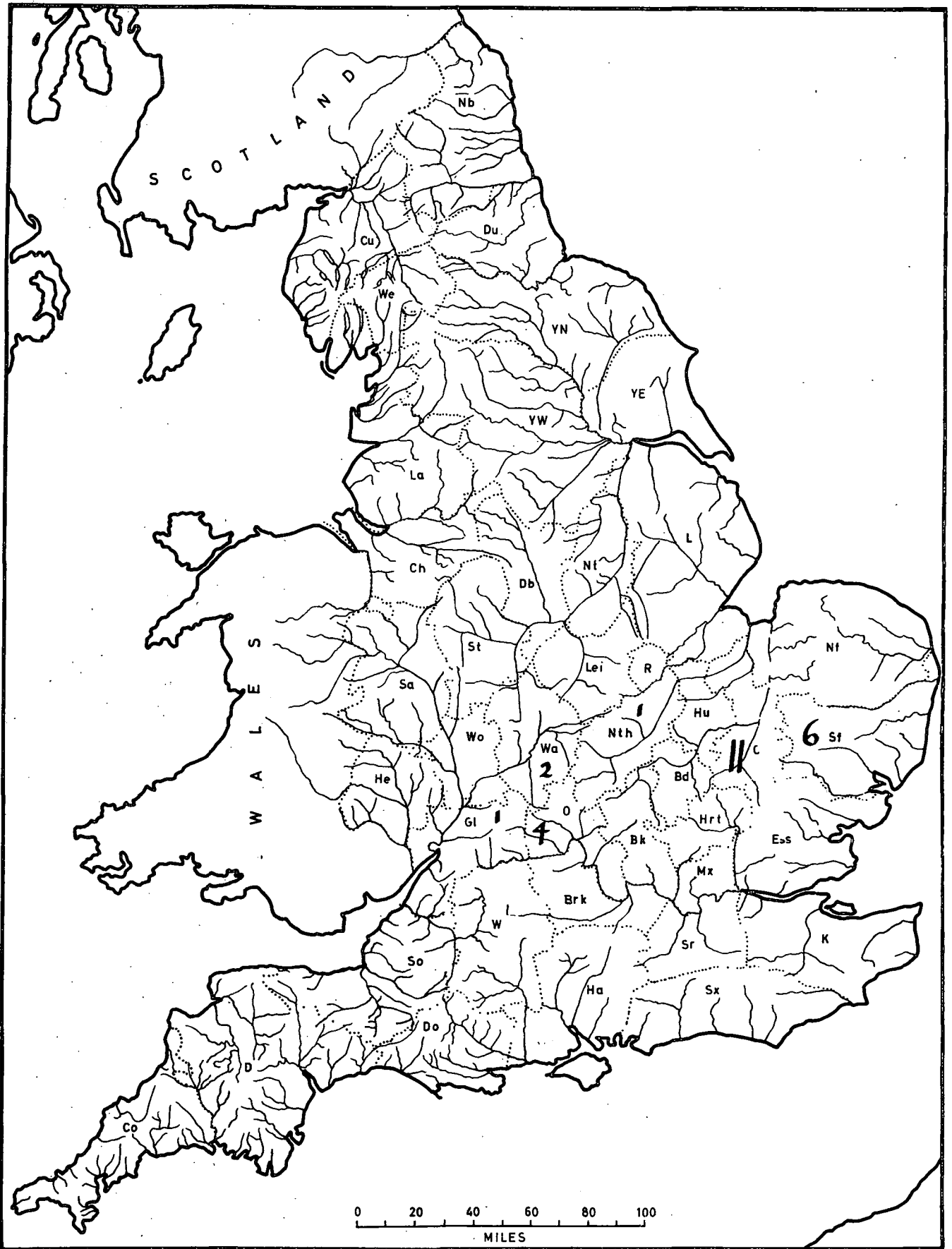
Map Vc.Small-long brooch: RELOC 17:13.



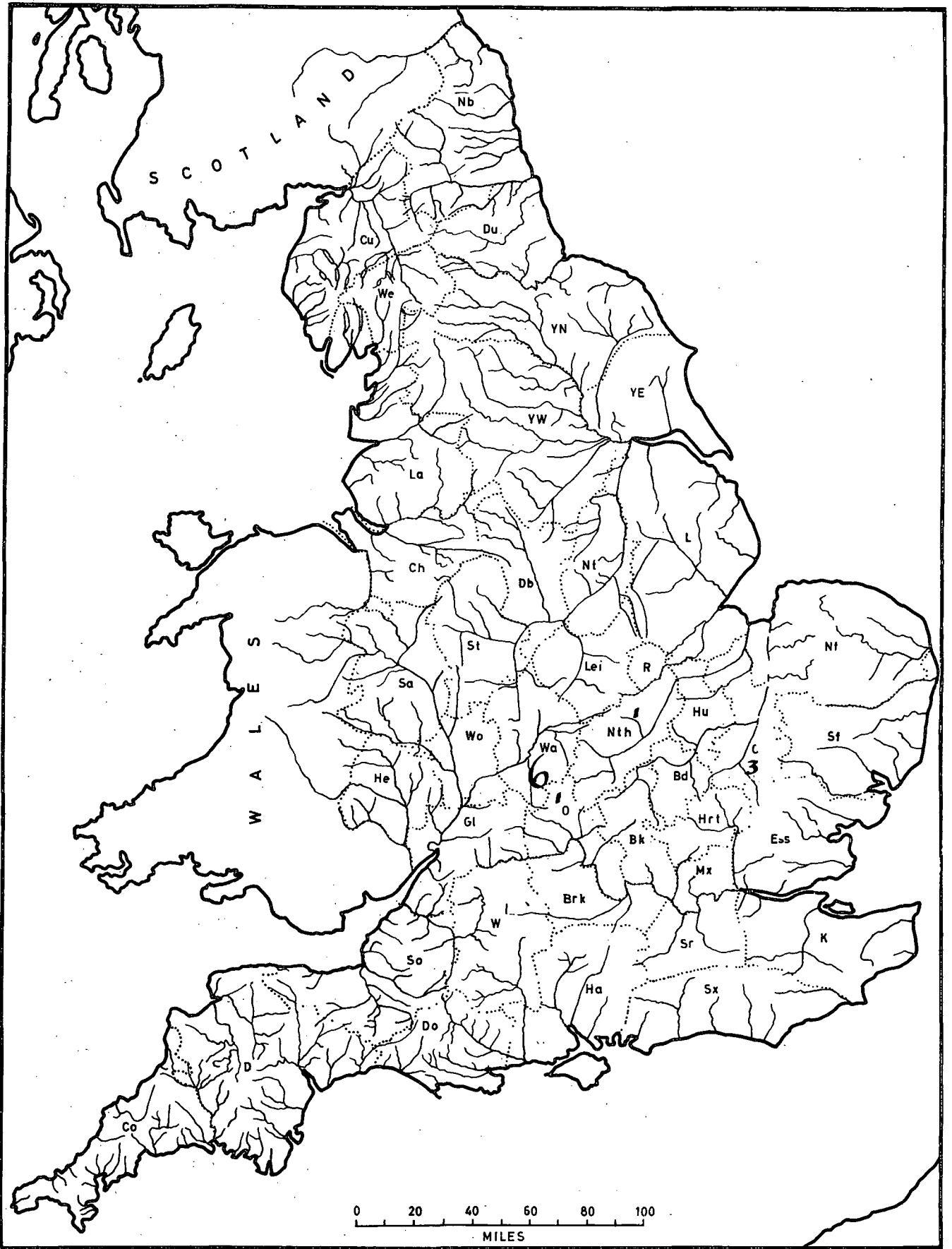
Map Vd. Smallelong brooch: RELOC 17:3.



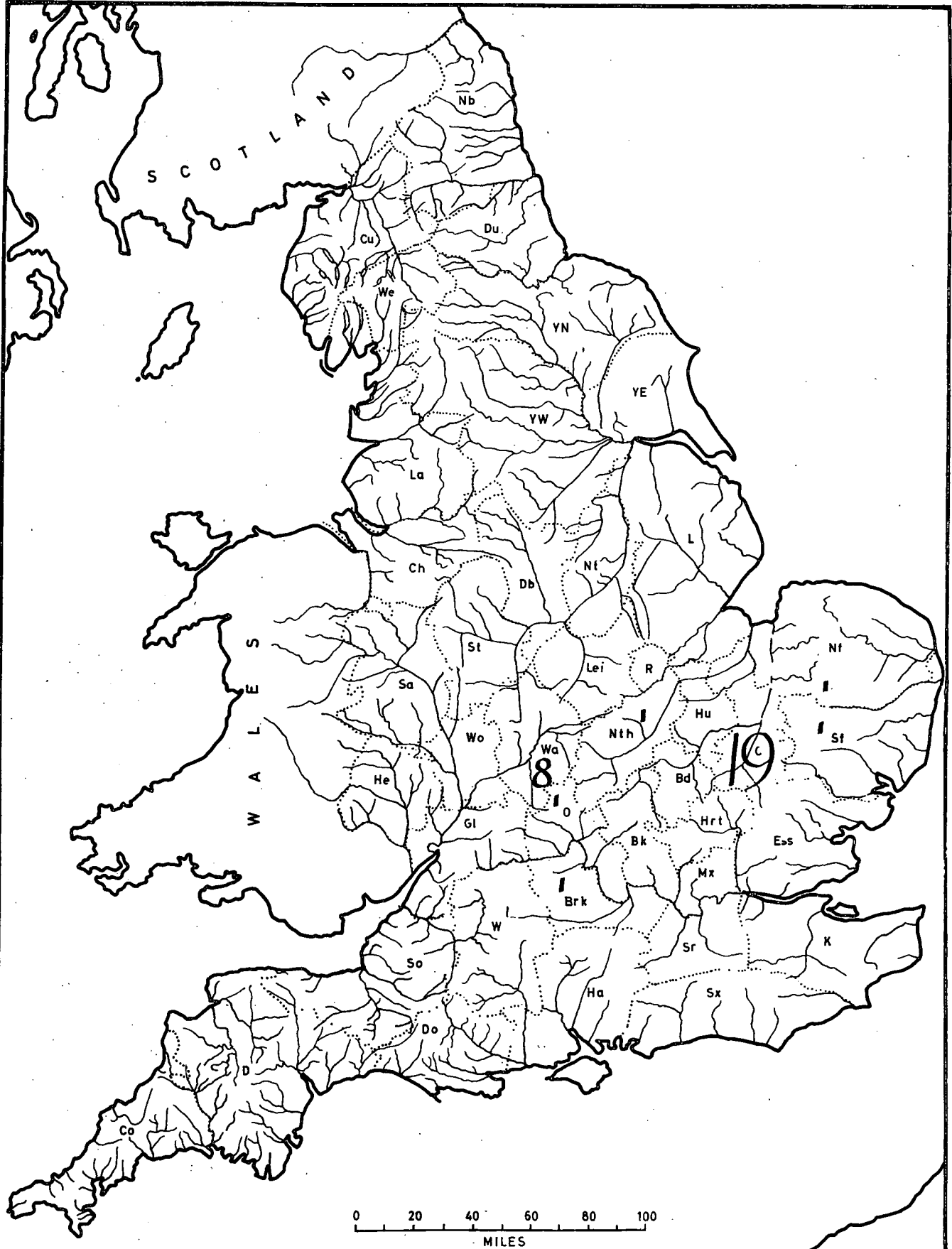
Map Ve.Small-long brooch: RELOC 17:5.



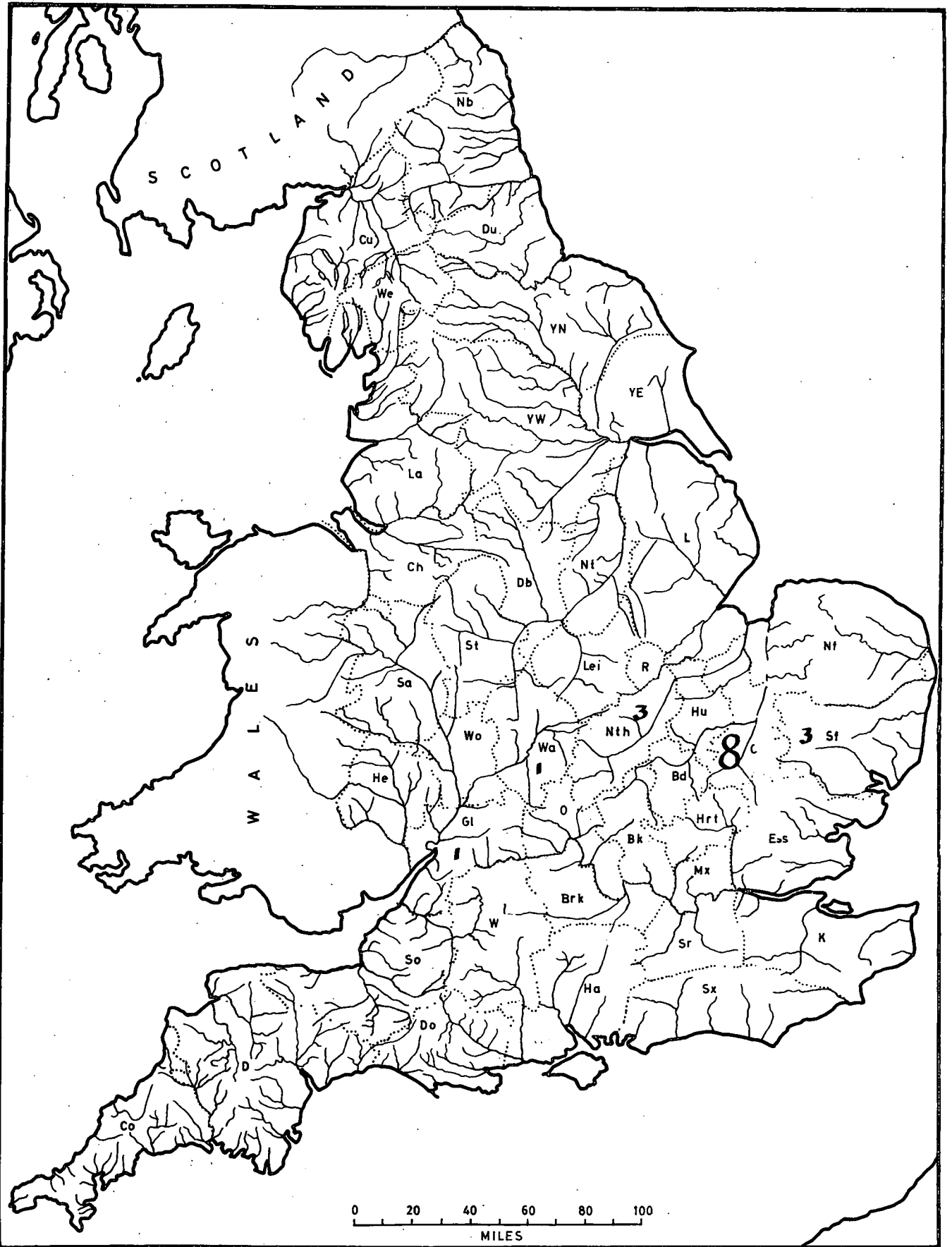
Map Vf. Small-long brooch: RELOC 17:4.



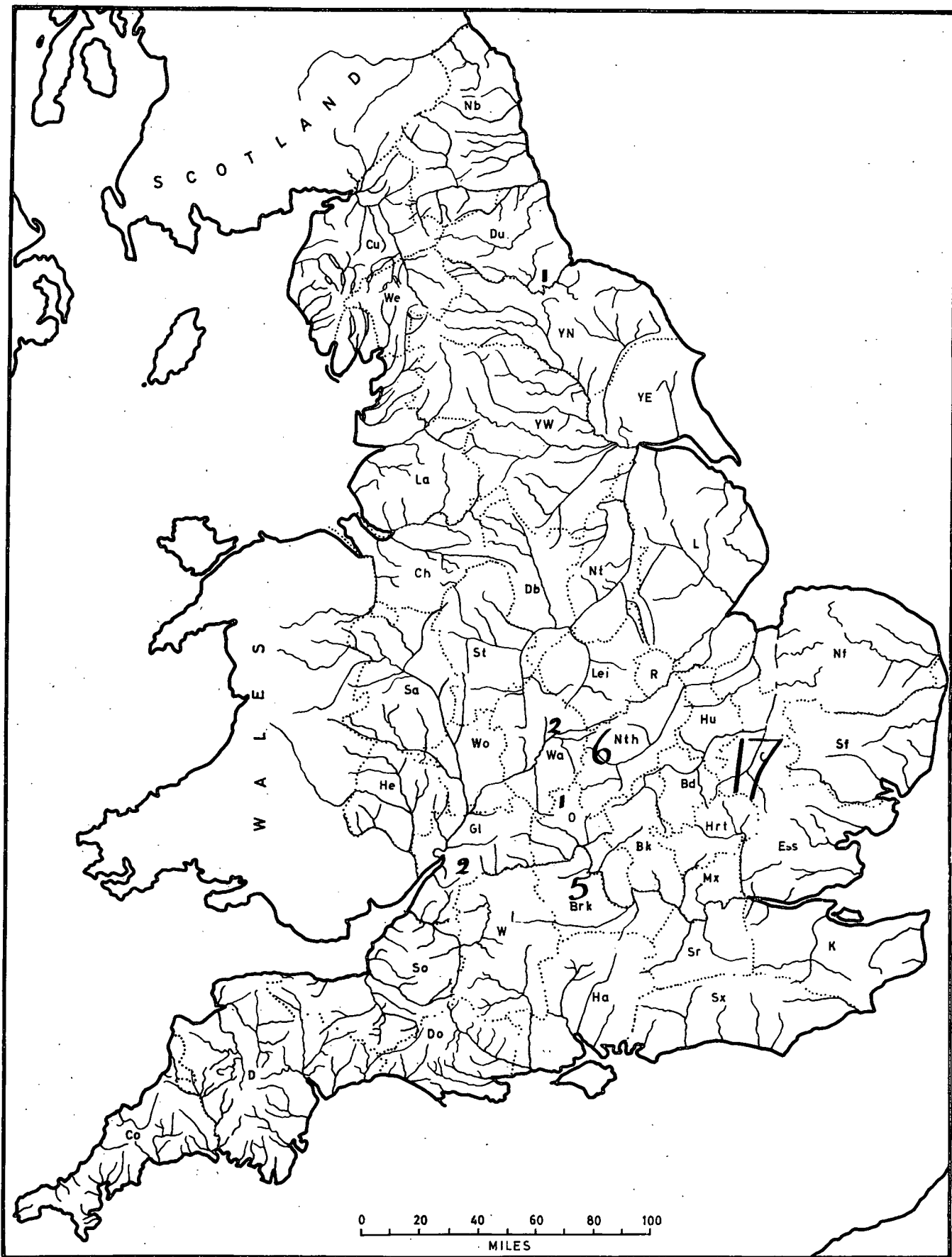
Map Vg.Small-long brooch: RELOC 17:14.



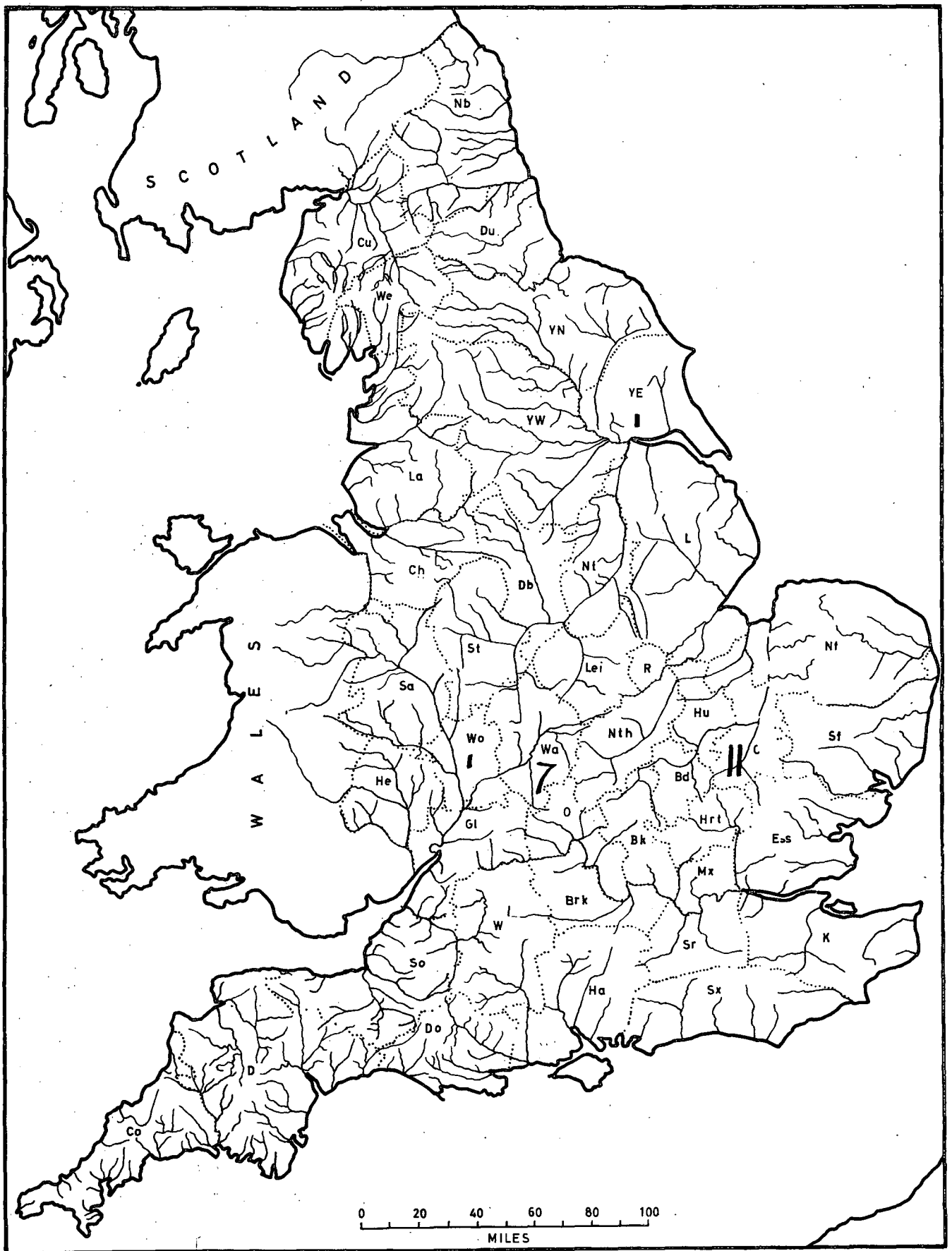
Map Vh.Small-long brooch: RELOC 17:15.



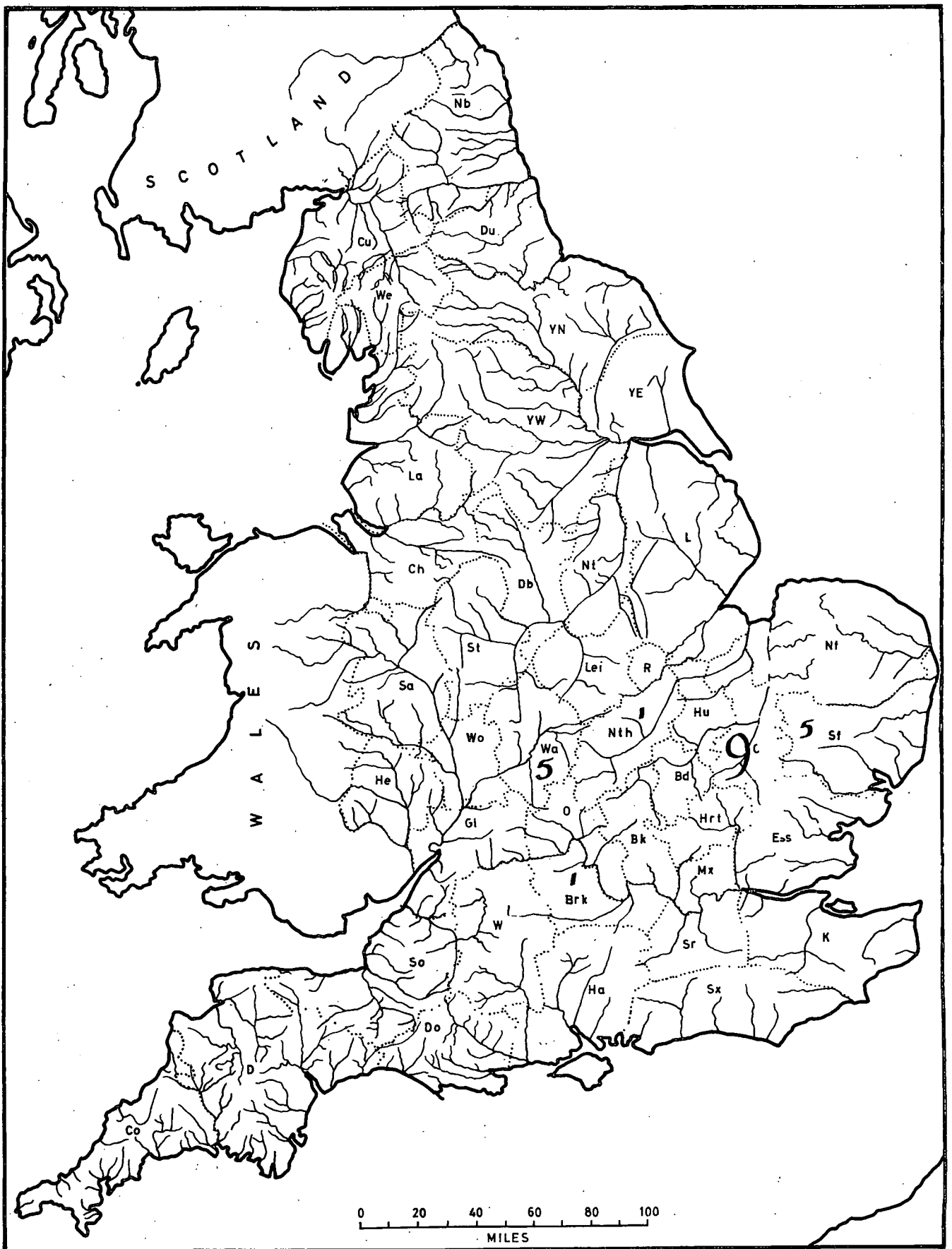
Map Vi. Small-long brooch: RELOC 17:16.



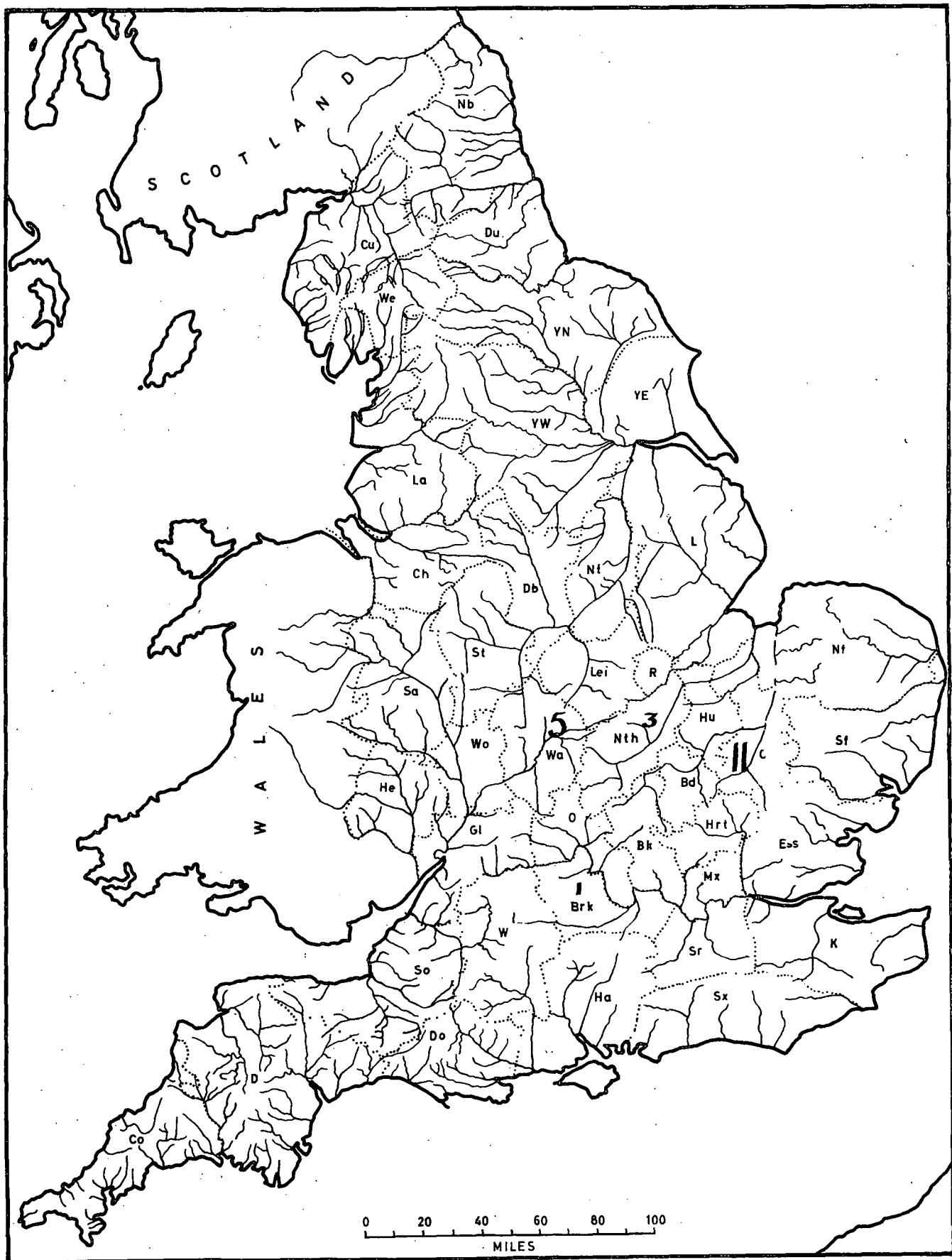
Map Vj.Small-long brooch: RELOC 17:8.



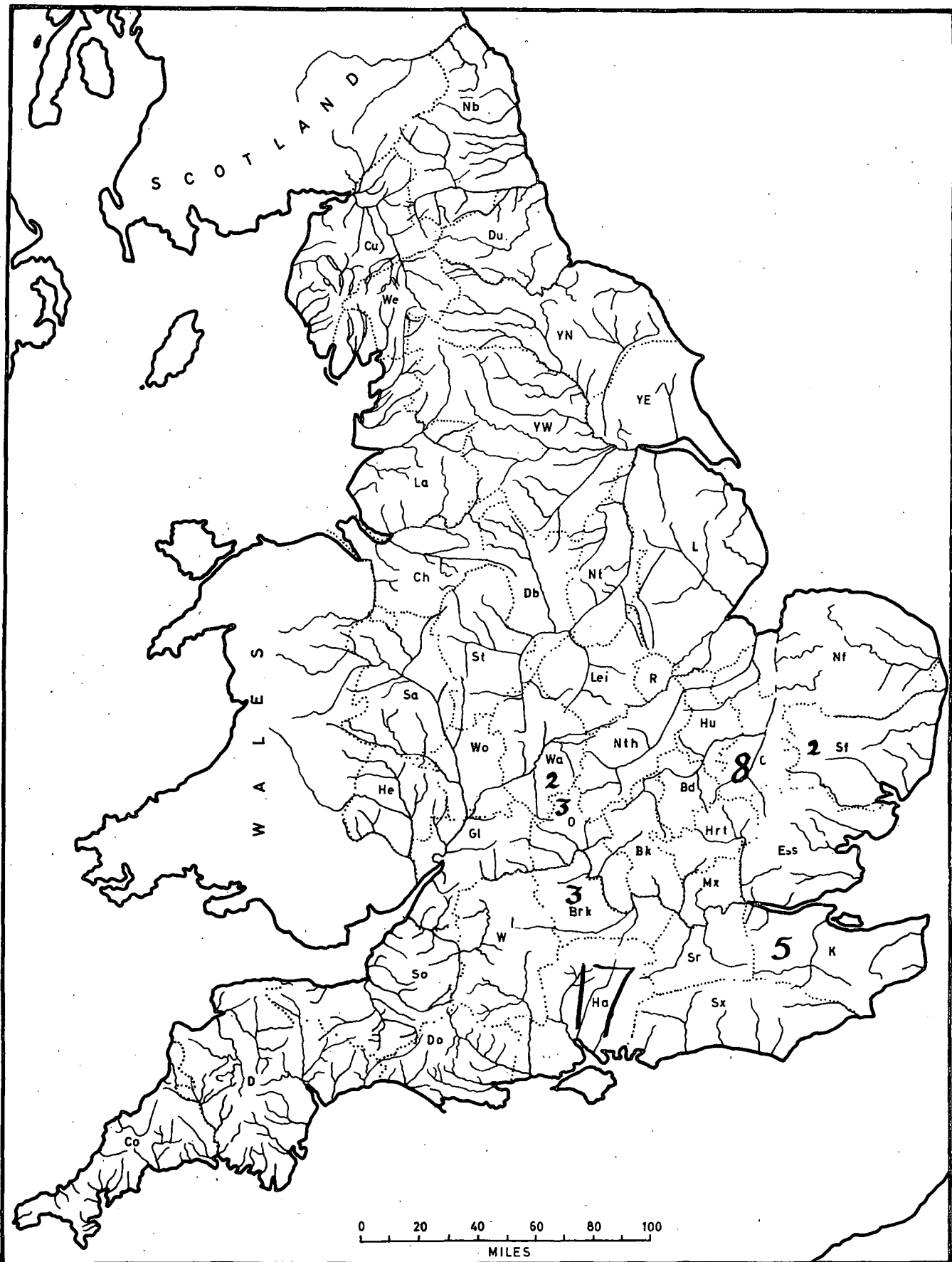
Map Vm.small-long brooch: RELOC 17:9.



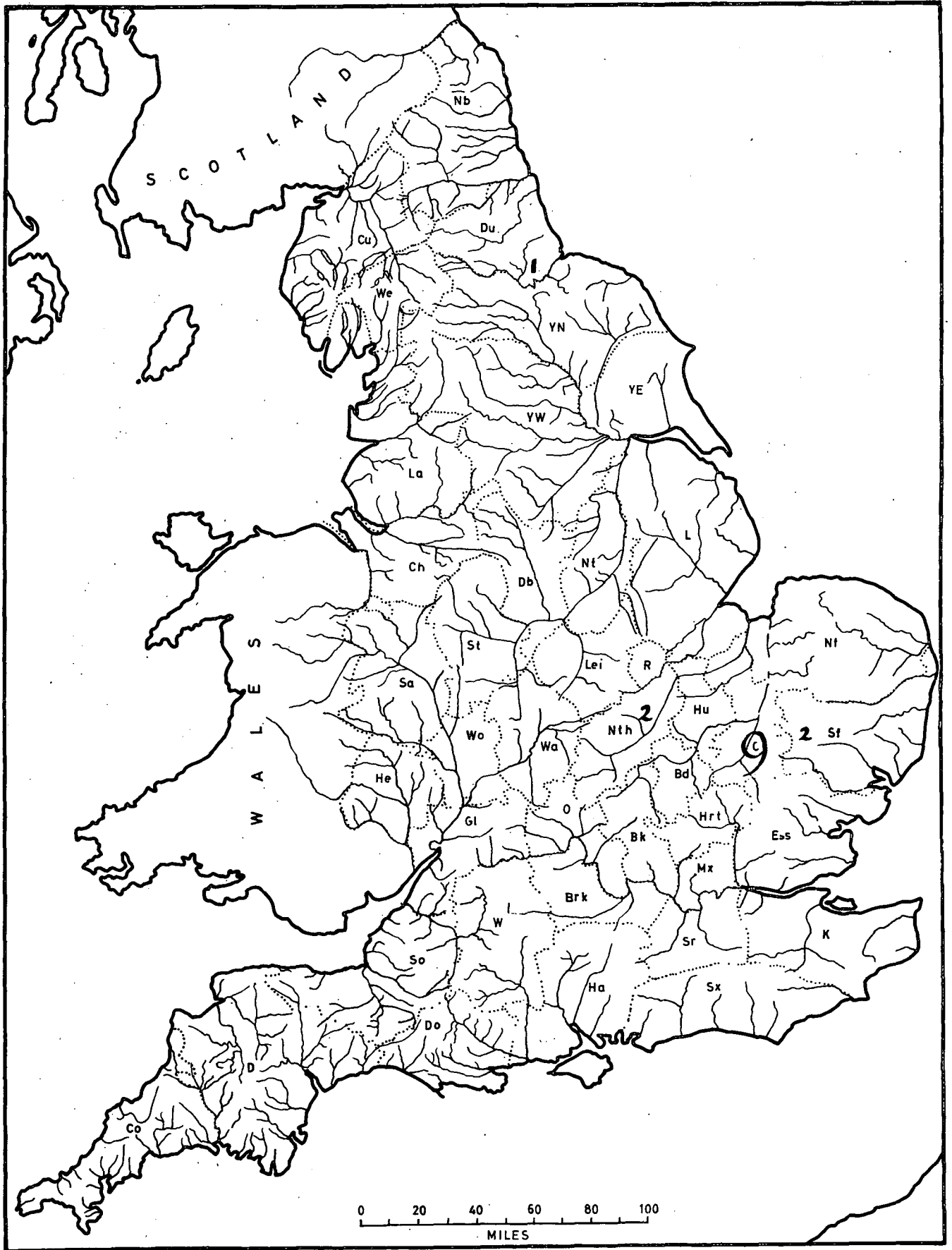
Map Vk.Small-long brooch: RELOC 17:6.



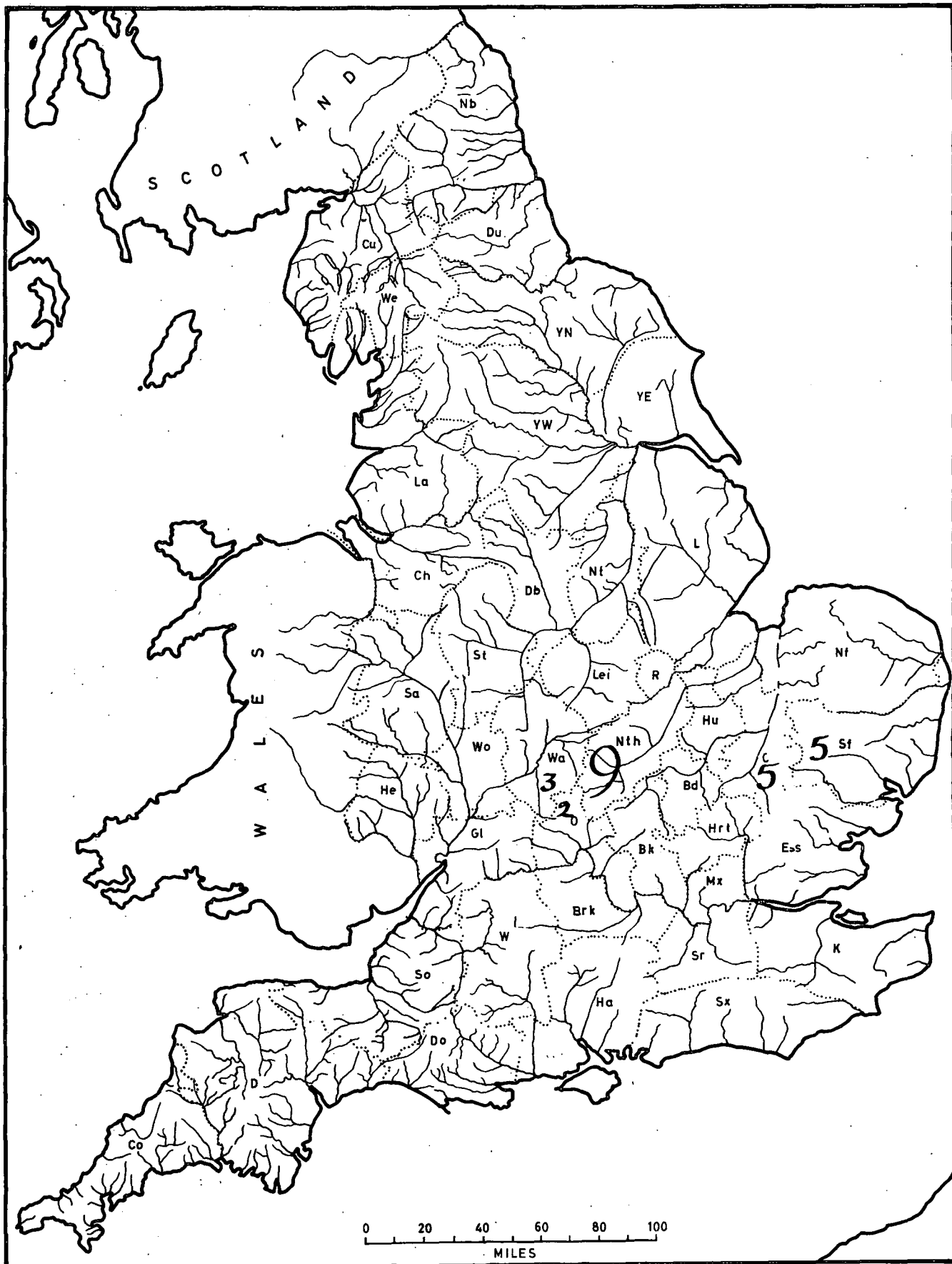
Map VI. Small-long brooch: RELOC 17:12.



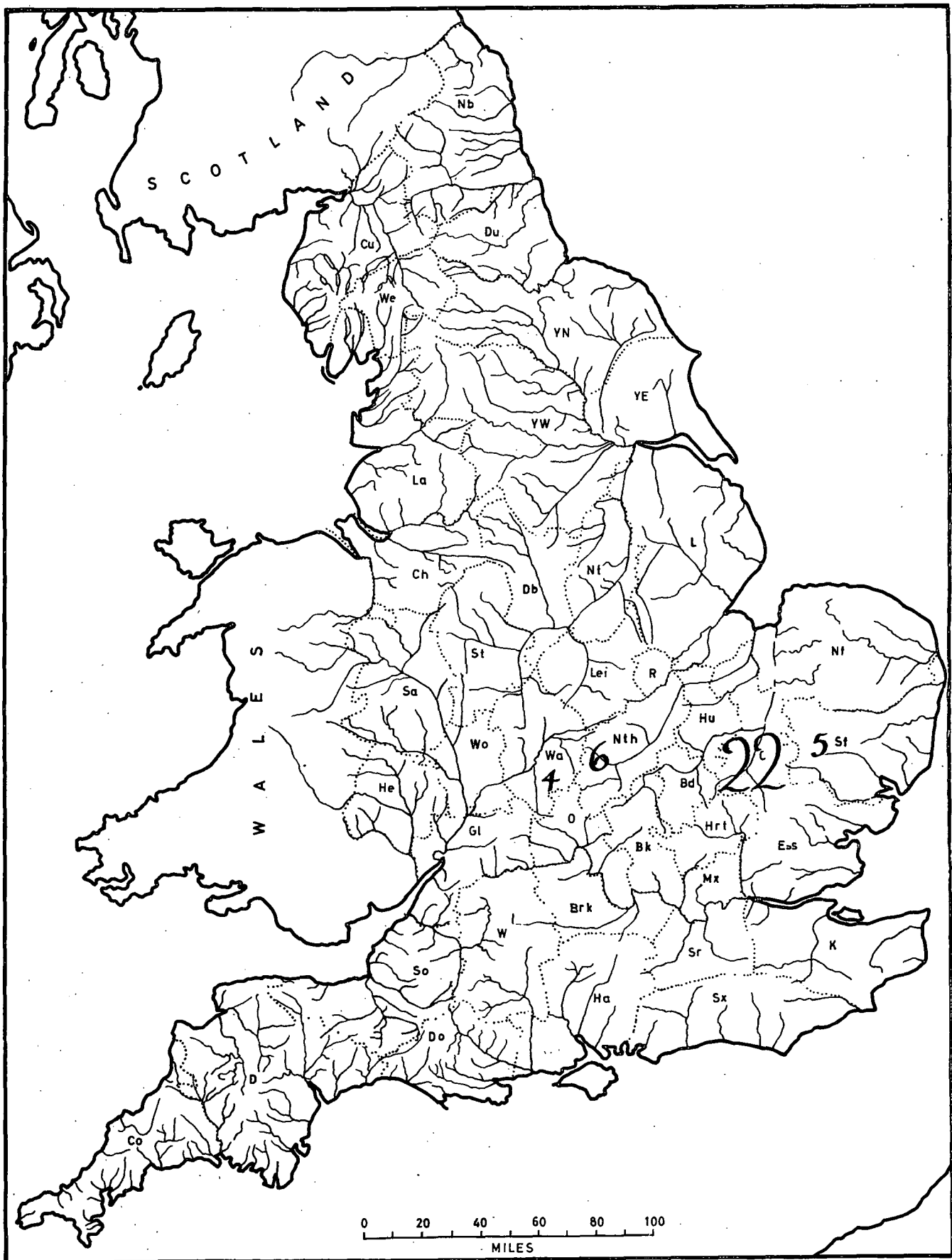
Map Vn.Small-long brooch: RELOC 17:17.



Map Vo.Small-long brooch: RELOC 17:2.

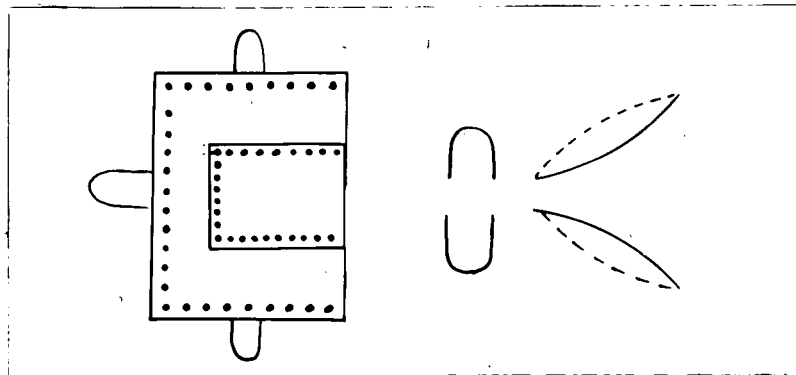


Map Vp. Small-long brooch: RELOC 17:7.



Map Vq.Small-long brooch: RELOC 17:10.

RELOC 17:1

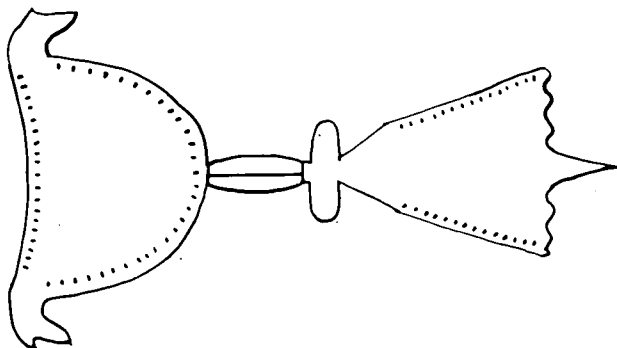


- a. 15 (panel); 19 (straight-sided head-plate);
- b. 1 (lappets); 7 (concave-sided foot); 12 (head-plate appendages);
20 (simple dec.);
- c. 1 (lappets); 6 (convex-sided foot); 12 (head-plate appendages);
15 (panel);

The panel on the straight-sided head-plate may be either an imitation one or an applied one, usually with a simple punched line of decoration emphasising the edge. Some of the brooches have lappets and/or other appendages. There are no holes in the head-plates.

This type is found almost exclusively in Suffolk and Cambridgeshire (Map Va) with an isolated example in Berks. which may be the result of trade or, possibly, marriage links. It seems to indicate a tightly knit community with few outside contacts as the style was not imitated or used elsewhere.

There is complete agreement between the significant features selected by all the cluster analysis programs (Table IIIId) and the class called "square-head (panelled)", types f,g,h, by Leeds (1945: 32ff, Fig.20,22). Such agreement is unusual in this study of the small-long brooches and is evidence that the brooches of this type are sufficiently distinct for there to be little room for argument in their classification.



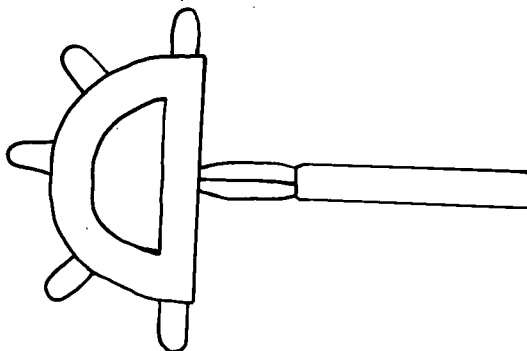
RELOC 17:11

- a. 3 (complex base of foot); 10 (median ridged bow); 20 (simple dec.);
- b. 16 (complex sided head-plate);
- c. 1 (lappets); 2 (finial); 3 (complex base of foot); 8 (straight-sided foot); 10 (median ridged bow); 12 (head-plate appendages); 16 (complex-sided head-plate); 17 (convex-sided head-plate); 18 (concave-sided head-plate);

Into this group all the strange brooches have been put. Many of them may be unsuccessful experiments which were not sufficiently popular to be copied many times and the numerous appendages (finials, lappets, head-plate appendages) give the group an extremely fussy appearance.

The group is almost totally confined to Camb. with a solitary example from Wa. Perhaps the distribution (Map Vb) may be a reflection of the taste of a group of settlers or of one worker in the Camb. region.

Generally, these brooches are those classed by Leeds (1945: 38) as "brooches with lozenge foot" but not square head-plate and the range of head-plate forms is illustrated by Leeds (1945: Fig. 23g-k) As four of the six cluster analysis programs show a fairly good correlation between the significant features for the type (Table IIIId) it may therefore have some validity.



RELOC 17:13

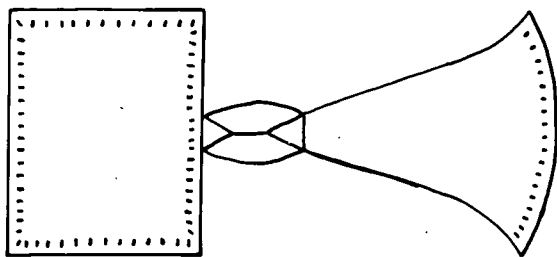
- a. 10 (median-ridged bow);
- b. 5 (straight-based foot); 12 (appendages); 15 (panel);
17 (convex-sided head-plate);
- c. 8 (straight-sided foot); 10 (median-ridged bow); 12 (appendages);
15 (panel); 16 (complex-sided head-plate);
17 (convex-sided head-plate); 21 (complex dec.);

This group should be further subdivided for it contains the radiates (originally included to test the efficiency of the clustering technique and here proving it) and an assortment of highly decorated brooches. The panel, appendages and complex-sided head-plate are typical of the group.

The peripheral nature of the distribution (Map Vc) should be noted with examples coming from Dovercourt, near Harwich, Fairford, Glos., Chessel Down, Hants., and several from Camb. Camb. may have provided the inspiration for the type but my total sample may not be sufficient to provide the solution to the problems posed by the map. These brooches need to be studied more closely to discover the subgroups within the type and whether these have local centres.

The radiates are "objects of Kentish fabric and imitations found outside Kent" according to Leeds" (1945: 61ff) classification with which RELOC 17:13 agrees. He has very little to add about the type but it may be possible to give relative dates to individual brooches according to the number of knobs on the head-plate. It is odd that so

distinctive a type of brooch should be found by only four of the six CLUSTAN 1A programs used but the fact that two of the DIVIDE programs do not fit into the correlations (Table IID) is not sufficient evidence to invalidate the type as the DIVIDE results are not very reliable at this level of clustering.



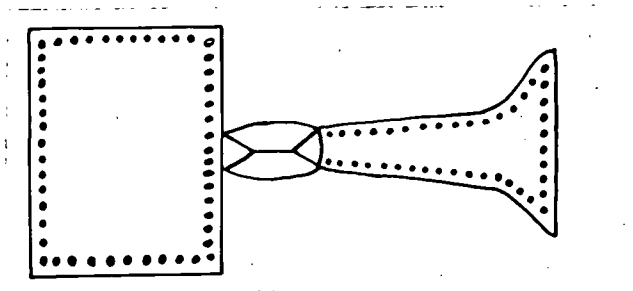
RELOC 17:3

- a. 10 (median-ridged bow); 20 (simple dec.);
- b. 4 (convex-based foot); 7 (concave-sided foot); 19 (straight-sided head-plate);
- c. 9 (faceted bow); 10 (median-ridged bow);

This type of brooch usually has all straight sides on the head-plate but what is the most characteristic feature is the absence of the plain bow. The base of the foot is generally convex but never straight.

The distribution of this brooch type shows a marked Camb. centre with no contacts in adjacent counties and a second, smaller, but more scattered, distribution in the West Midlands (Map Vd). The apparent absence of any examples between the West Midlands and Camb. is difficult to explain and there is need to test this type by further work.

As Leeds does not classify according to the bow, the major diagnostic feature given for this type, there is no agreement between my results and those given by Leeds (1945). There is a reasonably high degree of support for the type from the CLUSTAN 1A program results which suggests that the type cannot be dismissed without further consideration (Table IIIId).



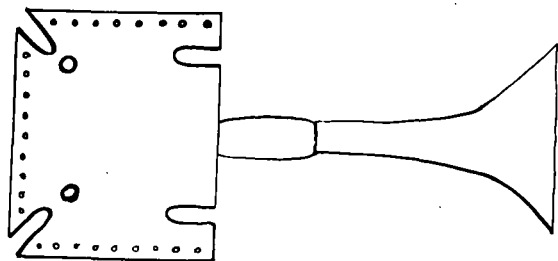
RELOC 17:5

- a. 5 (straight-based foot); 19 (straight-sided head-plate);
20 (simple dec.);
- b. 7 (concave-sided foot); 10 (median-ridged bow);
- c. 5 (straight-based foot); 9 (faceted bow);

RELOC 17:5 can be distinguished from RELOC 17:4 by the faceted or ridged bow but the straight-based foot and the straight-sided head-plate are also key features.

This distribution (Map Ve) repeats that of RELOC 17:1 (Map Va) with a marked concentration in the Camb./Suffolk region and two outliers again in Berks.

The importance in my results of the ridged bow, which is a key diagnostic feature of the type, means there is no clear correlation between my type and those chosen by Leeds. The square head-plate (plain) is the nearest of his classes (Leeds, 1945: 26ff) but some cross potent and cross pattee derivatives are also included here. The cluster analysis programs indicate a reasonably acceptable amount of agreement for the significant features characterising this type (Table IIIId).



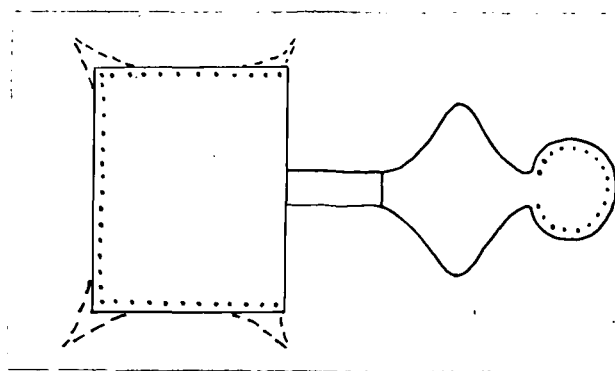
RELOC 17:4

- a. 5 (straight-based foot); 7 (concave-sided foot); 11 (plain bow);
19 (straight-sided head-plate); 20 (simple dec.);
- b. 13 (notches);
- c. 5 (straight-based foot); 14 (holes);

This type is most clearly seen by the characteristic straight-based foot with concave sides and the straight-sided head-plate which may have two or four notches in the upper and lower edges. The straight-based foot does not occur in many groups (Table IIIId) and so may be a more useful indicator of type, when present, than the head-plate is in this instance. The plain bow distinguishes this type from RELOC 17:5 which is similar in many other respects.

There is a fairly clear linear distribution of this brooch type from Suffolk, Camb., Northants., Wa., Oxon. and Glos. which presents evidence of contacts between the West Midlands and East Anglia via Middle Anglia (Map Vf).

The cross pattee derivatives (Leeds, 1945: 22ff) are the nearest of Leeds classes to this type but there is no strong correlation and my type also includes some of Leeds cross potent and derivatives and square head (plain) groups. The CLUSTAN 1A programs give some support for this type from the correlation of four of the programs (Table IIIId) and it has some claim therefore to acceptance. If the characteristic features are modified in future work significant features may be more clearly indicated.



RELOC 17:14

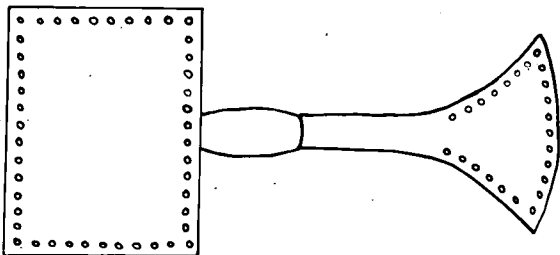
- a. 2 (finial); 3 (complex-based foot); 7 (concave-sided foot);
19 (straight-sided head-plate);
- b. 1 (lappets); 11 (plain bow); 20 (simple dec.);
- c. 1 (lappets); 2 (finial); 3 (complex-based foot); 18 (concave-sided
head-plate);

The square head-plate and complex foot typify this type of the small-long brooch. Frequently it is difficult to decide whether a brooch has lappets and an unusual foot or whether the 'lappets' are in fact part of the foot for the whole brooch below the head-plate has a complicated form, many of the sample having circular appendages to the foot.

The type is scattered, probably from a West Midland centre in Wa., to Oxon., Northants. and Camb. (Map Vg) which suggests that the route indicated by other types (e.g. RELOC 17:4,6,10,12) was used for the spread of ideas in both an easterly and a westerly direction.

There is almost complete agreement between the brooches in RELOC 17:4 and Leeds' brooches with lozenge foot and square head (1945: 36, and Fig. 23c-f). Because of this agreement it seems strange that the type is only poorly supported by the cluster analysis programs used and so this type should receive further study. CLUSTAN 1A produces the type from both RELOC data sets used (Table IIIId) and there must therefore be some suspicion of a group, or type, although the significant features are all shown by their absence rather than their presence, which is unusual.

The complexity of the foot, the difficulty in deciding whether the protruberances below the bow are lappets or part of the foot-plate, may have resulted in human errors in the classification stage which have been sufficiently constant not to mask the distinctive brooch type and this possibility is strong evidence for the need for a less subjective data set than that used.



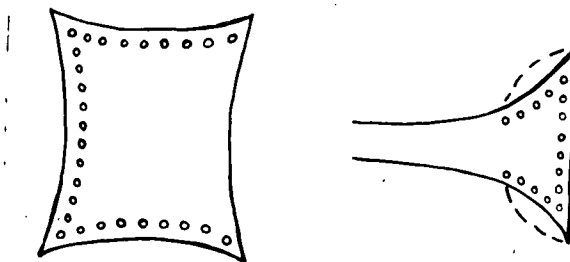
RELOC 17:15

- a. 7 (concave-sided foot); 20 (simple dec.);
- b. 4 (convex-based foot); 11 (plain bow); 19 (straight-sided head-plate);
- c. -

These rather simple brooches generally have a square or trapezoidal head-plate while the foot is frequently convex-based and concave-sided. A very small repetitive pattern of dots or circles is all the decoration normally found and this is used to provide an edging to both the head-plate and the foot plate.

The type is widely dispersed (Map Vh). The East Anglian region and Wa. provide two possible centres from which areas with fewer of the type may have obtained theirs and further analysis may reveal local trading patterns.

Leeds classes these brooches as "square-headed (plain)" (1945: 26) ones but RELOC 17:15 takes only a subtype of the group, those with a convex-based, concave-sided foot-plate. In practice, this does not appear to be a very clearly defined group and is poorly identified by the CLUSTAN 1A programs used (Table IIIId). Perhaps more precise definitions are required in the data used e.g. continuous variables rather than presence/absence criteria. The actual length of a brooch, any angles on the head and foot plate and the width of both may be useful attributes for defining classes in future typological studies.



RELOC 17:16

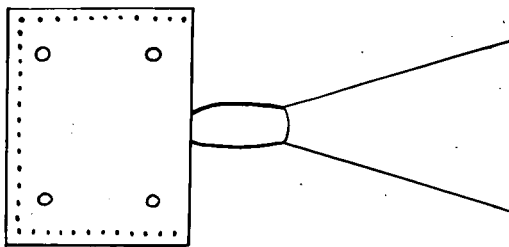
- a. 18 (concave-sided head-plate);
- b. 5 (straight-based foot); 7 (concave-sided foot); 20 (simple dec.);
- c. 6 (convex-sided foot); 18 (concave-sided head-plate);

There is very little variation between the brooches forming this type which has a trapezoidal head-plate with slightly concave sides. As is generally the case the simple, repetitive decoration follows the outline of the head-plate and the foot-plate and is often made up of tiny punched triangles. The simple decorative motifs used on the small-long brooches might well repay further study as this analysis indicates that certain motifs were confined to one type of brooch.

From a Camb. centre the type may have been spread to Suffolk, Northants. and finally the West Midlands (Map Vi). The distribution, more localised than some of the other types which have been found, occurs in very few numbers outside East Anglia.

The most likely one of Leeds' (1945: 26ff) types to match this one is the "square-head (plain)" one which he subdivides further according to rectangular or trapezoidal head-plates. This type is the trapezoidal one. I do not accept his statement that "this class, like all the rest, adopts the crescentic foot, but unlike others it is seldom found with regular lappets below the bow." (p. 26), for my evidence points strongly towards a straight-based foot and several have lappets. Five of the six cluster analysis programs give support for the features

listed above as significant diagnostic ones for the types and this is a high degree of correlation (Table IIIId). The type may therefore be accepted as valid.



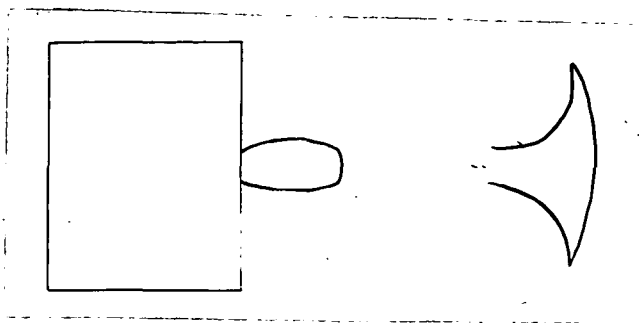
RELOC 17:8

- a. 19 (straight-sided head-plate); 20 (simple dec.);
- b. 8 (straight-sided foot); 11 (plain bow);
- c. 8 (straight-sided foot); 14 (holes);

Simple, geometric decorations punched around the edge of the straight-sided head-plate and the significantly high number of straight-sided feet characterise this very plain brooch type. Many of the brooches have holes in the head-plate.

This type is very widespread with examples found in Durham, Glos., Berks. and Camb. (Map Vj). More might be learnt about it if the initial sample is extended to include as many similar brooches as have been found and such a study might show regional peculiarities and chronological differences.

There is much difficulty in correlating my results with those of Leeds' square head-plate types because mine also take into consideration the foot-plate characteristics for each brooch type, which are ignored by Leeds, unless the brooch is unclassifiable in any other way. The brooches in RELOC 17:8 may be from Leeds' square-headed (plain, a), cross pattee derivatives or cross potent derivatives groups. It seems on this evidence that more work is needed on the manner of describing the head-plates of these brooches. My results show a reasonably good correlation between five of the six cluster analysis programs (Table IIIId) and it would seem, therefore, that there is a need to consider features other than the head-plate when constructing a typology.



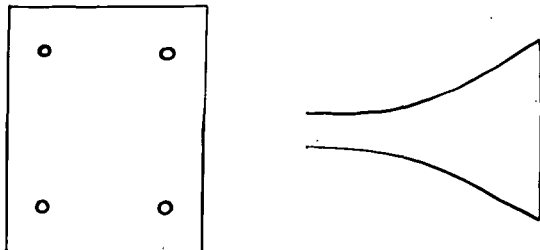
RELOC 17:6

- a. 7 (concave-sided foot); 11 (plain bow); 22 (no dec.);
- b. 4 (convex-based foot); 19 (straight-sided head-plate);
- c. 4 (convex-based foot); 22 (no dec.);

The total absence of even the most simple decorative motifs is unusual and a significant characteristic of this brooch type although not all the brooches in the type need be undecorated (Table III d). The convex-based concave-sided foot is a truer indicator of type, in this case, than the straight-sided head-plate.

The distribution of this type (Map V k) is similar to that of RELOC 17:4 (Map V f) with examples occurring in Suffolk, Camb. (a major centre), Northants. and Wa. (a second centre). One isolated example is found in Berks. It is important to note the distribution pattern, supported by more than one brooch type, for the links between the West Midlands and East Anglia via Middle Anglia.

As has been found for all brooches with a square head-plate, there is some confusion between my results and those of Leeds and this may be explained by the need for greater precision in identifying points on the head-plate. There is a fair amount of agreement between only four of the CLUSTAN 1A programs used. This type is most frequently classed by Leeds (1945: 26ff) as square-headed brooches with plain head-plates but should not be accepted without further study and justification for the diagnostic features used.



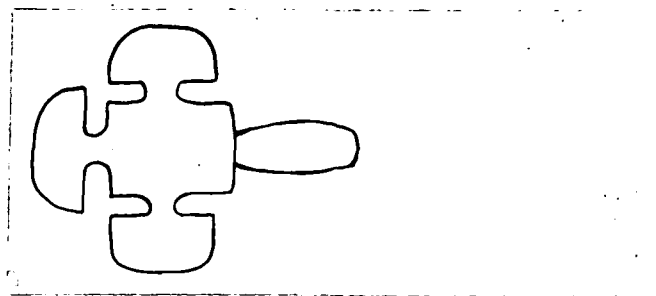
RELOC 17:12

- a. 19 (straight-sided head-plate); 22 (no dec.);
- b. 5 (straight-based foot); 7 (concave-sided foot);
- c. 5 (straight-based foot); 14 (holes); 22 (no dec.)

This type is easily recognised by the square head-plate and the absence of surface decoration although two or four holes may add variety to the type. The foot is extremely simple and is generally triangular in shape.

Camb., Northants. and Wa. provide the majority of the brooches of this type (Map VI) but as with RELOC 17:6 (Map Vk) a stray example has been found in Berks. The East Anglian-West Midland link via Northants. is again evident.

There appears to be a mixture of Leeds' cross potent derivatives and cross pattee derivatives in this type which arises from the difficulty, using my criteria, in grading variations in the notches present on some brooches at the top corners. In brooches illustrated by Leeds (1945: Fig. 10,14,15) the similarities are not necessarily as obvious in practice but this does appear to be a poorly chosen feature and one which is not well supported by my results. If the actual angle for the line of the notch from the horizontal be recorded a more definite classification might result. Although this type is not in agreement with those given by Leeds it is supported by four of the six cluster analysis programs and there is also much agreement between the two DIVIDE programs with minor differences from the other programs (Table IIIId).



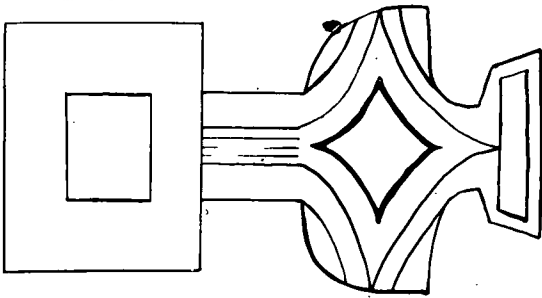
RELOC 17:9

- a. 22 (no dec.);
- b. 11 (plain bow); 13 (notches); 17 (convex-sided head-plate);
- c. 13 (notches); 17 (convex-sided head-plate); 22 (no dec.);

Many features of this type are also found in RELOC 17:7 but the main difference between the two types is the decoration - this type has no decoration. Notches divide the convex-sided head-plate making the characteristic trefoil head which is easily recognisable.

There are two important centres for this type; Camb. and Wa./Wo. (Map Vm). It has been found in Yorks. too. The East Anglian and West Midland centres are repeatedly found in the various types produced by this analysis.

The nearest of Leeds' (1945: 8ff) trefoil-headed brooches to RELOC 17:9 are those illustrated by him as classes a-b, (1945: Fig. 4) but there are also some brooches with only minute divisions in the semi-circular head-plate which I have included in this class. They are very crude brooches and have presumably deteriorated from the pure trefoil-headed type. These simple brooches have been put into a cluster by all six CLUSTAN 1A programs used (Table IIIId) and are therefore a justifiable type.



RELOC 17:17

- a. 3 (complex-based foot); 7 (concave-sided foot); 15 (panel);
- b. 10 (median-ridged bow); 19 (straight-sided head-plate);
21 (complex dec.);
- c. 3 (complex-based foot); 6 (convex-sided foot); 10 (median-ridged
bow); 15 (panel); 21 (complex dec.);

This type is the miniature "great square-headed" brooch with extremely complex, often chip-carved, surface decoration. Garnets have been added to the central panel or the two upper corners of the head-plate and in some cases to the foot-plate and/or the bow.

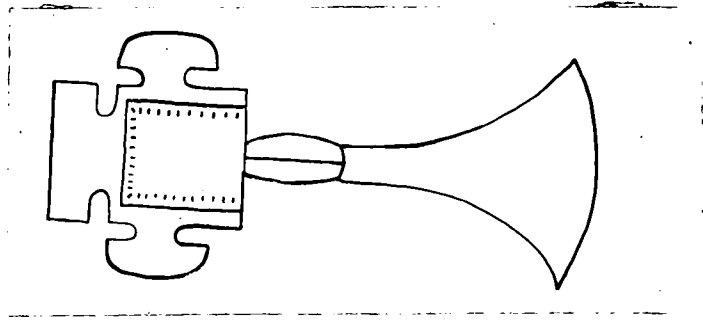
The nature of the decoration, especially the use of garnets, suggests a Kentish centre for the type and it is true that several of the type are from Kent but an even greater proportion of the sample has been found in Hants. (Map Vn). This may be due to a bias in the selection of the sample and requires further study but the widespread popularity of the type throughout Wessex, the West Midlands and East Anglia in addition to Kent shows a distribution over a larger part of southern England than for any other type.

Leeds (1945: 63f) classes these brooches as "objects of Kentish fabric and imitations found outside Kent". They are small-long brooches in that they are usually under 3" in length but are imitations of the much larger "great square-headed" brooches rather than the cruciform brooches. Leeds subdivides the type into three, according to variations in the foot-plate, but I have not found this justifiable when

only seventeen types are being distinguished (Table IIIId).

Undoubtedly the type may be subdivided if the total number of subtypes for the sample used is extended but it is sufficiently homogeneous to emerge at the triple division stage of the dendrogram (Table IIIb).

The six cluster analysis programs used show complete agreement on the significant features of the type which justifies its use.



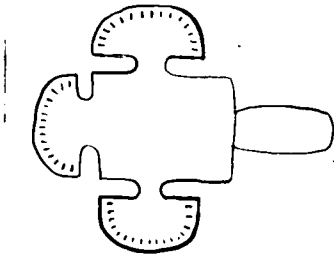
RELOC 17:2

- a. 7 (concave-sided foot); 13 (head-plate notches);
- b. 4 (convex-based foot); 10 (median-ridged bow); 15 (panel);
16 (complex-sided head-plate); 19 (straight-sided head-plate); 20 (simple dec.);
- c. 4 (convex-based foot); 13 (notched head-plate); 16 (complex-sided head-plate);

The characteristic notches in the head-plate may be in the lower edge of the head-plate or in all four corners which design helps to create a complex head-plate form. The complex nature of the head-plate may also be formed by one or two straight-sided edges and one or two curved ones.

Camb. is the main centre for this brooch type but it also occurs in Northants., Suffolk and Durham (Map Vo). Presumably the communities using these brooches had trading contacts based on the waterway system leading to the Wash which followed the east coast up to the north-east of England.

Leeds' cross potent type c(ii) (1945: Fig. 8) has the most similarity with RELOC 17:2 although the agreement, as for other groups, is not total. None of the DIVIDE programs has produced this type (Table IIIId) but the other three programs show an acceptable degree of support for it.



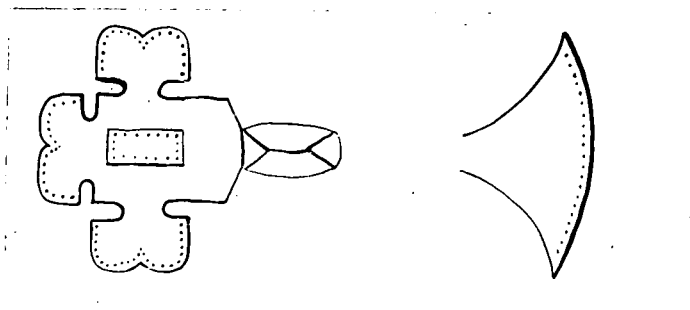
RELOC 17:7

- a. 13 (notches); 17 (convex-sided head-plate); 20 (simple dec.);
- b. 5 (straight-based foot); 11 (plain bow); 16 (complex-sided head-plate);
- c. 6 (convex-sided foot); 13 (notches); 16 (complex-sided head-plate);
17 (convex-sided head-plate);

Notches divide the complex-sided head-plate, which usually has convex sides, making a trefoil-headed brooch. Any decoration is very simple being small, geometric shapes punched around the edges of the head or foot plate.

Northants. seems to be the main centre for this type (Map Vp) which also is found in Wa. and Oxon. Camb. and Suffolk have fewer brooches and so form a secondary centre for this type.

Four of Leeds' types (1945: 8, Figs. 4,5) come into this category, namely, the trefoil-headed brooches a,b,d,h. There is complete agreement between his results and mine which show (Table IIIId) that the type is produced by all six of the cluster analysis programs with a high degree of support between five of them in particular. The type can be accepted as valid on this evidence.



RELOC 17:10

- a. 20 (simple dec.);
- b. 4 (convex-based foot); 7 (concave-sided foot); 11 (plain bow);
13(notches); 15 (panel); 16(complex-sided head-plate);
17 (convex-sided head-plate);
- c. 9 (faceted bow); 16 (complex-sided head-plate); 17 (convex-sided
head-plate);

This type of brooch has a cruciform pattern to the head-plate. Some of the group (e.g. Table III: 123) may be very closely related to the larger, cruciform brooch while the majority have the three lobes of the head-plate divided into two giving a scalloped edge. The overall impression given is that the group has rather fussy decorative features although any lappets present are usually small and plain. A panel is usually indicated in the head-plate.

The Camb./Suffolk and Northants./Wa. centres are clearly shown by the distribution of the sample (Map Vq).

There is a mixture of Leeds' (1945: 8ff, Figs. 4,5) trefoil-headed types in this group which unites those brooches with a concave-sided, convex-based foot-plate. Therefore, the lappets used by Leeds to subdivide the trefoil-headed brooches into two main groups have not emerged in this study as a major type feature. All the cluster analysis programs show a measure of support for the significant features used to identify this type (Table IIIId).

Conclusion

Some significant features of the brooches have been analysed and the cluster analysis programs have produced seventeen types. An attempt has been made to show any regional peculiarities of each type, as revealed by this typology by the data used. Each type has been examined to show what degree of support there is for it in the light of Leeds' (1945) study of these brooches and from the six CLUSTAN 1A programs used.

It should be stated here that there is an obvious need for more study of these brooches because the amount of support for any of the type with straight-sided head-plates is limited (Table IIIId). This suggests that my definition of head-plate characteristics is at fault. Instead of the simple presence/absence criteria used the significant features should probably be given in a quantifiable way such as actual head-plate width, the angle from the vertical made by the top of the head-plate, the angle from the horizontal made by any notches present and the actual length of the brooch. My study has supported some of Leeds' classes (e.g. RELOC 17:1,11,13,14,17) but casts doubt on the validity of his subdivisions of the square-headed, cross potent and cross pattee ones together with their derivatives. Despite the need for more work on this typology the cluster analysis programs have again demonstrated the greater refinements possible in a typology relying on the examination of many features rather than on one feature, or, as in the case of the X^2 results, two associated features.

Each cluster has been mapped and each appears to have a characteristic geographical distribution, which is the same type of result as that obtained from the saucer and applied brooch sample. Once the less well defined types have been reanalysed, using different criteria

it might be possible to give a chronological sequence within each small-long brooch cluster, too. The production of a valid typology for these brooches is urgently needed for meaningful analyses of the pagan Anglo-Saxon cemeteries, especially those in Eastern England.

Small-long broochesRELOC 12

The details of the significant positive and negative features for twelve clusters are included here in order to present the problems which are encountered where the results of several clustering techniques cannot be correlated in an acceptable way. This situation can be explained in several ways: the absence of any definable types using the data given, dangers inherent in the techniques when different starting points are used, the actual absence of types. Table IIIe shows that RELOC results from a starting point of twenty-two clusters found by (i) MODE, and (ii) HIERAR and those RELOC results from a starting point of twelve clusters from (i) MODE and (ii) HIERAR produce quite different cluster details. Where there is a very distinct type all four results show the same features (e.g. RELOC 12) but at the other extreme there are groups where the clusters are almost impossible to correlate (e.g. RELOC 2,4,6,9). Difficulties also arise because of the inflexibility of some of the divisive methods which cannot merge similar types once they have been divided and may have subdivided a set of brooches which other methods have left as one (e.g. RELOC 6,9, although DIVIDE results are omitted here). It is interesting to see that each set of four results given has two or three very similar ones but there is no clear pattern to prove that any one or two methods can be taken as true indicators of a type.

An examination of these results, together with those from other cluster levels, convinces me that a typology might be more accurately found if the data set includes actual measurements (length, maximum width of head-plate, maximum width of foot, etc.) and these continuous variables are then analysed by the clustering techniques. Types have been

found by using the simple presence/absence of key features but the data thus obtained has in some instances been too crude to give clear-cut types (Tables IIIb-e).

6. The Pottery Sample

The need for classification and some problems

In spite of the great archaeological interest in pottery classification little work has been done, other than by Myres, for the early Anglo-Saxon period. It is hoped that this study will suggest basic pottery types found within the West Midland area. There are 128 whole or nearly complete pots available for analysis (Table IV). Some fragments, especially those showing decorative techniques, might be used to expand a classification system once one has been established, but have to be ignored during the formulation process. Only whole pots, or those with almost complete profiles, have been used in order to obtain any relevant relationships between criteria analysed, so that features with a hypothetical relationship can be listed. Sixty seven vessels are from cemeteries in Warwickshire and near the lower Avon group but outside the diocese of the Hwicce. These have been included in order to provide a sample large enough to have any meaning and to give a small amount of comparative material for any characteristics from the territory of the Hwicce to be isolated.

The pottery is difficult to classify as it is hand-made and most is of the type frequently called crude and undecorated. Decorated pottery has received some attention from archaeologists (Myres, 1956; Myres, 1959; Myres, 1969) but 78.9% of surviving material from the West Midlands is undecorated. Such vessels are difficult to identify in museums and to

relate to their correct grave groups, even when reports are published, which makes dating almost impossible. However, associations may be known for some of the more elaborately decorated pots.

One of the major difficulties in examining the pottery is the lack of standardization in publication. Much description is subjective and, therefore, liable to varied interpretation by each reader. Comparison of material from reports is impossible in this situation. There is also no standardized system of terms, nor norms. The norms for variable features need to be found in order to show any significant deviations and I have produced norms for the West Midland material by inspection and detailed analysis of the data. It is unfortunate that such data is not available for other regions, as comparative conclusions cannot be made here, and it is possible that regional peculiarities may not be recognised. Shape and design also have to be compared and considered within each pottery group.

The collection and interpretation of the material should provide a series of pottery types. These are artificial, idealised generalisations which may be a useful guide to the interpretation of less complete vessels. It is artificial because a meaning is being read into variations which may not have had any significance to the potter when originally creating the vessel. Relative chronologies based on minor changes in features may be reflecting no more than ranges in ability of different craftsmen, accidents or unsuccessful experiments. Major changes may be due to new discoveries in technique or the acceptance of a new design from a creative local potter or from foreign contacts. Environmental and cultural factors tend to act against change and so encourage the development of a localised type. It is essential that the

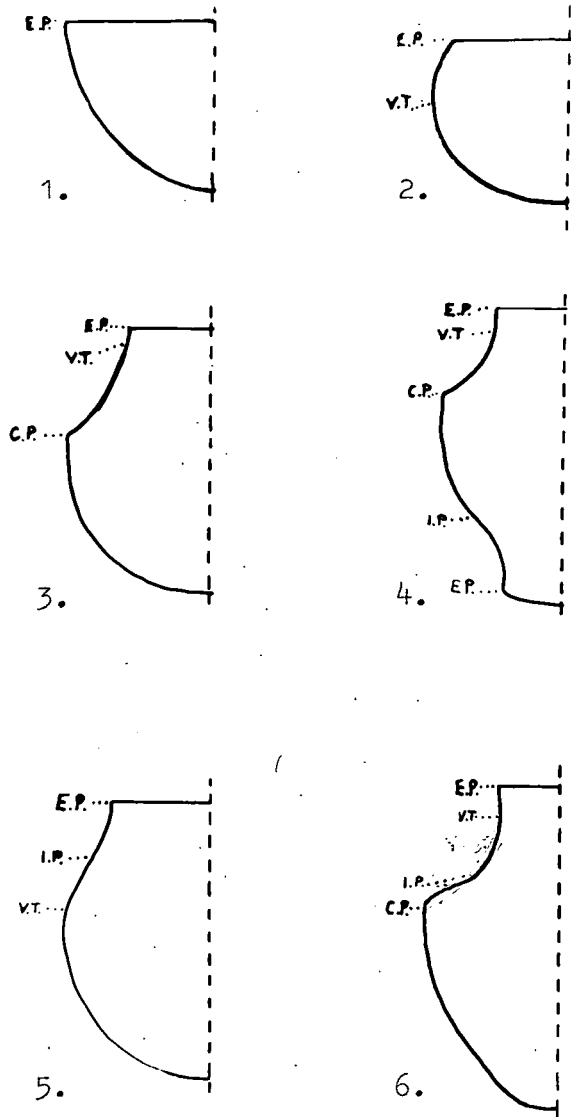
criteria chosen in defining a pottery type be consistent and not the fluke results of isolated accidents.

Pottery Classification

In her basic handbook on ceramics considered from an archaeological viewpoint, Anna Shepard (1965) endeavours to present a systematic approach to the problem of pottery classification. This is much needed in the study of early Anglo-Saxon pottery in England, and I have given a brief résumé of her techniques, some of which I adapted and used (Table IVa - to which code numbers in brackets refer in the following section) in an attempt to classify the extant Anglo-Saxon pottery from the Hwiccian territory. In the following pages the characteristics used are referred to and their code numbers given. I am aware, however, that more work needs to be done on this topic beyond the scope of the present study.

Shepard uses five basic elements as criteria in the classification of the shape and form of a vessel: symmetry, contour, geometric shape, structural form, proportion. Symmetry is assessed by rotating the vessel about its vertical axis. All the ceramics examined from the West Midlands tend towards symmetry, although the skill of the potter making coil and thumb vessels accounts for slight aberrations.

The contours of a vessel provide four types of shape: simple (18), composite (20), inflected (19) and complex (21). Shepard draws on the earlier work of Birkhoff (1933) for this analysis, which depends on the presence or absence of four "characteristic points" on any vessel. A diagram best explains these points (Fig. XV). The inflection point (I.P.) is the place at which a change in direction of the tangent is observed and is a very important, definable position. The corner



- | | |
|--|--------------------------------------|
| 1. simple, unrestricted. | 2. simple, dependent, restricted. |
| 3. composite, restricted, dependent. | 4. complex, restricted, dependent. |
| 5. inflected, restricted, independent. | 6. complex, restricted, independent. |

Fig. XV. Pottery: Characteristic points
(after Shepard, 1965).

point (C.P.) marks an abrupt change in contour. These "characteristic points" help establish the contour type of the vessel. A simple contour type has end points (E.P.) and may also have a point of vertical tangency (V.T.) while the composite contour type vessel has end points (E.P.), a corner point (C.P.) and may have a point of vertical tangency (V.T.). An inflection point (I.P.), which links smoothly a convex and concave curve, defines an inflected contour type but if a vessel has two or more corner points (C.P.) and/or inflections points (I.P.), it is a complex contour type. These profiles ignore rim modifications, applied handles or lugs which are considered in subsections of the main classifications. On the small sample of 128 pots available for classification from the West Midlands, the contour type can be assessed, following the above scheme by eye.

Once contour profiles have been established, each vessel is assessed as a geometric figure - the main types being spheres, ellipsoids, ovaloids, cylinders, cones and hyperboloids. A pot may be made of one or more of these shapes and their long axes may be orientated vertically or horizontally. The ovaloid may be upright or inverted. In the sample examined, the sphere (22), upright ovaloid (23) and inverted ovaloid (24) are the dominant shapes and are used for classification purposes.

Each pot is in one of three structural groups - unrestricted vessels (15), simple and dependent restricted vessels (16) and independent restricted vessels (17). The open orifice of the unrestricted vessel is marked by an end point tangent which is not inclined inwards and there is no constriction marked by a corner or an inflection point. The simple and dependent restricted vessel also has no constriction between the maximum diameter and the orifice (if the rim be excluded) but has an inclined tangent at the orifice end point. A corner point or inflection

point between the maximum diameter and the end point at the orifice characterises an independent restricted vessel. All three groups occur in the West Midlands and pots have been classified accordingly.

The proportions of a pot are defined by a series of ratios. Measurements are taken at significant contour points which are easily seen and can be accurately known from the contour analysis. Optical illusions are avoided by careful measurement. There are several main ratios, e.g. height:maximum diameter, height:base diameter, height:orifice diameter, corner or inflection points (diam.):height of the particular point from the base, neck:body either by diameter or by height. A careful selection of any three can define the slope of walls and the shape of the most complex profile. As the maximum diameter is more frequently known than the height in pots from the West Midlands - a missing rim making the latter measurement impossible - ratios have been taken in relation to that, which still allows the vessel's proportions to be defined (1 - 11). As many pots are slightly irregular in shape, or incomplete, the diameter of the corner or inflection points:the height of the point from the base, has been omitted. On a larger sample it would be important to have this measurement but with the present small sample the use of this ratio would mean that several pots would have to be discarded, making analysis very difficult. A small fragment may indicate the general contour profile but be inadequate for providing measurements although such pieces can be placed in a cluster once a typology has been produced. The general position of the maximum diameter:height from the base has been defined by the geometric shape (22, 23, 24) and a ratio has not been given for that. Shepard states (1965:238)

"it is customary to report overall proportion (height:orifice diameter for unrestricted vessels, height:maximum diameter for restricted dependent and independent vessels). How much farther the analysis of proportion should be carried obviously depends on complexity of contour, size and range of sample, and purpose of analysis."

As this sample does not contain a great variety of extremely complex vessels, it is felt that the ratios of diameter of orifice:maximum diameter (1,2), height:maximum diameter (3,4,5), base diameter:maximum diameter (6,7,8), will suffice for this study.

The five basic criteria of symmetry, contour, geometric shape, structure and proportion have therefore been categorized for each vessel, as far as its state of preservation allows. Minor variations which characterise each pot are considered after this basic classification has been done.

Unfortunately, because of lack of time and facilities, the inspection of each vessel in the sample has had to be of easily observed surface features only. There are however, other characteristics (which include the porosity, specific gravity and quality of firing) which can only be determined by using laboratory techniques. Such scientific analysis ideally needs to be done for any major study of pottery and before any conclusive conclusions can be reached, but, as has already been stated, is beyond the scope of this short analysis.

The rims of this sample are rarely distinctive and many have been damaged on shallowly buried pots. Direction (25,26,27), line (28,29) and cross-section (30,31) are considered but are often difficult to decide for any particular pot, which, being hand-made, often lacks consistency. The bases, too, are frequently irregular either because of lack of skill by the potter or possibly through subsequent distortion

and the categories used (32-36) are distinguished by the external shape of the base. The pots in the sample were probably thumbpots as the fabric irregularities in the thickness tend to run in a vertical direction but some may have been coil pots. It is difficult to identify the method of manufacture purely by a surface inspection and so no classification has been attempted.

The surface texture of the fabric appears to be either uniform in composition (38), or not uniform in composition (39), or tempered with a vegetable substance (37), which has now disappeared leaving a surface resembling the irregular open structure of cork. Also, on a purely visual assessment, the pastes themselves vary from fine-ground pastes to gritty ones (40-43); it should be stressed that this classification lacks scientific precision.

No pots were finished with slip but some were apparently given a lustre by burnishing (45). A few dried with a pimply surface (46), probably after smoothing in the plastic state with a soft implement which did not press coarse grains into the paste. On some a harder implement may have been used to smooth the surface leaving a pitted surface where coarse grains were dragged in leather hard clay, but it is not easy to distinguish these vessels from those abraded during use or burial unless they are examined microscopically for the characteristic striations caused by the dragged particles. The unpolished category (44) may, therefore, include smoothed examples which were not burnished and so are difficult to distinguish without a more detailed study.

The colour of a paste usually changes during firing and unless the firing conditions are skillfully controlled, the colouration variations are unpredictable. Changes may also have taken place since firing because

of the absorption of chemicals during use or since burial. Although American archaeologists have tried to standardise colour classification since 1912 (Shepard, 1965: 107) and have generally accepted the Munsell Soil Colour Chart since 1942 as their colour key, such a scheme has been resisted in the United Kingdom. This is a great drawback when reading reports about early Anglo-Saxon pottery, or pottery from any other age, for no two individuals can be guaranteed to describe the same colour in the same way. No words can be made to substitute for a carefully graded and universally accepted scale of colours which can narrow the margin of error in colours given in reports. Because of the lack of a standard colour key, the colours have been classified into the crude grouping of brown (49), or black/grey (50). The colours are further subdivided according to degree of evenness, unevenness (48) possibly indicating fluctuations in the temperature or supply of air during the firing process. The firing method and temperature cannot adequately be deduced from observations, and controlled experiments are necessary to decide the probable conditions of firing.

When assessing workmanship (51-55) the subjective element is again liable to give different results according to the assessor's standards - what is good in hand-made pottery might be judged poor by anyone used to wheel-turned pottery. Skill, as seen in the attention to symmetry, quality of finish and any decorative details, has been roughly classified in this section.

The decorative bosses (58,59,60) were all made by pressing the clay out from the body of the pot. Utilitarian bosses, or lugs (56), were usually applied to the exterior of the pot, and either a hole was left or they were pierced (57) to allow the pot to be suspended. 18.4% of the sample had bosses. Only single long bosses, orientated vertically

and/or horizontally, occur in the sample, and they are usually plain. Other decorative techniques, which are used on 20% of the vessels in the sample, include the use of small stamps and/or incised lines (66,67). The stamps decorating these pots are all different (68,69,70) although frequently of the common rosette and cross type, and it is not possible, therefore, to trace one workshop on this evidence.

The wyrm is an important character in Anglo-Saxon mythology, as in the ancient beliefs of many other peoples, and is found on some pottery. It is on a pot from Baginton, Wa. (Table IV: 77). Within the Hwiccian territory there is only one example of this design, in the form of an almost continuous zig-zag stamped all round the pot and this is from Bidford-on-Avon, Wa. (Table IV: 33). The decoration is very regular. Myres (1969: 138) says that this surrounding of the "urn with wyrm drawings was ... both a symbolic and a prophylactic exercise" for it was a pictorial representation of death consuming the body and also a magic sign to protect the dead from further disturbance.

The most common decoration was by stamps in horizontal bands (68) with linear incisions above and below the stamps (66). Twelve of the twenty-seven examples have this form of decoration. Of less popularity were simple linear decorations with stamps in restricted bands (68) and clusters (70) (5, all from Baginton), simple linear decorations with no stamps (66) (4 examples) and complex linear decorations (67) with stamps in restricted bands (68) (3 examples). Unrestricted decoration (no lines defining the outline of the decorative feature) is not found here. Therefore, these pots may be no later than the sixth century (Myres, 1969: 35,54,56).

The decoration was usually applied both above (62) and below (63)

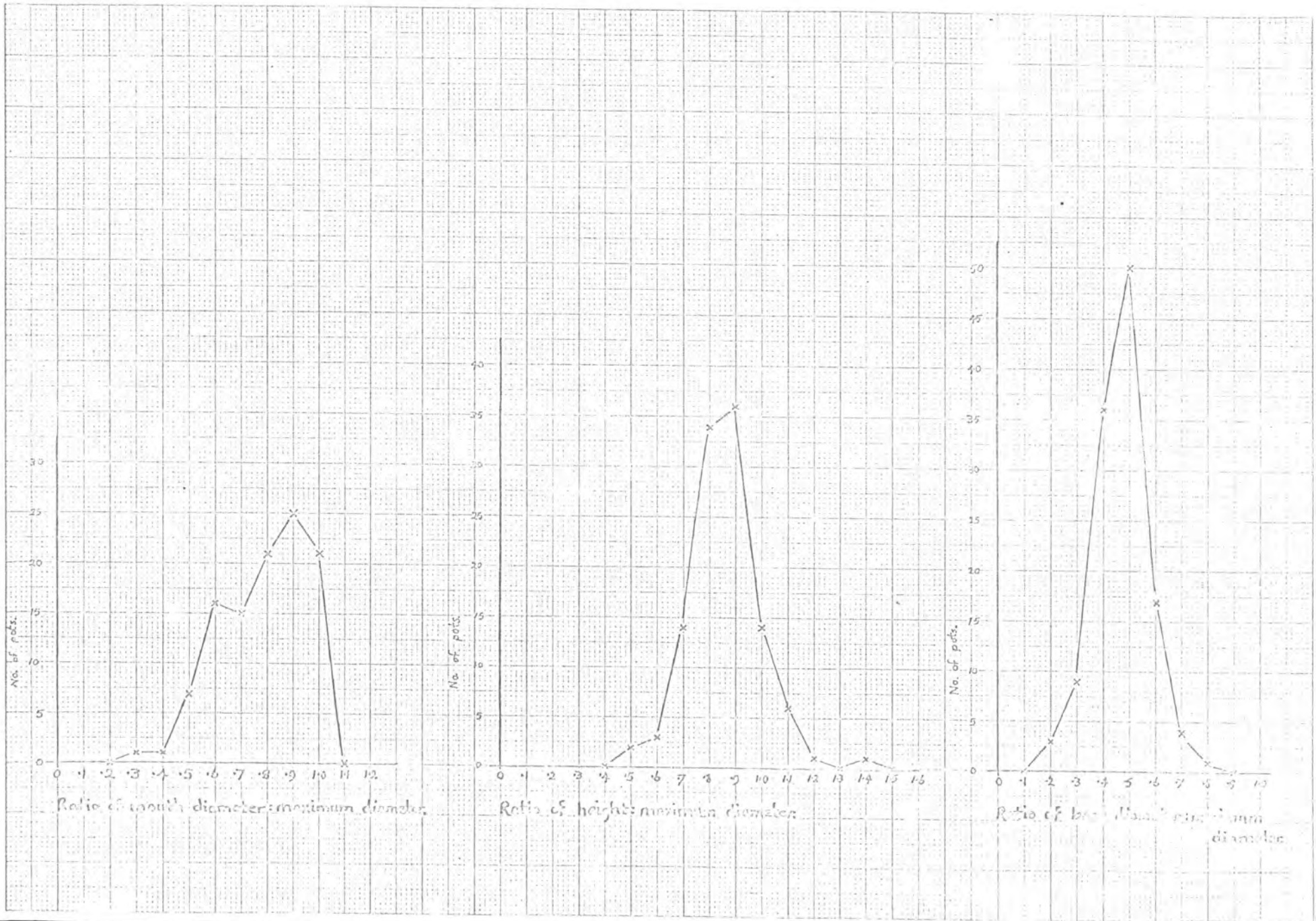
the maximum diameter of the pot in vertical (65) and horizontal (64) arrangements (8 examples). Almost equally popular was decoration confined to the area above the maximum diameter of the pot, also arranged in vertical and horizontal designs (6 examples), and decoration both on the neck (61) and above the maximum diameter of the pot arranged only in horizontal bands (5 examples).

A point that is immediately apparent from my analysis and contradicts the commonly accepted view that Anglo-Saxon pottery of the pagan period is lumpy and generally of poor workmanship is the extremely low variation between the maximum and minimum thickness of the fabric in any pot (Table IVa: 12-14; and Fig. XVI). I have not been able to find any measurements upon which this supposed irregularity of the pots is based but for this sample of 128, 62 pots have variations of $\frac{1}{8}$ " or less and only nine have variations in excess of $\frac{1}{4}$ ". This evidence contradicts Myres' (1969: 147) unsupported claim.

As explained (II. 119) the significant measurements for each pot are given as ratios (Table IV) which are all in relation to the maximum diameter. The ratio of the mouth diameter:maximum diameter (features 1,2) shows a negatively skewed distribution for the whole sample (Fig. XVI), with mode at .9, and a slight local maximum at .6 . This is important as the mode for decorated pots is .6 which is significantly different from that for plain pots alone, which is .9 .

Both the ratio of the height:maximum diameter (features 3,4,5) and the ratio of the base diameter:maximum diameter (features 6,7,8) show normal distributions (Fig. XVI). The mode for the height:maximum diameter is .9 for the total sample while the mode for the base diameter:maximum diameter is .5 for the total sample. These facts have been used to subdivide the ranges for each ratio into two or three groups

FIG. XVI. Pottery: important ratios.



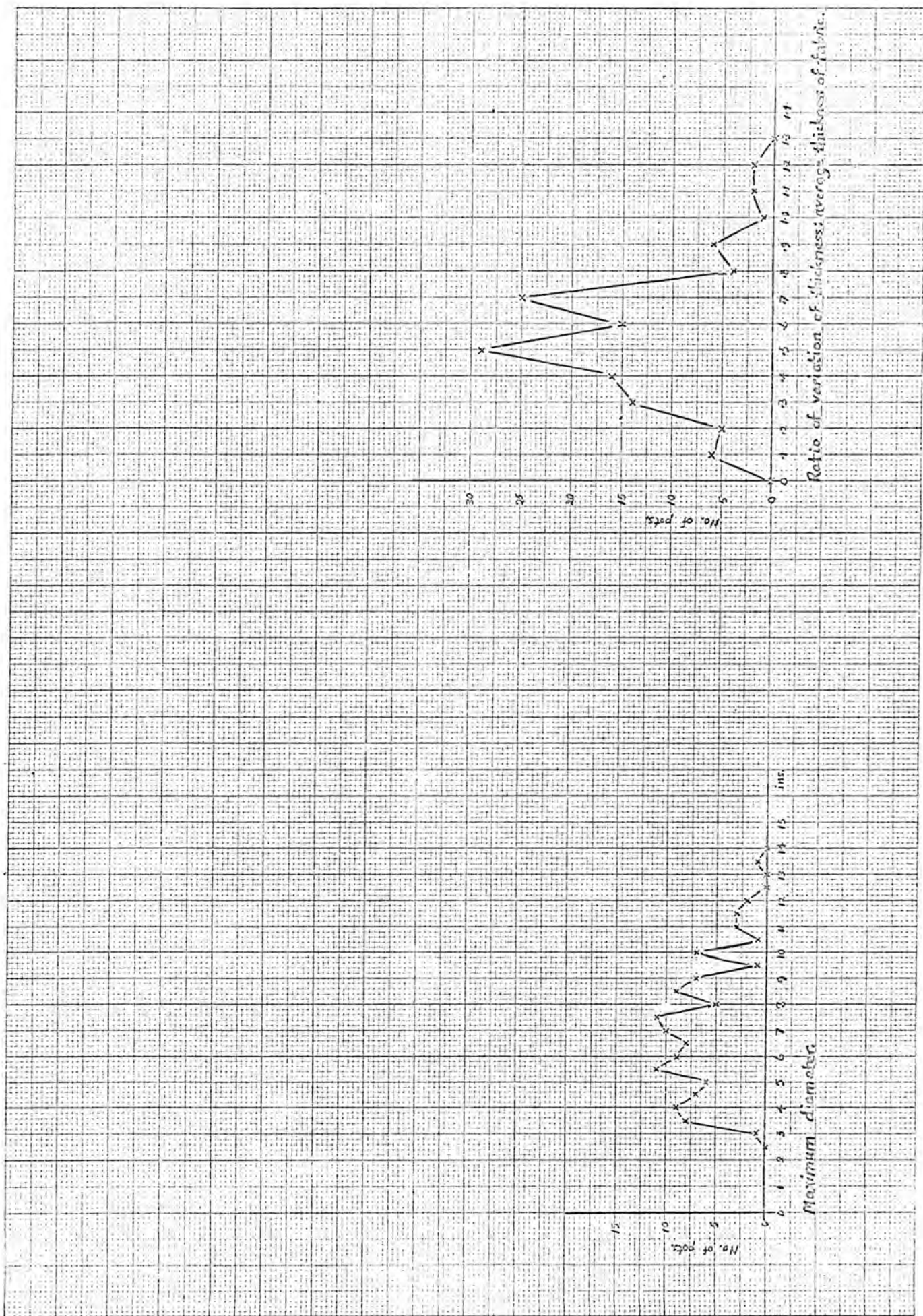


Fig.XVI. Pottery: important ratios.

(Table IVa) which allows the computer program to analyse the measurements according to the presence or absence of a value in the same way that non-quantitative data is examined. This method has been questioned. It must be admitted that the CLUSTAN 1A program might show the types more clearly if continuous variables are used and in future this should be tried. I have, however, looked at the actual range of values of the first eight features (Table IV and IVa) and present them (Fig. XVII) to show that the types produced do have a reasonably small range although these do not always fit naturally into those I have used. The theoretical divisions, based upon the mean and one or two standard deviations (chosen from the inspection of the data), has not, therefore, hindered the clustering of similar pots into one group.

When individual features are examined regionally there is a difference between those from Baginton, Wa., and those from the Hwiccian territory proper where decorated pots are more common (ratio 10:6). The Hwiccian sample also has a higher number of bossed pots (ratio 7:3) and linear decorative designs (ratio 10:6). These brief notes of observable variations, both regionally and stylistically, suggest that much more information can be found from a detailed study of Anglo-Saxon pottery than has, as yet, been made. Plain pots in particular may show localised styles.

There are some decorative styles found in this sample which are examined in some depth by Myres (1969) and a brief note is made of these here. Buckelurnen IV and V are found at Baginton, Wa., (Table IV: 77) and at Long Itchington, Wa. (Table IV: 63) which Myres (1969: 45,46) dates to the late-fifth century. They are found most often in East Anglia, Middle Anglia and the Upper Thames valley and from those areas spread into the Warwickshire Avon valley but unlike earlier Buckelurnen

| CLUSTER NUMBER | CODE 1 | | CODE 2 | | CODE 3 | | CODE 4 | | CODE 5 | | CODE 6 | | CODE 7 | | CODE 8 | |
|----------------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO | RATIO |
| 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 5 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 6 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 7 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 8 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 9 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 10 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 11 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 12 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 13 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 14 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 15 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 16 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 17 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 18 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 19 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 20 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 21 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 22 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 23 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 24 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 25 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 26 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 27 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 28 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 29 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 30 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 31 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 32 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 33 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 34 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 35 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 36 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 37 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 38 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 39 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 40 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 41 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 42 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 43 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 44 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 45 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 46 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 47 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 48 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 49 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 50 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

Ratio range —
 base diameter —
 height —
 (The number in the table indicates the number of specimens for each ratio.)

Fig. XVII. Pottery: ratio ranges for each cluster type.

groups they have no close association with Roman settlements. The samples from the West Midlands show links with Middle Anglia rather than with areas further south (Myres, 1969: map 4A).

In the extreme south-east of the Hwiccian area is Fairford, Glos. which has a pot thought by Myres (1969: 87ff, 220) to be a type which has been found on the continent and which may date from 450+. This is a biconical bowl with faceted carination (Table IV: 14). Although this particular pot is not dated Myres suggests that the type was

"introduced to Britain with the soldier-settlers at the end of the fourth or very early in the fifth century ... A further point of interest is the distribution of so much of this material along the south bank of the Thames below Oxford, at places many of which, though not in any sense towns, seem originally to have been occupied by small, rural communities in Roman times, and became eventually the sites of substantial Anglo-Saxon cemeteries."
(Myres, 1969: 88-9).

Perhaps Fairford, Glos., was a deliberately settled community of such peoples with links along the Thames rather than with Middle Anglia.

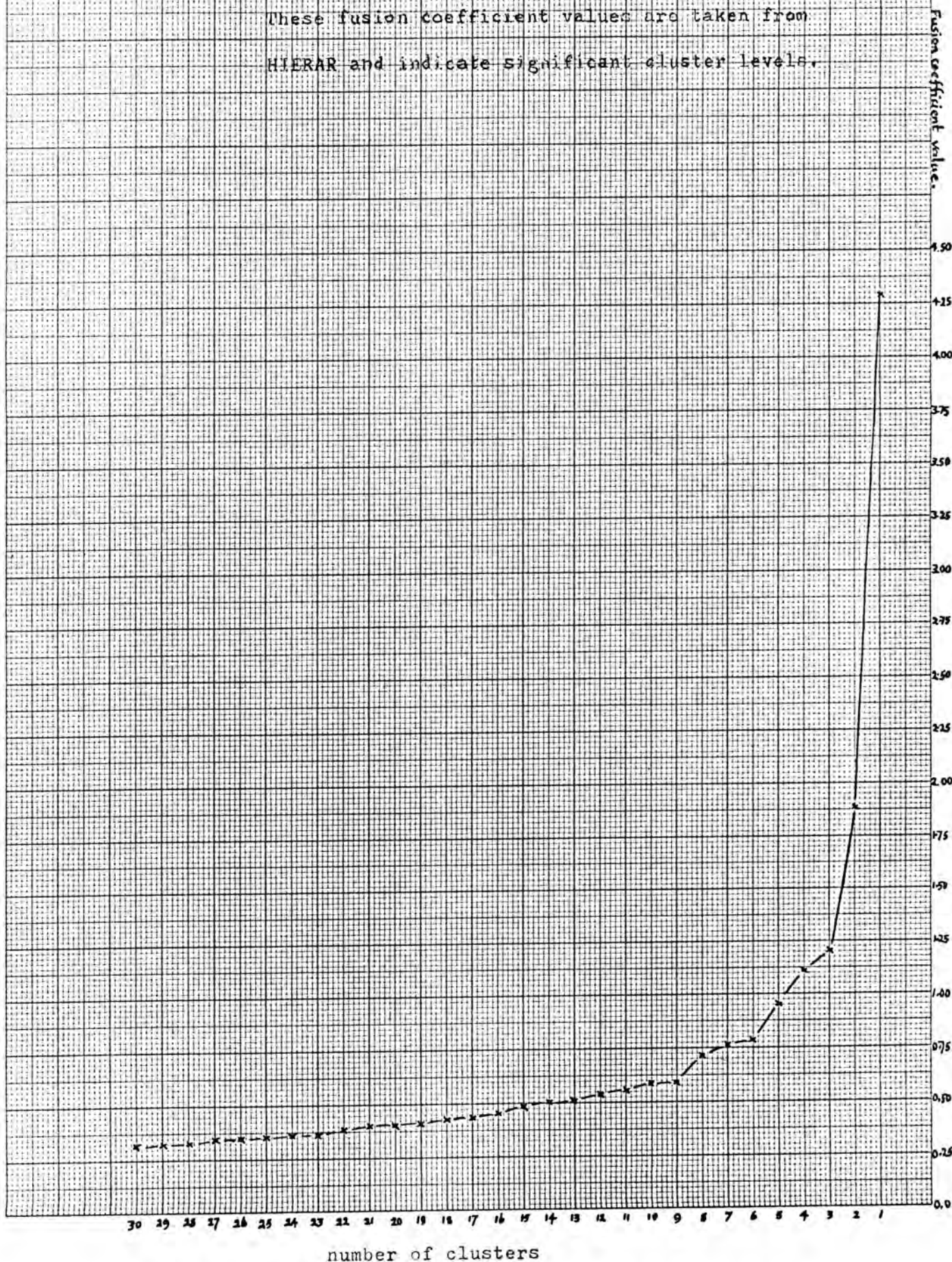
As Myres gives no detailed maps of the distribution of every type of pot it is not possible to examine the links with other areas that this evidence might show but there does seem to be some suggestion that the decorated pots have similarities with those of Middle Anglia from the second half of the fifth century onwards.

CLUSTAN 1A results

The fusion coefficient values from the CLUSTAN 1A program HIERAR were plotted (Fig. XVIII) to decide at which clustering level valid types might be found. I decided that 3 and 6 clusters were important but later breaks were not so clear and after studying many cluster levels I chose 17 as the best.

Fig. XVIIIPottery: fusion coefficient values.

These fusion coefficient values are taken from
HIERAR and indicate significant cluster levels.



3 clusters

The total sample of 128 pots can be divided into three basic groups with a remarkably high degree of confirmation from all clustering procedures (Table IVb). RELOC 1 tends to be an amalgamation of several types, as can be seen by the significant features being negative only, but RELOC 3, which has been formed from it, has both negative and positive features. Both are undecorated pottery groups but RELOC 3 pots have wider than normal bases in relation to the maximum diameter which itself is less than that usually found. In structure RELOC 3 are typified by either unrestricted or simple restricted forms and the contours are either simple or composite with inturned rims.

RELOC 2 is the decorated group of pots which usually have unslipped but burnished surfaces. Bosses may occur in any group but are more common in the decorated group.

6 clusters

At the six cluster level (Table IVc) the decorated pots are clearly defined by all the clustering procedures except by DIVIDE (ii), which tends to produce different results at all levels for all the data sets used. We may accept that the decorated pots, RELOC 2 and RELOC 6, are valid major groups. The plain pots do not show the same high degree of correlation between the different procedures as do the decorated pottery types but there is sufficient support for the RELOC groups to suggest that the clusters at this level are in fact valid and therefore the six groups provide a useful working classification.

RELOC 6:1 may be described briefly as pots with rounded, sagging bases, independent restricted structure and generally spherical contour.

Independent restricted structure is also characteristic of RELOC 4 but this group has flat bases and is more usually ovaloid or inverted ovaloid in contour and has a smaller than average base. A third group of independent restricted pots is found in RELOC 5 which is normally spherical with a maximum diameter of 4.5 - 9.4 ins. but the mouth diameter:maximum diameter ratio is bigger than average. The contour is usually inflected and the fabric is not uniform in composition.

What may be called bowls, the unrestricted or simple restricted structure pots with a base diameter:maximum diameter ratio greater than average, are grouped in RELOC 3. The maximum diameter of the pots is generally under 4.4 ins. All four of the groups listed above are made of brown coloured paste.

The decorated pots form two distinct groups depending upon the colour of the paste. RELOC 2 is the brown decorated pot group with a maximum diameter of 4.5 - 9.4 ins. and a base diameter:maximum diameter ratio of less than .3. The variation of thickness:average thickness of fabric ratio is normally .4 - .7 ins. The black decorated pots of RELOC 6 have a variation of thickness:average thickness of fabric ratio in excess of .8 ins. The maximum diameter is bigger than average, ≥ 9.5 ins., and the base diameter:maximum diameter ratio is also larger than the mean. Precise details of each group can be seen more easily in tabular form (Table IVc).

17 clusters

The amount of correlation between cluster procedures at this level is not so high for the pottery sample, (Table IVd), using the criteria selected, as it was for the saucer and applied brooch sample or the shield-boss sample but whether this is due to the size of the data set, poor

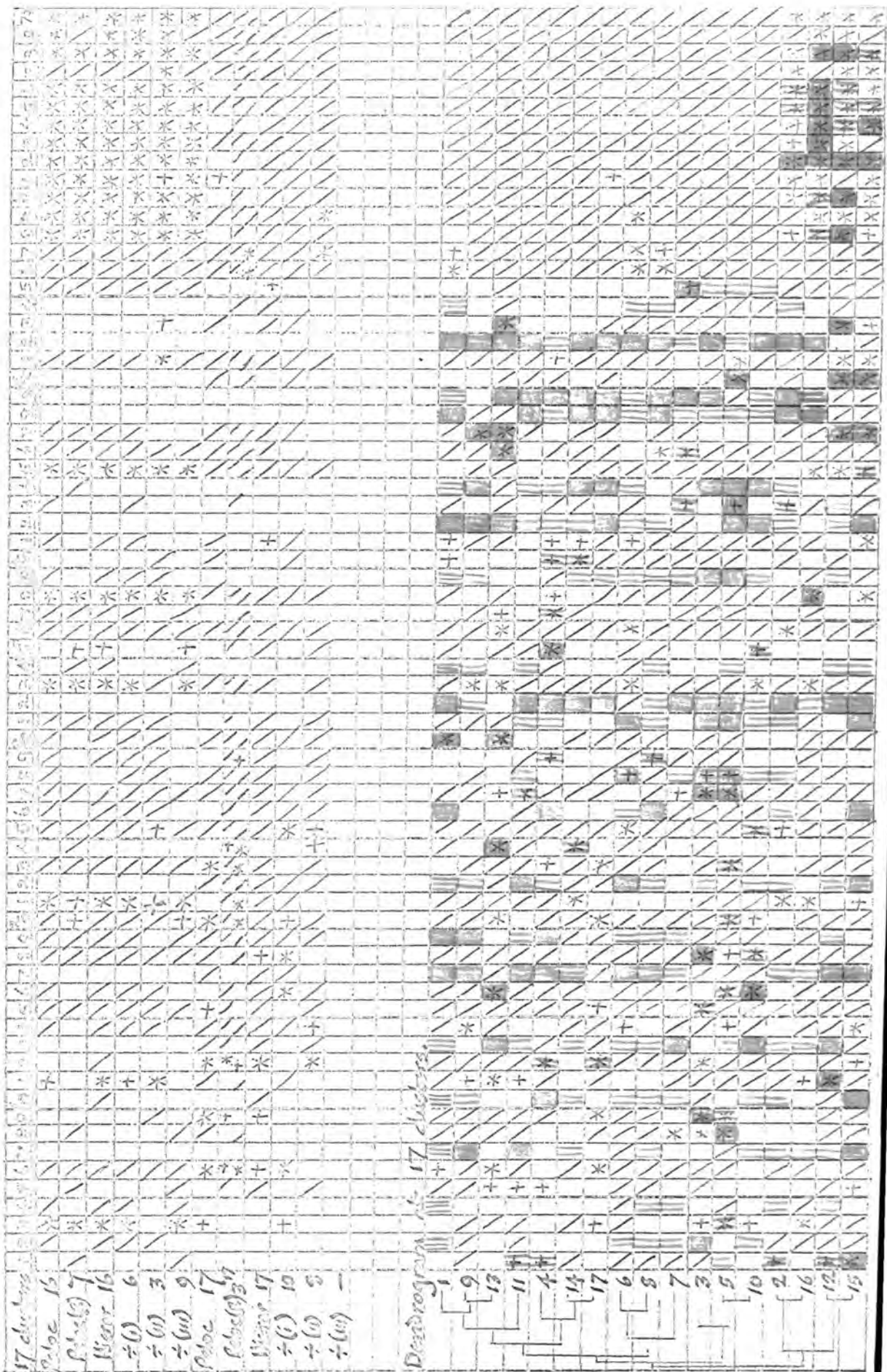
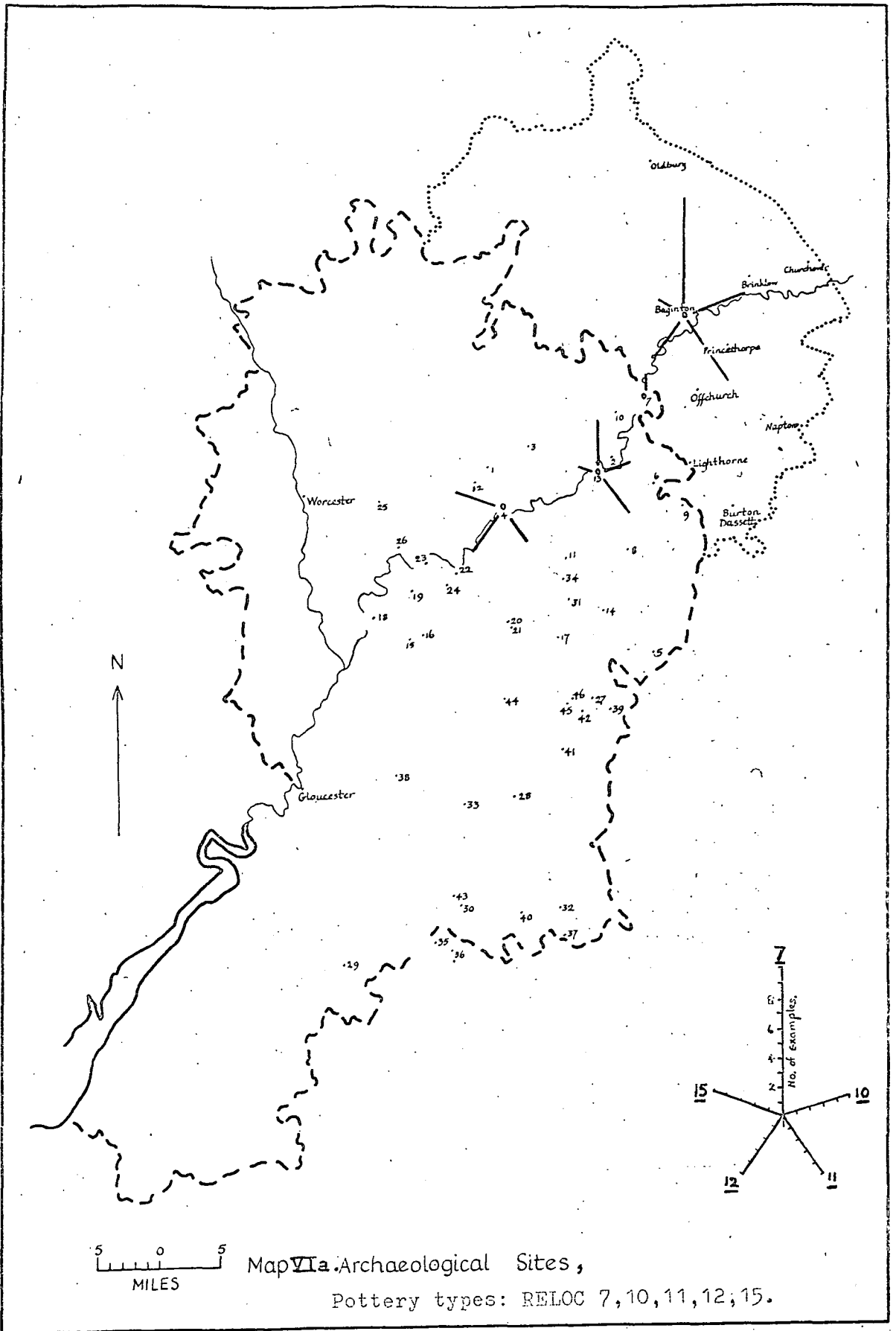
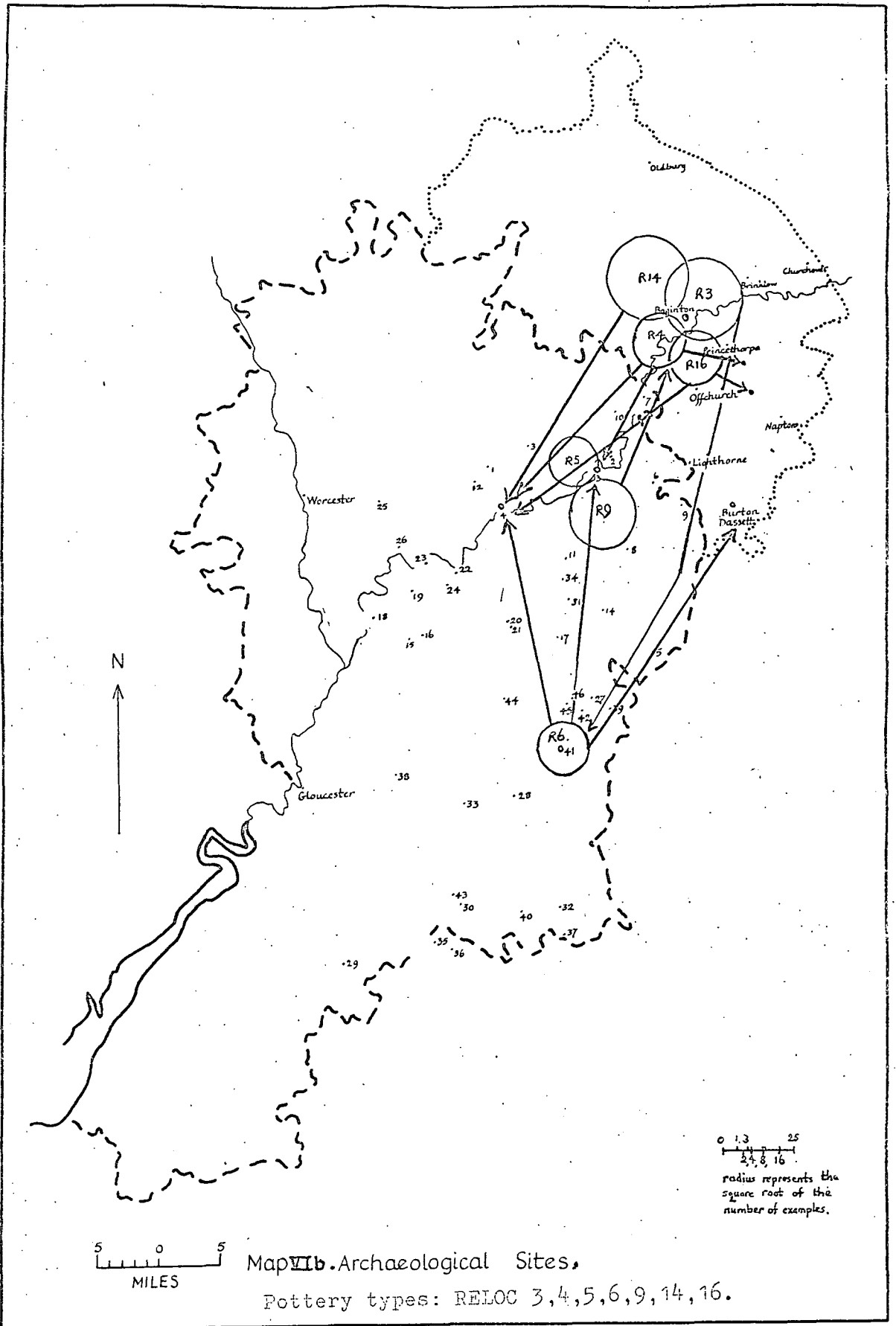
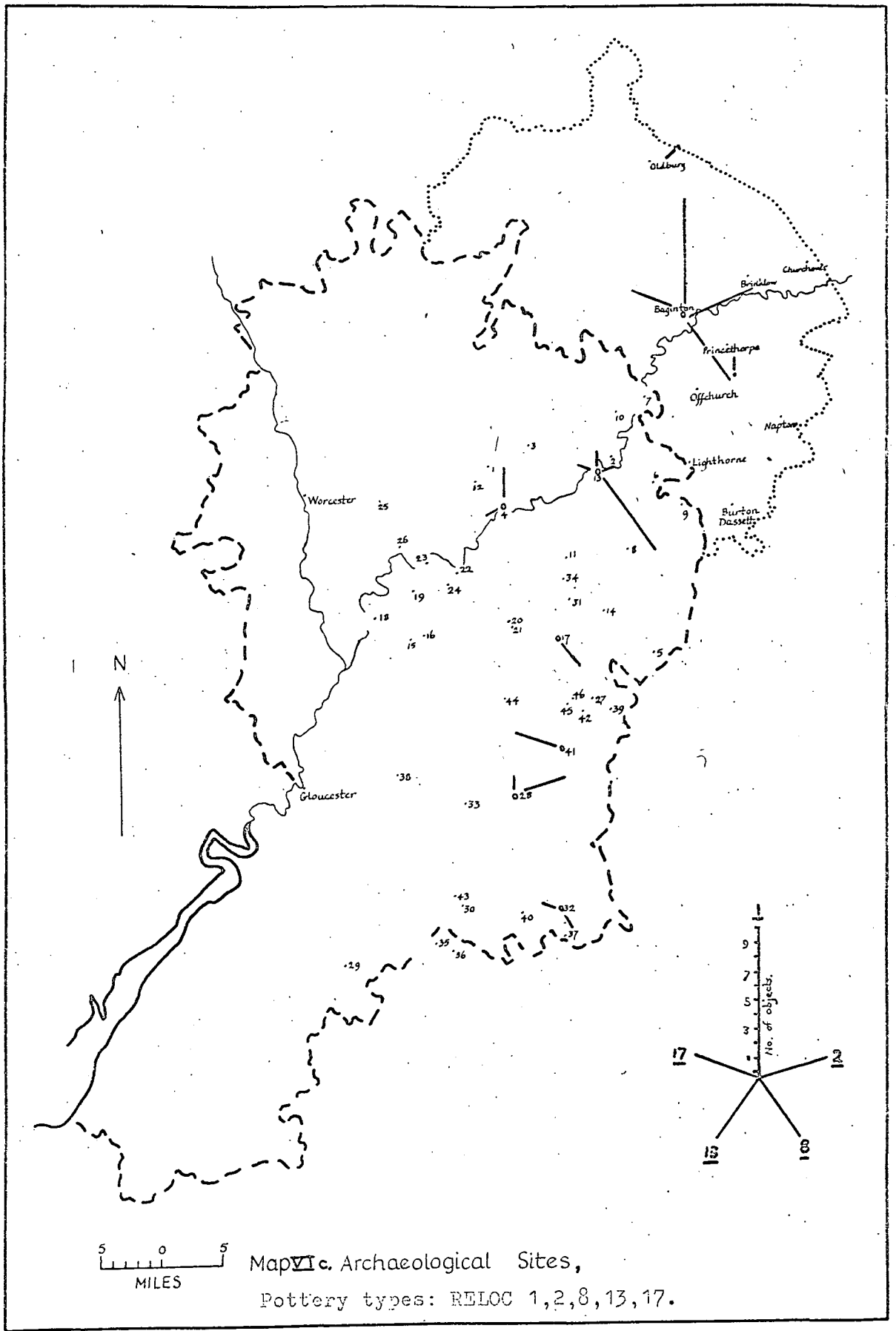


Table IVc. Tattary: 17 clusters and dendrogram.

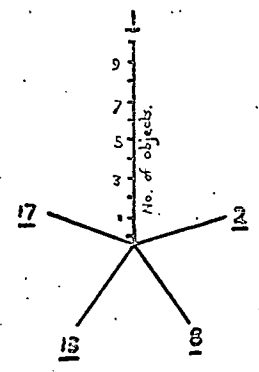


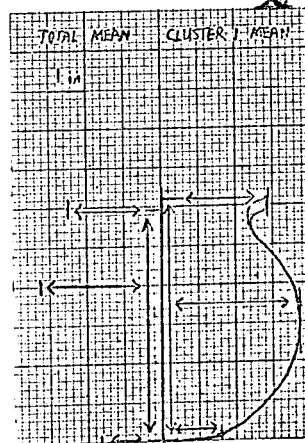




5 0 5
MILES

Map VI.c. Archaeological Sites,
Pottery types: RELOC 1, 2, 8, 13, 17.



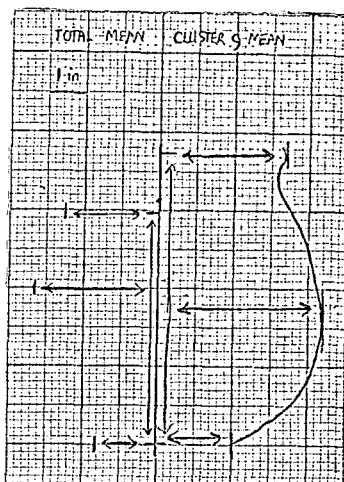


RELOC 17:1

- a. 17; 19; 26; 30; 32; 42; 48; 52;
- b. 2; 4; 7; 10; 13; 22; 34; 39; 44; 49; 54;
- c. 6; 30; 40; 41; 56; 57;

This type of pot is independent restricted in structure with an inflected contour and an everted, thickened rim. The unmoulded base is usually rounded. The fabric is sandy, an uneven brown in colour and neither slipped nor burnished and as these last characteristics are very common ones for pagan Anglo-Saxon period pottery it is the shape and proportions of this type of pot which distinguish it most clearly from others. The mouth diameter:maximum diameter ratio is greater than .7 while the height:maximum diameter ratio is average, .8 - .9, and the base diameter:maximum diameter, the maximum diameter and the variation of thickness:average thickness of the fabric ratio all fall within the middle range of values. Therefore, this type of plain pot can be most easily identified by its lack of extreme dimensions, the characteristic everted, thickened rim and, where present, the applied, pierced bosses or lugs which are generally vertically applied.

Myres (1969: 162; Fig. 8) "plain globular urns" seem to be the most similar group to this type although he does not say whether the everted rims are thickened or not. It seems to be widely spread throughout the country and occurs in burials throughout the West Midlands (Map VIc and e.g. Table IV; 1,31,34,48,64,73,91). They date from fifth-sixth century



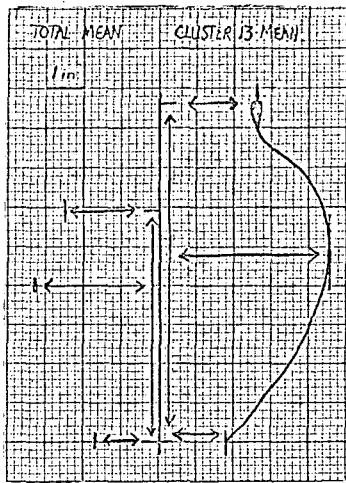
RELOC 17:9

- a. 7; 17; 19; 42; 44; 47; 52;
- b. 10; 22; 32; 34; 39;
- c. 11; 14; 33; 47;

The pots of this type are independent restricted with inflected contours and a base diameter:maximum diameter ratio of .4 - .5 . The sandy, unslipped and unburnished fabric is typically even in colour, but may be of either the brown or black ranges. Generally, the maximum diameter is larger than average, often over 9.5 ins., and there is a large degree of variation of thickness in the fabric.

Stratford-on-Avon, Wa., appears to be the main centre for these big, plain pots for five of the six examples were found there (Map VIb).

The large size of these pots distinguishes them from the similarly shaped RELOC 17:1 and so there is also some difficulty in finding a parallel group in Myres (1969) for this type. It too may be his "plain sub-biconical urns" (p. 152) or the "plain globular urns II" (p. 162). In all probability the type had a long life as it was a useful shape and size and Myres has nothing more definite to add to the date. The cluster programs used to produce this type show a good degree of consistency for the presence of significant features in the four sets of results which can be correlated (Table IVd) but two of the DIVIDE programs do not fit in. This may be explained by the nature of these programs which are very inflexible.

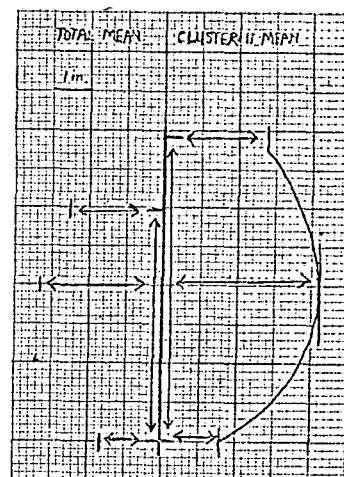


RELOC 17:13

- a. 13; 16; 24; 30; 42; 46; 47; 49; 52; 53;
- b. -
- c. 5; 6; 11; 16; 20; 24; 27; 30; 33; 36; 37; 46; 47; 53;

The simple restricted structure and inverted ovaloid shape may be used as diagnostic features of this type of pot. In addition the rim, which is usually upright, is thickened and the even-coloured brown, sandy textured fabric is pimply and unburnished but gives the impression of good workmanship. Some extreme ratios are present: the height:maximum diameter is at about 1.0, and the maximum diameter is well above average.

No clear distribution is possible for this type because it has few examples in this sample (Map VIc) but it may be Myres' "plain shouldered urns" (Myres, 1969: 154) which may be dated to the late fourth century although they continued in use for a long time. There are many positively significant features which are supported by four of the six cluster analysis programs and these may therefore be acceptable for classification purposes. The interesting point to note (Table IVd) is the discrepancy that has arisen between the two data sets used for RELOC - that on a random grouping does not produce a type similar to that on HIERAR. This needs further investigation because the group produced by RELOC on HIERAR is supported by other programs and appears to conform to a class given by Myres.

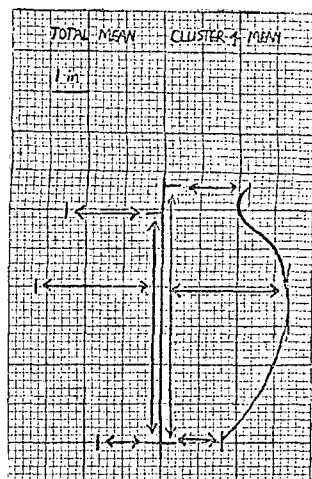


RELOC 17:11

- a. 7; 17; 22; 32; 48; 49; 52;
- b. 1; 13; 19; 27; 28; 31; 34; 42; 44;
- c. 1; 5; 11; 27;

Type 11 pots have base diameter:maximum diameter ratios within the average range of values, .4 - .5, but there is a tendency for the mouth diameter:maximum diameter ratio to be less than .7. A large number of these pots have maximum diameters in excess of 9.5 ins. The independent restricted, spherical pots have straight, upright rims and sagging, unmoulded bases. The sandy, unslipped and unburnished fabric is an uneven brown colour.

There is no clear centre for this type of pot (Map VIa) which has been found at Bidford-on-Avon, Wa., Stratford-on-Avon, Wa. and Baginton, Wa., and so it is not confined to the territory later known to have belonged to the Hwicce (Map VII). The nearest group to this in Myres' typology is the "plain globular urns I" (Myres, 1969: 160) which he notes (1969: 27) have short, upright rims. Pots like these have been found in fifth and sixth century contexts in Schleswig and, as quoted before (RELOC 17:1), Myres claims (1969: 27) "wherever they are found, these distinctive vessels are a sure indication of direct derivation from the continental Angles." There seems to be general agreement in the cluster analysis results about this type (Table IVd) with all six methods indicating features 5 and 7 as being positive indicators of the type which is a much higher level of agreement than is found for several other groups.

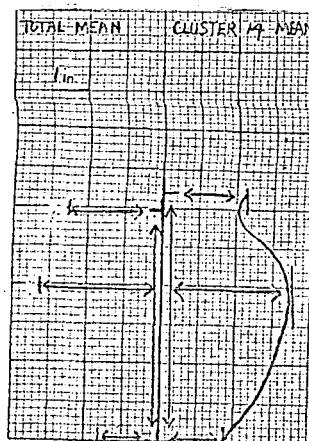


RELOC 17:4

- a. 10; 17; 19; 26; 32; 35; 49;
- b. 1; 12; 22; 29; 31; 37; 40; 42; 44; 48; 52;
- c. 1; 5; 12; 23; 29; 35; 37; 38; 40; 41; 51;

These inflected, independent restricted pots have a medium maximum diameter, 4.5 - 9.4 ins., and only a very small variation in thickness of the fabric. The everted rims are usually curved and unthickened while the unmoulded base is characteristically flat. All these pots are brown in colour and many of them contain some form of vegetable temper although the surface appearance is generally smooth.

This type occurs more frequently in the eastern part of the West Midlands than in the area later known to be the territory of the Hwicce (Map VIb) which only has one example from Bidford-on-Avon, Wa., and one example from Stratford-on-Avon, Wa. The nearest group to this type illustrated by Myres (1969: 150) is the "plain hollow-necked urns" which have been found in fifth century sites in Norway as well as the eastern parts of England, and they might well be indicators of early settlement within the West Midlands by people with cultural or trading links with the Anglian eastern parts of England. Myres' "plain vessels with tall narrow necks" (1969: 165) may possibly be included in this type and as these are late in date (Myres, 1969:27), mid sixth-seventh century, sequence dating might give useful results for this type in the future. There are some discrepancies about significant features between the various cluster analysis programs used (Table IVd) but sufficient agreement, especially between the two RELOC results, for the type to be valid.



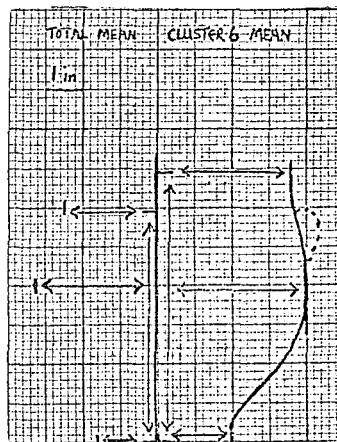
RELOC 17:14

- a. 17; 32; 44; 48; 49; 52;
- b. 7; 10; 13; 24; 39; 40; 42;
- c. 21; 24; 40; 41;

This type of independent restricted, unmoulded based pot includes many complex contoured ones and generally the type is inverted ovaloid in shape. It is perhaps easier to identify the type by the lack of certain features rather than the presence of others (Table IVd); the rarity of mouth diameter:maximum diameter ratios of less than .7, no height:maximum diameter ratios under .7, no base diameter:maximum diameter ratios under .3 are especially useful diagnostic features.

Apart from two pots from Bidford-on-Avon, Wa., all the others in the group were found at Baginton, Wa., outside the territory of the Hwicce and so show a very localised distribution (Map VIb). The nearest type in Myres' classification (1969: 154) is probably the "plain shouldered urn" but some of my type may be in Myres' "plain biconical urns" (p. 148) and his lack of detailed information about typologically significant features makes a more precise correlation impossible. The plain shouldered urns are dated to 500 A.D. on the continent but continued in use for a long time while the biconical urns also date from the fifth century and so, if Myres' dating is correct, these could be examples of early pottery. The two data sets used for RELOC have not produced corroborative evidence for this type and it should, therefore, receive further study but there does seem to be sufficient indication from the other cluster analysis results that the type is distinctive and its validity is not in much doubt.

this cluster level. The "plain accessory vessels" (Myres, 1969: 158) may more truly resemble the type, with those pots having faceted carinations being a subset of the type. There is no accurate dating for the type but it may be found in early and late sites. The two sets of data used for RELOC and the HIERAR results stress the emphasis in the type of the dimensions but the DIVIDE programs do not confirm its acceptability (Table IVd). Perhaps a larger sample is needed to identify the small pots more accurately.



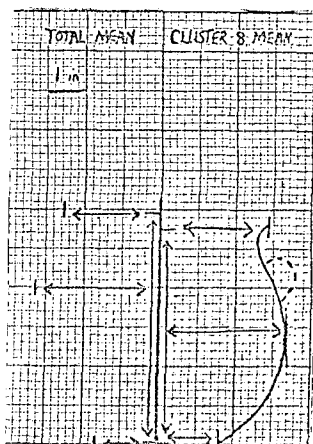
RELOC 17:6

- a. 17; 22; 28; 31; 52;
- b. 2; 10; 13; 19; 26; 39; 42; 44; 48; 49; 54;
- c. 14; 25; 28; 33; 36; 41; 56; 57; 59;

Perhaps the most characteristic feature of this type of pot is not its positive characteristics but the complete absence of pots with unmoulded bases, which is peculiar to this group. Their mouth diameter:maximum diameter ratio is over .7 although their maximum diameter is average, 4.5 - 9.4 ins. They are independent restricted in structure and inflected in contour with a basically spherical outline and straight, unthickened rims. Most of this group have horizontal, applied, pierced bosses or lugs.

That no examples of this type have been found at Baginton, Wa., from whence so many of the pottery sample was collected, is a most noteworthy fact. Bourton-on-the-Water, Glos., Burton Dassett, Wa., Bidford-on-Avon, Wa., and Stratford-upon-Avon, Wa., have produced the pots in this type which are not therefore confined to burial sites (Map VIb). Myres (1969: 170) gives the presence of applied lugs as the key feature of a distinct class but my results do not confirm this opinion for, as Table IVd shows, (features 56, 57), these may be very common within one type but not sufficient evidence alone for classifying a pot. I prefer to classify pots with lugs as subsets of types produced by the correlation of all features and this seems to be supported by the

illustrations used by Myres (1969: 171) where the form of the pots with lugs is seen to vary considerably. If form is used to classify the total sample it does not seem justifiable to ignore form in this instance, especially if this is done without any explanation. There is a reasonable degree of support for my type when the cluster analysis methods are correlated.

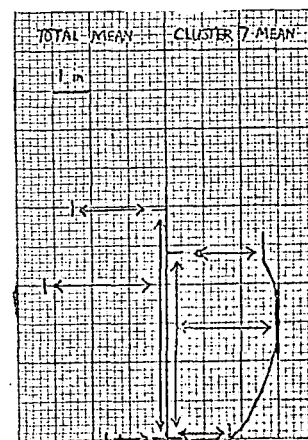


RELOC 17:8

- a. 17; 26; 48; 49; 52;
- b. 2; 4; 7; 10; 13; 19; 22; 29; 31; 32; 34; 39; 42; 54;
- c. 29; 46; 56; 57;

Another type of independent restricted pot with inflected contour is classified as RELOC 8 and this may have applied, pierced bosses or lugs which are vertically placed on the pot. The significant ratios of this class are the mouth diameter:maximum diameter ratio of more than .7, but all the other four values fall within the mean for that category. The rims are everted, curved and unthickened. A non-uniform fabric, which may cause the pimply surface, is characteristic.

This is a widespread, large class throughout the West Midlands (Map VIc) but there is not a similar type in Myres, unless he classifies it with the "plain domestic wares III: cook-pots with lugs" (Myres, 1969: 170) in which case this could be a subset of such a class. The "plain domestic wares II: wide-mouthed cook-pots" (p. 168) is more nearly the same as RELOC 17:8 if it is extended to include some of the previously mentioned group with applied lugs. There is no clear dating evidence for the type and it probably was used over a wide time range. This type is poorly supported by the cluster analysis results (Table IVd) although a comparison of the drawings for each pot in the type shows them to be very similar and it would appear, visually, to be justified. A future study of material from a wider geographical area might help to solve the problem posed here.



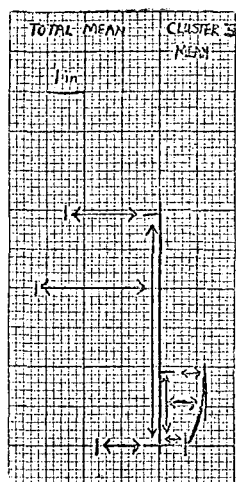
RELOC 17:7

- a. 13; 32; 49; 55;
- b. 2; 4; 10; 17; 19; 28; 39; 43; 46; 48; 52;
- c. 8; 27; 43; 46; 55;

This type of pot is never found in a sandy fabric. It is typically poorly finished, brown, gritty ware with a variety of shapes but an un moulded base and a straight, upright rim. The contour is inflected and the structure independent restricted but the proportions, with the exception of a variation of thickness:average thickness of fabric ratio of .4 - .7, are not very clearly defined. A tendency may be observed towards a small to medium maximum diameter but a medium to large base diameter:maximum diameter ratio and mouth diameter:maximum diameter ratio. The height:maximum diameter ratio may fall within the entire range of values but is more likely to be .8 - .9 .

Seven pots from this type are from the east of Wa. and therefore outside the Hwiccian territory and only three are from Stratford-on-Avon, Wa. and one from Emscote, Wa., (Map VIa). The distribution of the type is along the Warwickshire Avon. Perhaps the nearest equivalent group in Myres (1969: 156) is the "plain bowls" class but my type includes only the globular variety and not those pots with sharp carinations. Myres (p. 26) states that the rim diameter must equal or exceed the height which is so for many of my type but there does appear to be an overlap between these pots and his "plain globular urns" (p. 160). The dating

of the plain bowls is early fourth-fifth century on the continent, while the plain globular urns may be fifth-sixth century on the continent. How long the form continued in use is not given by Myres but it must have been useful and stable and I presume therefore that it enjoyed a long existence. There is a fair degree of support for the type when the six cluster methods are correlated (Table IVd).



RELOC 17:3

- a. 2; 9; 18; 27; 28; 31; 32; 39; 44; 49; 52;
- b. 15; 22; 48; 55;
- c. 3; 8; 9; 12; 15; 18; 27; 28;

The maximum diameter of this type is less than 4.4 ins. with a mouth diameter:maximum diameter ratio of .7+ indicating that this type includes many small bowls. The height:maximum diameter ratio is less than the mean but the stability of the bowls is shown by their base diameter:maximum diameter ratio of .6+ . The bowls are generally of unrestricted structure and a simple hemispherical contour with upright, unthickened, straight rims and they are made from a poorly mixed paste.

With the exception of one pot from Bourton-on-the-Water, Glos., this type is found exclusively at Baginton, Wa., (Map VIb). Myres' "plain domestic wares I: small crude accessories" (1969: 166) is the same as this type. Unfortunately, he claims that

"most of this household pottery is extremely crude and formless (Fig. 10), and the shapes are so lacking in specific character that any attempt to divide them into a meaningful series of types is likely to prove unrewarding." (p. 28).

I think that the very high degree of support shown by all six cluster analysis results (Table IVd), which is possibly greater than for any other plain pot type, proves Myres wrong on this point. The type is valid and has a higher degree of homogeneity than Myres allows, which can be demonstrated when many factors are correlated, as can be done with the aid of a computer although it is an impossible task for the human brain.

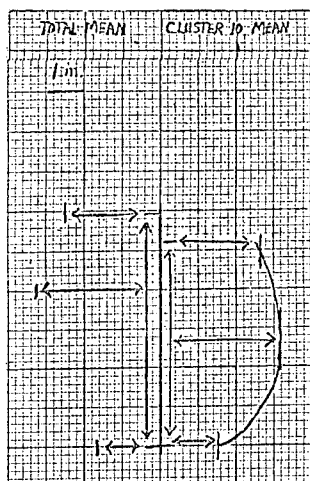
| TOTAL | MEAN | CLUSTERS | MEAN |
|-------|------|----------|------|
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 |
| 10 | 10 | 10 | 10 |
| 11 | 11 | 11 | 11 |
| 12 | 12 | 12 | 12 |
| 13 | 13 | 13 | 13 |
| 14 | 14 | 14 | 14 |
| 15 | 15 | 15 | 15 |
| 16 | 16 | 16 | 16 |
| 17 | 17 | 17 | 17 |
| 18 | 18 | 18 | 18 |
| 19 | 19 | 19 | 19 |
| 20 | 20 | 20 | 20 |
| 21 | 21 | 21 | 21 |
| 22 | 22 | 22 | 22 |
| 23 | 23 | 23 | 23 |
| 24 | 24 | 24 | 24 |
| 25 | 25 | 25 | 25 |
| 26 | 26 | 26 | 26 |
| 27 | 27 | 27 | 27 |
| 28 | 28 | 28 | 28 |
| 29 | 29 | 29 | 29 |
| 30 | 30 | 30 | 30 |
| 31 | 31 | 31 | 31 |
| 32 | 32 | 32 | 32 |
| 33 | 33 | 33 | 33 |
| 34 | 34 | 34 | 34 |
| 35 | 35 | 35 | 35 |
| 36 | 36 | 36 | 36 |
| 37 | 37 | 37 | 37 |
| 38 | 38 | 38 | 38 |
| 39 | 39 | 39 | 39 |
| 40 | 40 | 40 | 40 |
| 41 | 41 | 41 | 41 |
| 42 | 42 | 42 | 42 |
| 43 | 43 | 43 | 43 |
| 44 | 44 | 44 | 44 |
| 45 | 45 | 45 | 45 |
| 46 | 46 | 46 | 46 |
| 47 | 47 | 47 | 47 |
| 48 | 48 | 48 | 48 |
| 49 | 49 | 49 | 49 |
| 50 | 50 | 50 | 50 |
| 51 | 51 | 51 | 51 |

RELOC 17:5

- a. 8; 27; 28; 31; 32; 39; 42; 43; 44; 50;
- b. 1; 3; 9; 13; 16; 20; 23; 34; 48; 52; 55;
- c. 1; 3; 8; 9; 14; 16; 18; 20; 23; 27; 28; 43; 50; 51;

The mouth diameter:maximum diameter ratio of this type is often less than .7 and the height:maximum diameter ratio under .7 but the base diameter:maximum diameter ratio is over .6 . With a maximum diameter in the small to medium range these simple restricted, simple or composite in contour, ovaloid shaped pots often have narrow mouths in relation to their sagging bases but might well be suitable for holding liquids. The straight, upright, unthickened rims are characteristic features of the type as too is the sandy-gritty, non-uniform textured paste which, it should be noted, is black or grey and not one of the brown shades.

All of these pots come from Stratford-on-Avon, Wa., (Map VIb) and are a subset of Myres (1969: 158) "plain accessory vessels". The group has an early date on the continent but Myres includes such an assortment of varieties that I think further work on his type is justified. Better dating might result from the refining of the group. Four of the six cluster analysis programs have produced support for my typology (Table IVd) which does divide Myres' group and this is acceptable proof that more work, using a larger sample, might be extremely helpful in the classification of these pots.

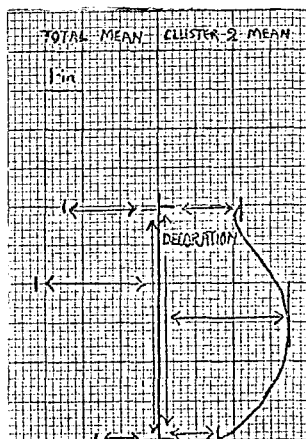


RELOC 17:10

- a. 13; 16; 42; 44; 52;
- b. 2; 7; 10; 18; 22; 25; 28; 31; 32; 35; 39; 48; 49; 55;
- c. 3; 16; 18; 20; 25; 33; 35;

The simple restricted structure pots with a simple or composite contour and spherical shape form RELOC 10 which type has all its proportion ratios within the medium range with the exception of the mouth diameter:maximum diameter ratio which is greater than .7 . The straight, inturned rim is unthickened and the fabric is of a non-uniform nature which give the impression of poor workmanship.

Stratford-on-Avon, Wa. and Baginton, Wa. have produced the examples for this type of pot (Map VIa) which is difficult to parallel in Myres' work unless it is a small subset of "plain domestic wares I: small crude accessories" (1969: 166) which are spherical in form and without any obvious rim. The six cluster analysis program results give a fairly good correlation and support for the type (Table IVd) and add further proof that the division of Myres' group is possible (see above, RELOC 17:3).

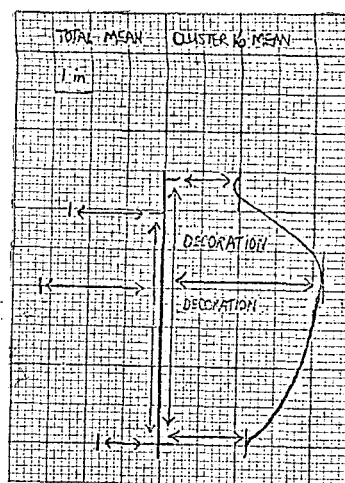


RELOC 17:2

- a. 32; 48; 49; 52; 62;
- b. 1; 4; 7; 10; 13; 17; 22; 26; 28; 31; 42; 43; 44; 54; 64; 65; 66;
- c. 1; 21; 25; 36; 43; 58; 60; 61; 62; 63; 64; 65; 66; 67; 68; 70;

The most recognisable feature of this type is the non-uniform, brown paste which may contain some form of vegetable temper while the decorative features do not include horizontal bosses or stamps in panels but may have complex linear patterns. There are no moulded bases in this class, which has a mouth diameter:maximum diameter ratio under .7, but no other ratios show extremes in proportions. The pots are usually of independent restricted structure and complex contour although all other contour forms may occur. The finish is neither slipped nor burnished.

Three of the four Burn Ground, Hampnett, Glos., pots are in this class but there are also examples from Baginton, Wa. so it is not a very localised type (Map VIc). It is extremely difficult to try to identify which of Myres' many groups most nearly parallel this one and as each example seems to lie in a different category I cannot correlate my results with his. For the same reason I am dubious about giving any date range since Myres does this for the type and not for individuals, which may have been made at any point within his sequence, if that is an acceptable one. As all six methods of cluster analysis (Table IVd) produce very similar results RELOC 17:2 cannot be dismissed as totally meaningless and future work, using an extended sample, might shed more light on an acceptable, justifiable and workable typology for the decorative forms of pottery.



RELOC 17:16

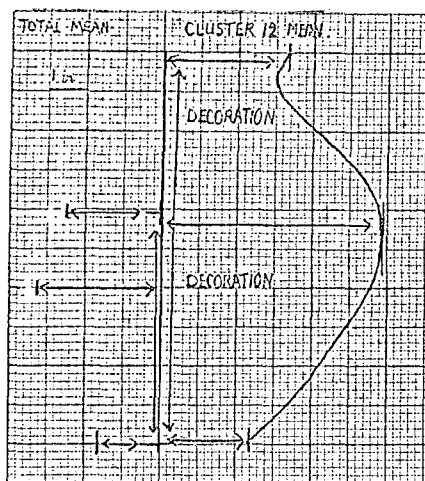
- a. 38; 48; 52; 62; 63; 64; 65; 66; 68;
- b. 7; 13; 17; 32; 49; 58; 60;
- c. 3; 11; 21; 33; 38; 45; 58; 59; 60; 61; 62; 63; 64; 65; 66; 68; 69; 70;

This uneven coloured pottery, which is generally a brown colour, has decorations which include horizontal bosses and stamps in panels but no complex linear patterns and can therefore be distinguished quite easily from RELOC 2. Further diagnostic differences are a tendency for some pots to have moulded but not dished bases and, most important, for the fabric to be of a uniform consistency. The proportions of the pots are not the same as for the other brown, decorated pot type, RELOC 2, for there is a height:maximum diameter ratio in the two extremes of values, especially under .7, while the maximum diameter may also lie anywhere along the full range of values, with a suggestion that the wider values are more common. There is a smaller range of differences in the thickness of the fabric for this type of pot which is normally of a spherical or inverted ovaloid shape with inflected or complex contours and an independent restricted structure.

The distribution of this type is mainly within the eastern part of Warwickshire (Map VIb), three being from Baginton, one from Long Itchington and only one from Bidford-on-Avon. Myres (1969: 145) refers to one of the type as a Buckelurne IV but the rest of the sample included in the type cannot be given that label since some are more like the

"rectangular linear designs" (Myres, 1969: 198) while others resemble the "triangular panel-type" (Myres, 1969: 204). It seems that there is not much correlation between RELOC 17:16 and any of Myres' groups.

There is, however, a very good degree of support for RELOC 17:16 (Table IVd) which means that more work would be justified into the validity of this type throughout the rest of England.



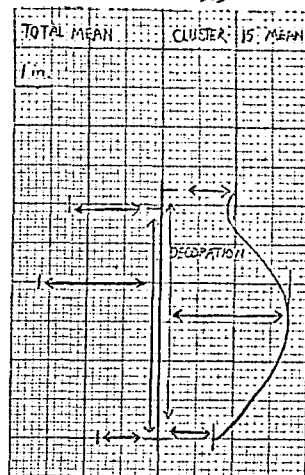
RELOC 17:12

- a. 11; 13; 17; 32; 47; 50; 53; 58; 60; 62; 68;
- b. 1; 4; 7; 19; 22; 34; 39; 42; 43; 64; 65; 66;
- c. 1; 11; 45; 47; 50; 51; 53; 58; 59; 60; 62; 63; 64; 65; 66; 67; 68; 69; 70;

This is one of the two even black coloured, decorated pottery types and is distinguished by a maximum diameter greater than 9.5 ins., a variation in fabric thickness:average thickness ratio of .4 - .7, decoration below the maximum diameter but rarely on the neck of the vessel, and stamps in panels and/or clusters. In addition, the mouth diameter:maximum diameter ratio is less than .7 while the height is above the average range of values and the profile is independent restricted in structure with an inflected contour. The base is unmoulded and usually sagging.

Three of the sample come from Bidford-on-Avon, Wa., and three are from Baginton, Wa., and so this is a type found along the Warwickshire Avon (Map VIa) both within and outside the territory of the Hwicce in the same proportions. As has been found with the other decorated pottery groups there is no close parallel with any of Myres' types although one of the sample from this type is called a Buckelurne V (Myres, 1969: 146). The rest of the pots are by no means Buckelurnen but as each appears to be similar to a different type, using Myres' typology, I cannot give either dating or type details from that work. With the exception of DIVIDE (ii) all of the cluster analysis programs used support RELOC 17:12 with a high degree of consistency (Table IVd) and it must be considered as an

alternative typology to that proposed by Myres although future research is needed to test the validity of the type over a wider geographical area than the West Midlands.



RELOC 17:15

- a. 1; 7; 10; 17; 22; 26; 31; 32; 42; 47; 50; 62; 64;
- b. 34; 45; 65; 68;
- c. 1; 5; 12; 14; 21; 38; 41; 45; 47; 50; 51; 53; 58; 59; 60; 61; 62;
64; 65; 66; 67; 68;

This type of even coloured black decorated pottery is characterised by a lack of the very wide pots but the variation in thickness of the fabric: average thickness may be very small, under .3, or very great, over .8. The type rarely has poorly fired pieces of pot and this suggests that they are the work of skilled craftsmen, as may be true for RELOC 12, too. There are never any applied lugs on these pots which also do not have any decoration below the maximum diameter or stamps in panels or clusters. The decoration of this type of pot may be simpler in form than that of RELOC 12.

As with RELOC 17:12, the distribution of this type lies along the Warwickshire Avon (Map VIa) with three examples from Bidford-on-Avon, one from Stratford-on-Avon and one, outside the territory of the Hwicce, from Baginton. There is, therefore, some justification in thinking that this is a rather localised type. There does not seem to be a close parallel to this type in Myres' typology (1969). There is a very high degree of support for the cluster analysis programs (Table IVd) by all six methods used and so the type produced as RELOC 17:15 cannot be dismissed out of hand as invalid. A larger sample must be examined in order to test the results produced by Myres and those produced in my work.

Conclusion

I have presented a pottery typology, giving the significant features by which individual pots may be examined and placed in their most appropriate type, and have suggested that some types are widespread throughout the West Midlands while others, presumably the work of a local potter, seem to have a much more localised distribution. I have then tried to correlate my typology with that given by Myres (1969) with varying degrees of success and have come to the conclusion that whereas there is some slight agreement between the results for the plain pots (e.g. RELOC 17:13,11,7,3) there is no correspondence between the decorated ones (RELOC 17:2,16,12,15).

The plain pots form almost 79% of my sample and as they are probably less often restored than the more interesting decorated ones even this figure may be rather low for the relative frequency of each form of pot used by the Anglo-Saxons. The importance of this research has been the identification and justification of the plain pottery types: I have been able to show support for some of Myres' classes while providing subdivisions of some of his rather amorphous ones (e.g. RELOC 17:1,9,7,5) which I suggest are easier to use in practice.

My sample included very few decorated pots (27 pots) and it is not possible to base general conclusions upon these results which have been seen to bear no relationship to those presented by Myres. My results should not however be dismissed for there is no proof that my conclusions are any less valid than those of Myres, indeed, that high degree of support for the types given by all the cluster analysis techniques (Table IVd), which exceeds the amount of correlation for the plain pottery types, is evidence that this typology may well prove in

the future to be of worth. The programs must be used again upon a larger sample of decorated pots only as the cluster analysis results do not justify more than four types of decorated pot when only seventeen pottery types are presented. One of the difficulties in using Myres' results, apart from lack of information on the identification of a type, is his apparent change in emphasis from the significance of the profile (Myres, 1969: 148, 152, 154, etc.) to that of workmanship (1969: 166) and then to that of forms of decoration (1969: 182, 204, etc.) without any explanation or consideration for more than one feature at a time. But all of these have been taken consistently into account with equal weighting for each pot in my analysis and the discrepancies between the two methods of approach can be seen.

My typology needs to be tested for its use outside the West Midland region, whence the sample came, but this study has shown that cluster analysis can be a valuable tool in the study of Anglo-Saxon pottery of the pagan period.

General conclusions from the archaeological data

In Part II, the archaeological material from each burial group has been plotted on a map (Map II) to show not only its spatial distribution but also the relative importance within each group of eight classes of archaeological remains and I have suggested that this is a valuable means of studying an area in order to discover whether any regional peculiarities exist. The burial of warrior bands has a completely different assemblage of material from that found with a settled family unit or village community and variations in the wealth of the communities are also immediately apparent. When data banks are set up in this country it should be possible to produce similar maps to cover the whole country but at the moment these are only being set up in a few areas. The West Midlands is fortunately pioneering them. A great deal of information about the social and economic life of the community should emerge from this type of analysis. In this study the wealth of material remains from the Avon Valley burials and Fairford, Glos., has contrasted with the less well equipped burials of the Cotswolds but whether this was due to a more pagan community or an economically more prosperous one in the rich valley lands is not known at the moment. What has emerged from this study is the frequency with which the largest burial groups, those over 15 burials, have been found on the modern parish bounds and near to the modern settlement. Those cemeteries found on the modern parish bounds but at some distance from the modern settlement are usually smaller ones and may have belonged to less successful communities whose settlement sites have changed or there may have been subdivisions of the parish which have destroyed the Anglo-Saxon unit. It is therefore extremely important that developments near to

existing settlements, especially those within the villages, are observed carefully for traces of burials and, most important of all, previous settlements.

The second part of this chapter has been concerned with the detailed analysis of four assemblages of pagan Anglo-Saxon objects, namely, the shield-bosses, the saucer and applied brooches, the small-long brooches and the pots. Cluster analysis has been shown to have a considerable contribution to play in the development of acceptable typologies for these objects and from such typologies we may in future produce a chronological ordering. Such work would need^a further long period of research which is being considered at the moment. It is important to establish acceptable ordered sequences for these objects, the common ones in pagan Anglo-Saxon graves, and then to dovetail the separate typologies in order to provide a framework to aid in dating archaeological finds. This should receive priority treatment because without viable dating methods the understanding of this era of our history is hampered.

PART III. OTHER EVIDENCE

1. The documentary evidence

Anglo-Saxon documentary evidence shows that a tribe named the Hwicce occupied most of the modern counties of Warwickshire, Worcestershire and Gloucestershire by the mid-seventh century and this material forms the basis for Part III of this thesis. Earlier studies of the Hwicce will be examined in the light of the literary and archaeological material in an attempt to show whether there is any justification for calling the pagan Anglo-Saxon settlers the Hwicce and whence in England the original migrants came to the West Midlands but before such an examination can take place, the documentary and place-name evidence must be presented.

The information about the West Midlands and the Hwicce as recorded in Bede (Earle and Plummer, 1896), and the Anglo-Saxon Chronicle (Earle and Plummer, 1892-1900), is given briefly before discussing the size and status of the Hwiccian tribe especially as recorded in the Tribal Hidage (C.S.297). The Hwiccian territory is further defined by the use of place-names and charters and the spheres of influence of both the royal family and the Hwiccian bishops are shown.

Documentary Evidence

Bede is the earliest writer to describe the location of the Hwicce when he recounts how Augustine and the British bishops met at Augustine's Oak, on the border of the Hwicce and the West Saxons (II.2).

"Interea Augustineus adiutorio usus Aedilbercti regis conuocauit ad suum colloquium episcopos siue doctores proximae Brettonum prouinciae in loco, qui usque hodie lingua Anglorum Augustinaes Ac, id est robur Augustini, in confinio Huicciorum et Occidentalium Saxonum appellatur". (Earle and Plummer, 1896).

However nothing further is said of the tribe and, as is often the case, we know of them purely through an incidental reference in an account of a major event. In IV:13 of Bede's Ecclesiastical History another passing reference mentions the royal family for the first time when describing how the South Saxons were converted to Christianity and Wilfrid baptised them.

"Erat autem rex gentis ipsius Aediluach, non multo ante baptizatus in prouincia Merciorum, praesente ac suggerente rege Uulfhere a quo etiam egressus de fonte, loco filii susceptus est; in cuius signum adoptionis duas illi prouincias donauit, Uectam uidelicet insulam, et Meanuarorum prouinciam in gente Occidentalium Saxonum. Itaque episcopus, - concedente, immo multum gaudente rege, primos prouinciae duces ac milites sacrosancto fonte abluebat; uerum presbyteri Eappa, et Padda, et Burghelm, et Oiddi ceteram plebem, uel tunc uel tempore sequente baptizabant. Porro regina, nomine Eabae, in sua, id est Huicciorum prouincia fuerat baptizata. Erat autem filia Eanfridi fratris AEnheri, qui ambo cum suo populo Christiani fuere." (Earle and Plummer, 1896).

We also learn that their king, Ethelwalh, had a Christian wife, Eaba of the Hwicce. It therefore seems that the Hwicce were Christian by the mid-seventh century although Bede tells nothing of their conversion. Their first recorded bishop was Bosel of whose existence we learn quite incidentally when Bede (IV:23) describes how Oftfor, a Northumbrian trained cleric, visited King Osric of the Hwicce and was elected bishop in place of Bosel, who was ill.

"De (Oftfor) nunc dicamus, quia, cum in utroque Hildae abbatisae monasterio lectioni et obseruationi scripturarum operam dedisset, tandem perfectiora desiderans, uenit Cantiam ad archiepiscopum beatae recordationis Theodorum; ubi postquam aliquandiu lectionibus sacris uacauit, etiam Roman adire curauit, quod eo tempore magnae uirtutis aestimabatur; et inde cum rediens Britanniam adisset, diuertit ad prouinciam Huicciorum, cui tunc rex Osric praefuit; ibique uerbum fidel praedicans, simul et exemplum uiuendi sese uidentibus atque audientibus exhibens, multo tempore mansit. Quo tempore antistes prouinciae illius, uocabulo Bosel, tanta erat corporis infirmitate depressus, ut officium episcopatus per se

implere non posset; propter quod omnium iudicio praefatus uir in episcopatum pro eo electus, ac iubente Aedilredo rege per Uilfridum beatae memoriae antistitem, qui tunc temporis Mediterraneorum Anglorum episcopatum gerebat, ordinatus est; pro eo, quod archiepiscopus Theodorus iam defunctus erat, et necdum alius pro eo ordinatus episcopus. In quam uidelicet prouinciam paulo ante, hoc est ante praefatum uirum Dei Boselum, uir strenuissimus ac doctissimus atque excellentis ingenii uocabulo Tatrid, de eiusdem abbatissae monasterio electus est antistes; sed, priusquam ordinari posset, morte inmatura praereptus est." (Earle and Plummer, 1896).

This incident, which probably took place c680, Bede gives in rather more detail possibly because a fellow Northumbrian religious was involved. Except in the charters, which give references to individual members of the Hwiccian royal family and their status and the ecclesiastical land-holdings of the Bishops of the Hwicce, there is then a gap in direct documentary references to the Hwicce until the battle in 800 when ealdorman Aethelmund rode from the lands of the Hwicce to fight the men of Wiltshire. The leaders of both sides were slain and the Hwicce defeated.

"**J** Ecgeberht feng to Waest Seaxna rice. **J** þy ilcan daeg rad Aethelmund ealdorman of Hwiccum ofer aet Cynemaeres forda. **P**a gemette hine Weohstan ealdorman mid Wilsaetum. **J** þær waero mycel ge feoht. **J** þær begen ofslagene waeron. **P**e ealdorman. **J** Wilsaete na(mon) sige." (Earle and Plummer, 1892).

This passage from the Anglo-Saxon Chronicle [Parker MS (A) and the Laud MS (E)] differs only slightly in spelling in the two texts, (E) having 'waeron' in the penultimate phase. I have quoted from (E) the Laud MS, which was written about 1122 and was "largely based on (D) or on some sister MS" (Earle and Plummer, 1892, ii:xii), as the text of (D) probably originated at Worcester and included the Mercian Chronicle. There is, therefore, no significant variation in the accounts of this battle, the only instance when the Chronicle texts

refer specifically to events involving the Hwicce. Unfortunately, the texts are all comparatively late and information about the early years of the Anglo-Saxon settlements in the West Midlands and the people who lived there, which would be passed on orally, was apparently of no significance to the writers. Alternatively, it could have been deliberately suppressed as part of the West Saxon policy of uniting England under one ruler, and so minimising the memory, and hence danger, of rival claimants to the royal power which might be expected from once self-contained small kingdoms. This could account for the scant references to the territory in the Anglo-Saxon Chronicle but an assessment of the size of the Hwiccian tribe is given in a document of disputed date written probably before the end of the eighth century. This is the Tribal Hidage (C.S. 297); which lists many tribes (Fig.XIX), some of which are known from other sources, and gives an assessment of the hidage of each. The charter exists in two forms, Latin and Old English, which have little variation since they merely list the tribal names.

"Oht gaga ~~þa~~ þusend hyda. þæt is syx 7 syxtig þusend hyda 7 an hund hyda. Hwınca syfan þusend hyda. Ciltern sætna feoƿer þusend hyda." (C.S. 297).

"Ochtgata duas hidas. Hynica* septem hidas. Ciltena seztana quatuor hid'."
 *Hynita - Liber Albus,
 Hinta - British Museum, MS Hargrave 313. (C.S.297A)

"Oht gaga, 2,000 hid. Hwınca, 7,000 hid. Cilternsetna, 4,000 hid." (C.S. 297B).

A tribe called the Hwınca, is assessed at 7,000 hides and these, Smith (1965a:63) states, are corrupt versions of the Latinised Hwicci, which form appears in charters and Bede. Stenton (1947: 294) considers the

Fig. XIX. The Tribal Hidage.

Hides

100,000

30,000

10,000

7,000

5,000

3,000

2,000

1,000

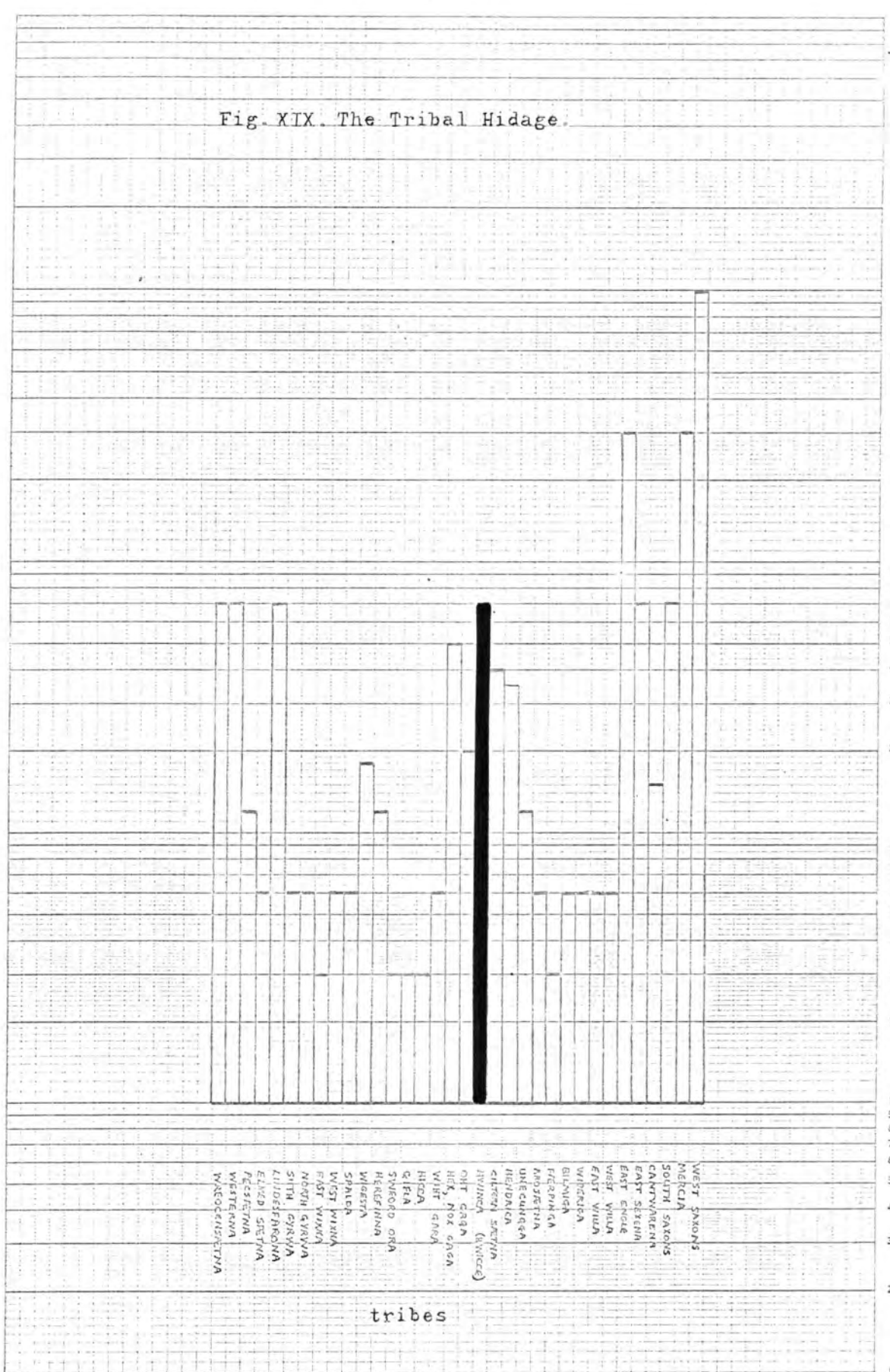
600

300

100

- WEST SAXONS
- MERCIA
- SOUTH SAXONS
- CANTONBERN
- EAST SÆTHA
- EAST ENGLE
- WEST WILLA
- EAST WILLA
- WINTREDA
- BURGH
- FLEDMINGA
- MORSTINA
- ONECINGA
- HEBENCA
- CLIFTON SÆTHA
- IRVINGA (WICCA)
- ONT GARA
- HEG, NOZ GAGA
- WIST GAGA
- RHOCA
- GLETA
- SWERD ORA
- HENGFINNA
- WIGESTA
- SPALC
- WEST WIRIA
- EAST WIRIA
- NOBTH GYRWIA
- SITH GYRWIA
- LIJOSTFROTHA
- ELVED SÆTHA
- FESTETA
- WESTENNA
- WACOSTENETHA

tribes



Tribal Hidage to be "primary evidence for the real character of the local divisions [within England in the seventh or eighth centuries] - the regiones or provinciae - mentioned incidentally by early historians". According to Stenton and his followers (e.g. Loyn, 1966: 306) it is a Mercian document compiled between 670 and 796, but Josiah Cox Russell (1947-8) argues for a Kentish original from the reign of Æthelbert of Kent (c.590) which was revised for further use during the "Mercian Renaissance". The arrangement, with sub-groups under Mercian control heading the list but with general headings only for other kingdoms, which Stenton and others give as proof of Mercian compilation, is accepted by Russell but he argues that this is purely a convenient revision by the Mercians. Certainly, once Mercian supremacy was over, there would be no need to revise the list in this form and this helps to indicate the latest date for its compilation into its present order.

Russell's arguments for a Kentish prototype include conventions of diplomatic, which follows Kentish traditions, and paleographic mistakes of Mercian scribes copying unfamiliar Kentish names. The strange omission of such folk-groups as the Tomesætan, centred on Tamworth, and the Stoppingas of Wootton Wawen, Wa., is difficult to explain in a Mercian compilation, more reasonable in a Kentish prototype, itself derived from a Frankish tradition of surveys of population. Also, the Tribal Hidage appears to be earlier than diocesan re-organisation as postulated at the Council of Hertford in 672 (Bede IV: 5 and Godfrey, 1962: 132-4). If this is accepted, and with it Russell's reconstruction of the Kentish document, we have a hint of the political geography of sixth century England. Unfortunately, Stenton gives no other supporting evidence to his belief in a Mercian seventh-century

origin nor do successive writers who give him as their source. Williamson (1947: 398) reiterates the Mercian origin based on tribal details and accepts the seventh-century date but Russell's arguments sound more convincing.

The purpose of the Tribal Hidage is generally accepted as an administrative document but whether this was for taxation (Stenton, 1947: 294), levying the fyrd (Williamson, 1947: 398) or a list of confederates hostile to Wessex (Russell, 1947-8: 199) is difficult to tell. It could possibly be of ecclesiastical origin for Augustine or Theodore and upon which they based their evangelistic work but for this analysis it matters little for the figure would still be proportional and this gives us the relative importance of the Hwicce in relation to other groups (Fig. XIX). It was obviously a major group, of equal rating to the South Saxons, the Westerna (of Hereford?), the East Saxons, the people of Lindsey (Lincolnshire), and the Wrekin dwellers. Although the Hwicce may have included smaller groups (III:20) or parts of tribes, these were probably minority groups and probably do not greatly affect the total assessment of the Hwicce.

To the sparse references to the Hwicce in other documents the charters, intended primarily as records of land transactions, add information concerning the spatial extent of the Hwiccian territory and its human and economic geography. From the witness lists the status of individuals and their approximate dates of active administration are known (Fig. XX) while the bounds recorded land use and communication routes and, if mentioned, the place from which the charter was issued may help locate important administrative centres. These documents do present problems to the user although Sawyer's list of extant charters

| Date of ref. | Names | <u>Rex, Regulus</u> | <u>Subregulus, Other</u> |
|--------------|----------------|---------------------|--------------------------|
| 804 | Æthelric | | |
| d.800 | Æthelmund | | — |
| | Ingeld | | |
| 757-790 | Ealdred | — | — |
| 757-775 | Uhtred | — | — |
| 757-759 | Eanberht | — | — |
| 774 | Æthelburg | | — |
| 718-740 | Osred | | — |
| 740 | Ælfred | | — |
| d.709 | Offa, of Essex | — | |
| 714 | Oswald | | — |
| 692-709 | Oswudu ? | | |
| 692-709 | Æthilberht | | |
| 692-712 | Æthilweard | — | — |
| 692-736 | Æthilric | — | — |
| 692-709 | Æthilheard | — | |
| 693-709 | Cuthbert | | — |
| d.697 | Osthryth | | |
| 679-693 | Oshere | — | |
| 675-685 | Osríc | — | — |
| 671-681 | Oswald | | — |
| mid C | Eaba | | |
| | Egburg | | |
| | Osgith | | |
| | Cyneburh | | |
| mid C | Eanfrid | | |
| mid C | Eanhere | | |
| | | | 1 reference — |

Fig. XX, The status of the Hwiccian royal family.

(1968) has eased the difficulty of finding what information may be available and how much trust may be placed in the authenticity of any particular charter. To allow the reader to assess the relative value of each document Sawyer's numbers have been used throughout (Table V) as it can be seen there that authorities disagree on the authenticity of many charters. Professor Stenton, in a series of lectures published under the title "The Latin Charters of the Anglo-Saxon Period" in 1955, elaborated upon the difficulties of using these and stressed the need for more work to be done but also of interest in a study of the region is Professor Finberg's "Early Charters of the West Midlands" (1961), which is invaluable for dealing with all but the eastern part of the area forming the early Anglo-Saxon diocese and, as stated earlier (I: 1), the secular kingdom of the Hwicce.

Grants may refer to parts of an estate or an estate may be divided for some reason between other estates. S. 1283 of 899-904 gives three of Elmstone Hardwick's five hides to the Bishop of Worcester's kinswoman, Cyneswith, with church scot to be paid to Bishop's Cleeve while the other two hides belong to Prestbury, implying that there were two distinct areas within the estate. Information like this is rare however and one could wish for more information which would provide evidence for the morphology of Anglo-Saxon settlements. When an area, usually expressed in hides, is stated in a charter there is not always proof of the location of the land unit: it may have been in a unified parcel or it may have been in scattered strips within the settlement lands. Therefore, the bounds which survive may be those of the whole estate or of the area in which scattered strips were located thereby enclosing a greater number of hides than those stated. It is problems

of interpretation such as these which make it difficult to know details of local organisation (Roberts, 1968:101). The early bounds tended to be brief giving only the four cardinal points and often utilised obvious physical and man-made features for markers, many of the latter having since decayed or been obliterated, but as charters became more common and once charter formulas were adopted the bounds developed in complexity which probably indicates the importance of the land to the owners at a time of increasing land pressure.

References to heathen or pagan burials often occur in boundary charters (Kemble 1857) of the Anglo-Saxon era (S.414 of 934-9 has hæþenan byrigelsas, S.1599 has Aelfstanes byriels) but these references do not occur where any archaeological evidence for pagan Anglo-Saxon cemeteries has yet been recorded in the West Midlands. The charters may be referring to pre-Anglo-Saxon burials rather than pagan Anglo-Saxon ones. The charter bounds do not therefore prove that the burial grounds used by these people were always deliberately placed on the periphery of the land used by a community if the modern parish bounds are basically those established by the Anglo-Saxons. It must also be admitted that this evidence does not disprove the use of peripheral lands for burial purposes either and so little is added to our understanding of the period by the use of documentary sources mentioning burial places.

How accurate a reflection of the density of the population at this time the known burials are is difficult to determine as these meagre remains (Map II) do not tally with a population assessed at 7,000 hides. The cemeteries are not found on the Keuper Marl, which predominates in the west of the region, so some may have perished in that damp soil, but

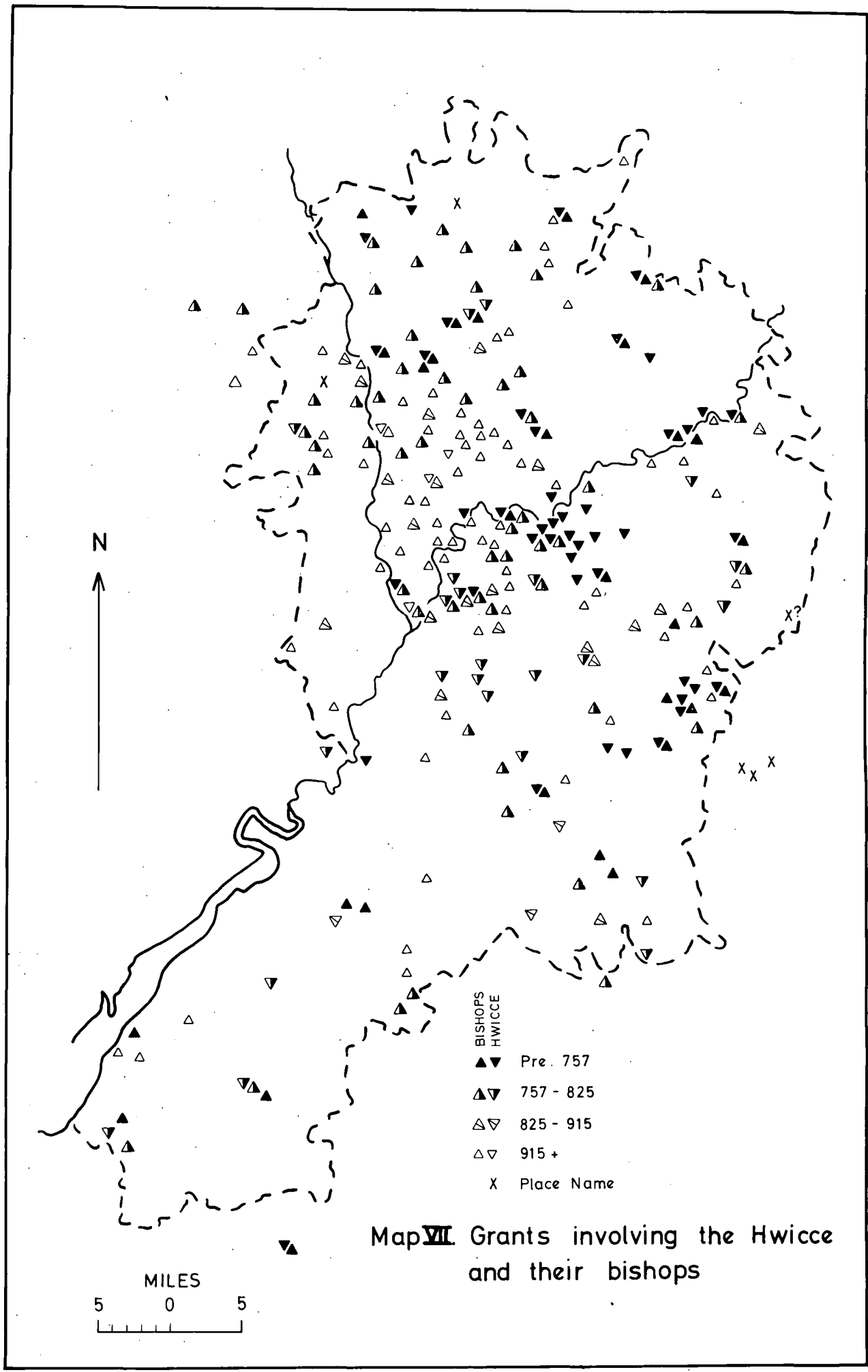
the influence of the Celtic church must not be disregarded, especially in the more westerly parts of the West Midlands. This influence would be against pagan burial customs such as the placing of grave-goods with the body and so this too might act as a limit to the number of identifiable typical pagan Anglo-Saxon cemeteries in the west of the territory. As the Hwiccian royal family was Christian by the mid-seventh century (III:2), being then part of the Roman branch of the church, their influence must also have led to the dropping of pagan customs amongst their followers and these changes may have progressed at different rates in different parts of the kingdom. Presumably, the royal influence was strongest near Worcester which was their main town. Any of these factors might lie behind the distribution pattern of pagan Anglo-Saxon archaeological material.

A histogram of the extant charters, by dates, indicates that there were four distinct phases when there were many charters separated by periods without extant charters and it is therefore convenient to subdivide the Anglo-Saxon period into four parts to correspond with the charter phases. This is further justified by the fact that the breaks in evidence occur at dates when there were significant changes in the political power structure of the West Midlands. The four phases are:

- a. pre-757, the hey-day of the smaller, independent tribal unit.
- b. 757-825, the period of Mercian dominance and decline when the Hwiccian royal family lost power and ultimately disappeared from records.
- c. 825-915, the supremacy of Wessex.
- d. post 915, plus records of no known date, which is of only marginal interest in a study of the Anglo-Saxon migration period but

charters from this period help to consolidate the picture produced by earlier evidence.

Map VII shows the date and location of these grants and also indicates, for each period, the spheres of influence of the Bishops of the Hwicce and the royal family of the Hwicce. The core area of the Hwiccian territory is clearly shown by this evidence but except on the Cotswold border the boundary is less well defined. I have explained in Part I (I: 1) some reasons for giving the bounds as indicated on these maps but it is convenient to add at this point a little more explanation. The peripheral territory is conspicuous by the relative paucity of extant charters thus supporting the boundary location as the kings and Bishop would be unlikely to grant lands in places where they might have to defend their ownership more vigorously than in the heartlands. The extreme north-western part of the modern county of Worcestershire and the Forest of Dean were not included in the diocese of the Hwicce, being part of the diocese of Hereford and presumably in the territory of the Magonsetan, but there are a few references to Hwiccian land-ownership in north-western Worcestershire (Map VII) and I suggest that this part of the boundary at least may be incorrect for the secular tribal group. Sir Charles Oman (1927) did not dispute the exclusion of the north-western parts of Worcestershire and did not try to explain the non-physically defined parts of the Hwiccian diocesan border. In the extreme south of the diocese Bath was a strategically important settlement belonging to the Hwiccian land-holdings (S.51) at a major focal point on the Roman route system and on the Bristol Avon, which defines the southern diocesan boundary.



BISHOPS
 HWICCE
 ▲▼ Pre. 757
 ▲▼ 757 - 825
 ▲▼ 825 - 915
 ▲▼ 915 +
 X Place Name

Map VII. Grants involving the Hwicce and their bishops

MILES
 5 0 5

The distribution of land held by the Hwiccian royal family before 757 also included land within the forests of the north of the territory (e.g. S.54 of 706 and possibly S.64 of 699-709) (Map VII). Grants indicating their control may be of a small number of units, (S.52 of 678-693), but this does not mean that the Hwiccian control was fragmentary as confirmation of large areas of land belonging to the Hwicce was given for Gloucester, with 33 tributarii, by Ethelred of Mercia (S.70 of 674-9) and 100 manentes were held at Bath (S.51) in 676. These large units are known from endowments to large ecclesiastical centres of which many were established by the Hwicce in this period but smaller ecclesiastical centres, such as Withington, Glos. (Finberg, 1961: 32:5 of 674-704) and Wootton Wawen, Wa. (S.94 of 716-737), may also have been endowed with a small amount of land, probably the size of an ecclesiastical parish.

During the reign of Offa of Mercia and until the dominance of Wessex (757-825) the known pattern of Hwiccian royal family land ownership was merely consolidated, especially in northern Gloucestershire. There is no documentary evidence that new churches were established but those existing were receiving land endowments, whether founded by Hwiccians (S.1782 and Finberg 1961:40:40 of 779-790) or by others; one such was Bredon, Wo., founded by Eanulf, Offa's grandfather, which received land at Weston-on-Avon, Wa., (Finberg, 1961: 38:31 of 773).

Many of the Anglo-Saxon charters still extant for the West Midlands record Mercian royal confirmations and grants and many more must have been lost. Usually, before 757, the Mercian king confirmed - or was a co-signatory with the Hwiccian royal family of - donations

within the West Midlands although a block of land along the Warwickshire Avon (S.1250 of 714) was given to Evesham Abbey without reference to the Hwicce. How strong each family was in relation to the other in this territory cannot be judged but once Offa of Mercia had become king he authorised grants throughout the whole territory, often without mention of the Hwicce. Indeed, the Mercian kings controlled the important land by the mouths of the Severn and Wye before 757 (Henbury, Glos., S.77 of 691-699) probably for trading purposes.

After 825, the power of the West Saxon kings was paramount in the West Midlands, for example a grant was authorised in southern Worcestershire (Pendoc, S.1839 of 888) and two donations were made in southern Gloucestershire (Shirehampton, Finberg, 1961:47:73 and 74 of 854-5) while during the same period Mercian kings made fewer grants in Gloucestershire although they continued to make grants in Worcestershire and Warwickshire. The Hwicce were obviously a buffer state at this time. After 915 land to the west of the Severn, in the Forest of Dean, was not the subject of extant grants nor was the land in the Vale of Gloucester between Wotton-under-Edge, the Severn, the Fosse and Badgeworth to Pegglesworth but this latter may have remained firmly in control of the minster at Gloucester from its foundation in 674-679 (S.70 and Finberg, 1961: 163).

In the post 915 period the king of England, rather than of Mercia, was authorising land grants in all parts of the territory as it became part of a more unified nation.

We have seen that the secular Hwiccian leaders were ruling the area by the mid-seventh century and a summary of the diocesan limits of the see of Worcester is necessary to add information about the extent

of this unit. It is probable that the assessment of a people at 7,000 hides either as a homogeneous unit or in a confederation was large enough to support a bishopric, as other tribes referred to in the Tribal Hidage (C.S. 297) with this assessment also had their own bishops after the Theodoran reforms of 674 (C.S. 30, Godfrey, 1962: 131-134) (e.g. Lindsey, the East Saxons, the South Saxons). The name Hwicce has thus been preserved through the establishment of the diocese for the tribe, many bishops granting charters not as Bishops of Worcester but rather as Bishops of the Hwicce and once, possibly through a scribal error (S. 1352 of 985), as "Ossuuild gratia dei gratuita Hwicciorum archiepiscopus". It is this association of the diocese with a folk group which allows us to use the earliest ecclesiastical documents to map the probable territorial extent of the people, a pattern which was established before Offa's reign (Map VII). National, rather than purely diocesan, interests later in the period, together with a strengthening of centralised government, resulted in lands far from the diocese being held by the bishops, many of whom may possibly have been politically active too. Such later holdings are therefore ignored as they do not help to explain the earliest settlement of Anglo-Saxon peoples in the West Midlands.

It is tempting to speculate on reasons for the church's choice of Worcester for the episcopal centre rather than a town which was of major importance in Roman times, for normally the Roman church based its administrative centres on those of the Empire. It would be logical, therefore, to expect Cirencester, Bath or Gloucester to have been chosen in preference to Worcester. Cirencester and Bath were too peripheral to the territory (which argues for new territorial boundaries

after the Anglo-Saxon settlement) and would not have been convenient centres from which to control the Severn-Avon Lowland where the charter evidence and pagan archaeological remains (Maps VII, II) suggest the population was most densely concentrated. Gloucester, in the possession of the royal family of the Hwicce (S.70 of 647-9) had a Roman background and was well sited for controlling the territory by land and water routes. There seems to be no good reason for by-passing Gloucester and so perhaps Worcester was chosen for reasons now obscure. Before the huge Mercian diocese was subdivided (C.S. 30 of 647, Stenton, 1947: 134) there was no well established Mercian diocesan centre for the bishop who was a peripatetic figure like his Celtic contemporaries. If the new episcopal centres are mapped (see O.S. Monastic Britain) and Thiesson polygons constructed about them according to the method shown by Haggett (Haggett, 1968: 247-8) it can be seen that the theoretical bounds so produced approximate very closely to the actual boundaries of the dioceses. From my experiments, using these methods, I have come to the conclusion that there would appear to be a geometric basis for the diocesan organisation (with the exception of Kent). The artificial nature of this territorial organisation is more precisely defined than can be accounted for by chance. It is possible that the conversion of ^{the} Anglo-Saxons was carried out with a military precision inherited from the days of the Empire and, indeed, based on maps from that era. (I have not reproduced the maps constructed for this work as the closeness of the boundaries cannot be shown on very small-scale maps). If the diocesan boundaries were chosen by dividing the land between neighbouring bishoprics equally there was the added advantage for Mercia that the newly formed sees were not too far from Lichfield for relatively easy consultation. The journey from Lichfield to Worcester would have allowed

far greater contact between bishops than the extra miles involved in the journey to Gloucester. In practice, the boundaries utilised easily recognised features of the landscape such as ridgeways, Roman roads and watersheds but it is interesting to note how closely those features selected approximate to the geometric model.

There are very few records of episcopal jurisdiction in the Worcester diocese before 757 (Map VII) but those extant show that the Bishop exercised control throughout the territory from Bath in the south (S. 1257 of 781, which refers to earlier control), to Stratford-on-Avon, Wa., in the east (S.76 of ?697-699) and Wolverley, Wo., in the north (S. 1827 of 716-757). Nothing is recorded west of the Severn during this period but whether this is explicable by lack of surviving documentary evidence or by the land being outside the episcopal control cannot be determined.

After 757, the power of the Bishop increased even over the privately founded and controlled churches, such as Withington, Glos., (S. 1255 of 774), which usually reverted to the Bishop after three lives. An ecclesiastical network was developing, and dependent minsters were built (S.172 of 814), but the diocese seemed to be defined at this period rather by a frontier than a boundary: Pencovan, Heref., belonged to Worcester (Finberg, 1961: 140: 412 of 757); Innsworth, Glos., was under Glastonbury's control (S.1692 of 794); Cheltenham, Glos., and Beckford, Wo., were the subjects of a dispute between the bishops of Hereford and of Worcester (S.1431 of 803). The core area around Worcester was clearly defined but, with the exception of the area to the south-west of Worcester, west of the Severn, where records are still absent, in all other directions the sphere of influence of the bishop, although less

clearly marked, approximates to the later known diocesan boundary.

With the rise of a powerful Wessex Worcester had to insist on its rights in east Gloucestershire after 825 in the face of land acquisition by Abingdon, Berks., (Calmsden in S.202 of 852), and Malmesbury, Wilts., (Kemble in S.305 of 854). Glastonbury had rights near the well established Worcester-controlled port of Henbury, Glos., at Shirehampton (Finberg, 1961: 47: 74 of c.855) but despite these inroads into the diocese the sphere of influence of the bishop was maintained at its earlier extent. By 915 very few settlements have no recorded grant sanctioned or made by the Bishop, and as map VII shows, after 915 the land holdings show a consolidation of episcopal control within the territory.

Because of the paucity of surviving charters in the south of the territory the importance of Gloucester abbey should be noted. It was dedicated to Peter and established by Osric of the Hwicce in 674-9 (S.70; S.209 and S.1782, both of 862) so that it may antedate the see of Worcester. This, and the nunnery founded by Osric at Bath in 676 (S.51), are the oldest Anglo-Saxon religious houses known in the West Midlands. Osric gave 300 tributarii for his new foundation, which Finberg (1961: 163) suggests may have been the later hundreds of Berkeley, Whitstone and King's Barton and in the same work he discusses some interesting problems posed by this foundation, amongst whose earliest donations were land units at Beaminster and the Isle of Portland, Dorset (S.209 of 862).

By the 757-825 period previously unrecorded parts of Gloucestershire are known to have belonged to Gloucester abbey (e.g. Nympsfield, S.1782 and Finberg, 1961: 40: 40 of 779-790; Frocester, Finberg, 1961: 45:60

of 824; Standish, S.1782 of 823-5) and the Hwiccian royal family continued to have an active interest in it - Aldred donated 120 hides outside the city in 777-90 (Finberg, 1961: 41; 45) which Finberg suggests may have been Abbot's Barton. Despite its early and royal foundation Gloucester's sphere of influence shows a distorted pattern which can only be explained by established religious centres exercising power at Evesham in the north-east, Malmesbury to the south-east, probably Deerhurst to the west and the physical presence of the rivers Leadon and Severn.

The importance of land holdings to the east continued after 825 with Fairford, Glos., (S.1782 and Finberg, 1961: 49: 80 of 852-74) among the recorded holdings but abbeys at Evesham, Abingdon and Malmesbury continued to prevent expansion of the sphere of influence in other directions. The south of Gloucestershire therefore remains an enigma with no extant references to prove to whom it owed allegiance.

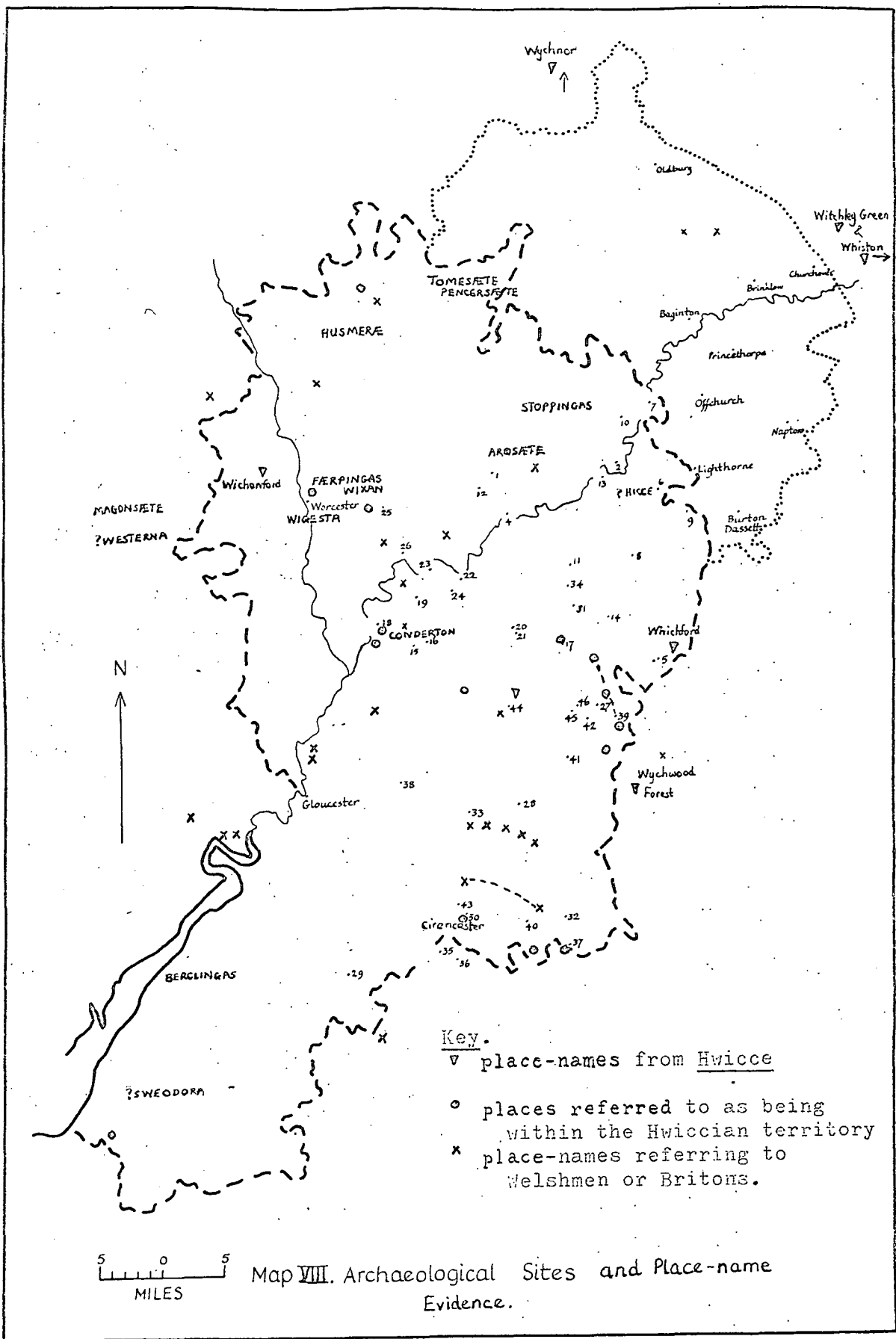
We have briefly noted the information available to us from documentary and charter evidence and have seen that direct references to the Hwicce are rare. Their name is best preserved in the ecclesiastical area within the jurisdiction of the Bishop of the Hwicce and, from the charters which may have been granted by members of the royal family of the Hwicce, we have seen that the secular and religious territories probably did coincide (Map VII). We also know from the Tribal Hidage that the folk-group was assessed at 7,000 hides and so was one of the larger units referred to in that document. The territory of the Hwicce is not subject to much doubt but the problem of the affinities of the group with other areas of England has been the subject of much speculation which I have listed elsewhere (1968-9: 21ff). These

affinities may best be examined in the light of archaeological and place-name evidence and a brief look at the latter now follows.

Evidence from place-names is based on the language of the Anglo-Saxon invaders and the many dialectical developments it underwent, mainly before the Norman conquest, as phonetically spelt and preserved in early documents. It may therefore be used to show where linguistic groupings were, and their bounds, and this has been attempted for the Hwicce by Mills (1960). However, it must be stressed that it is not possible to stratify place-name evidence into an absolute chronology. The great advantage of place-name evidence is its widespread distribution and even scatter throughout the territory and despite numerous problems in place-name study Mills has produced some significant results with regard to the place-name forms of the West Midlands, which will be discussed after various folk-group names have been noted.

"The name of the Hwicce is obscure it would seem to be a very early type of folk name, perhaps, in view of its lack of etymological connections in Old English, of pre-migration origin."

(Smith, 1965a: 62). Place-names containing the folk name are unlikely to have evolved within the heart of the tribal area however: they can much more reasonably be expected to characterise peripheral tribal settlements and to have arisen from the usage of neighbouring groups (Map VIII). Some confusion arises in the interpretation of the generally accepted 'Hwicce' names but some might be derived from OE wice or wic. Wychwood Forest, Oxon. (Hwiccewudu, S.196 of 840), Wichford, Wo., (Wicenford, Heming of 11 century) and Whichford, Wa., (Wicford, D.B.1086) are all located near the diocesan, and therefore presumed tribal, boundary (Map VIII). Other documents have such terms as



Key.

- ▽ place-names from Hwicce
- places referred to as being within the Hwiccian territory
- × place-names referring to Welshmen or Britons.

5 0 5
MILES

Map VIII. Archaeological Sites and Place-name Evidence.

"in Huic" or "in provincia Hwiccorum" when referring to certain places and from this we know that Bredon, Wo., (S.109 of 775; S.116 of 780), Winchcombe, Gos., (S.167 of 811), Oslafslau Hundred, Wo., (C.S.384, 385 of 825) and Westbury-on-Trym, Gos., (S.139 of 793-6) were in the territory while Cutsdean Hill, Gos., was "mons Huiccorum" (S.116 of 780) and the Cotswolds were "in monte Wiccisca" (S.731 of 964). Specific documentary references to the position of places in respect to the territorial border give Cirencester, Gos., as "in meridiana parte Huiccorum" (Earle and Plummer, II, 1892: 95), with Kempsford, Gos., (A.S.Ch.800) and Augustinaes Ac (Earle and Plummer, II, 1896: 2 for 603) on the Hwicce/West Saxon border but the exact location of the last has not been established: The Oak in Down Ampney, Gos., is a possible site (Smith, 1965a: 63 and 1965b, iv: 33). Worcester itself was the "metropolim Huiccorum" (S.1254 of 718-745).

Migrants from the Hwicce settled in Wichnor, Staffs., Whiston, Northants., and Witchley Green, near Ketton, Rutland, all Anglian areas and supporting the links found in the archaeological analysis (Pt. II). Whiston is an especially interesting case as this may have been named from a single migrant from the Hwicce and later a convent at Whiston owned land at Nunnery Wood within the city of Worcester (E.P.N.S.Wo., 1927:161). There is very little evidence upon which to base conclusions but definite references to a territorial border are confined to the south where there was a common boundary with the West Saxons. From this and the migrations only to Anglian areas there would appear to have been a closer contact with Anglian groups than with Saxons.

To support this Anglian link personal names of the Mercian royal families seem to occur within the Hwiccian area (e.g. Pybba in Pedmore,

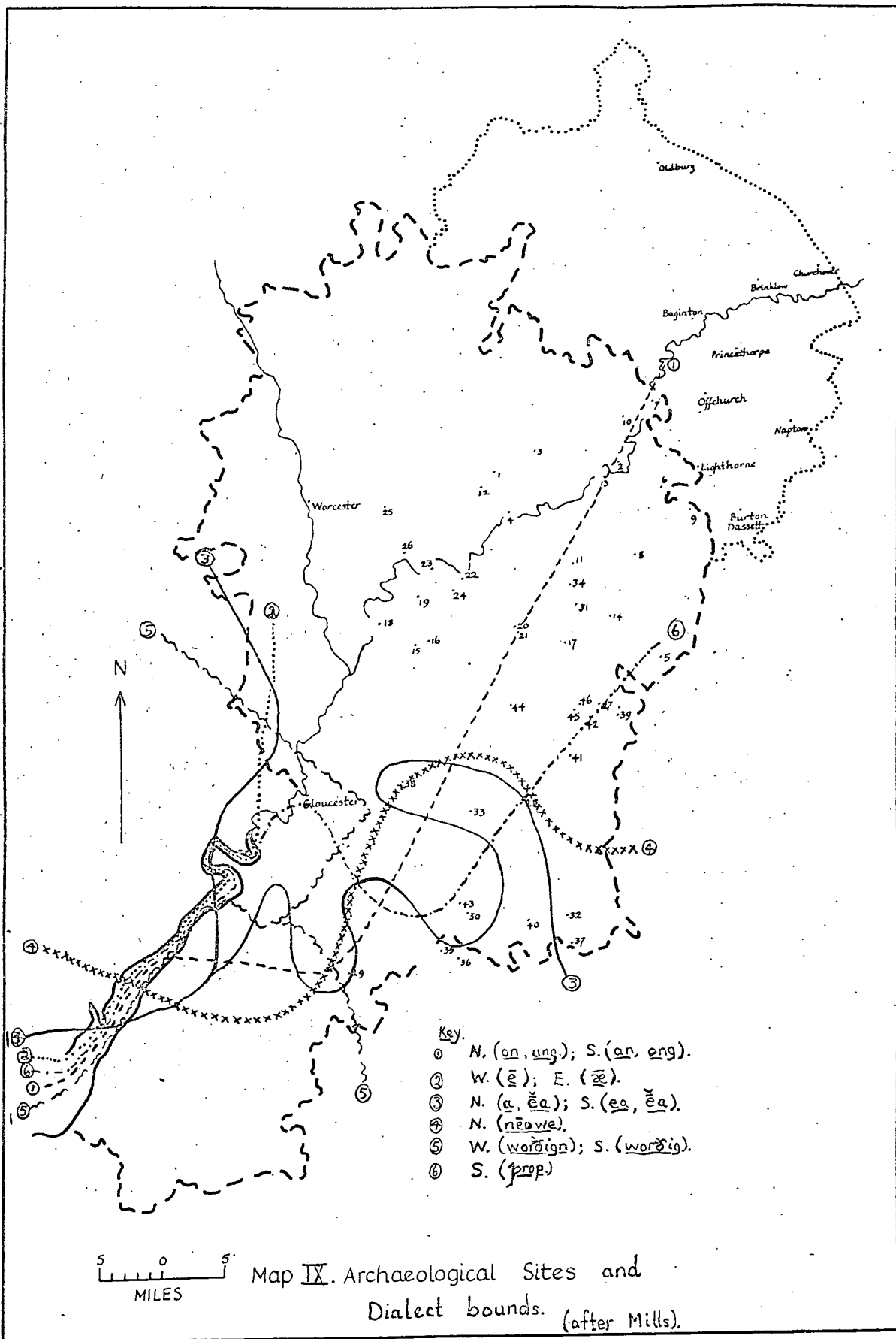
Pepper Wood and Pepwell, Wo.; Penda in Pinbury Park and Pimbury Park, Glos., Pinvin and Pendiford, Wo.; Peada in Paddington, Glos., and Padonger, Wa.; Offa of Essex, and possibly of the Hwicce, in Offchurch and Offord, Wa.). The only name which may be West Saxon, but is not proven, is that of Tetta, a West Saxon princess, whose name forms part of the place-name Tetbury, Glos., (Smith, IV, 1965b: 41). Once again, the dominant element seems to be Anglian rather than West Saxon although these names could have been given after the period of Mercian domination.

Small groups of settlers from other tribal groups are known from place-names and charters. Conderton, Wo. (Cantuaretun, S.216 of 875) may refer to a Kentish settlement (Mawer and Stenton, 1927: 116) and Britons may have lived at Cumberwood, Glos. (Smith, III, 1965b: 149) and Comberton, Wo. (Mawer and Stenton, 1927: 193-4, 249) as well as those places containing the element Waelisc and Walh (Map VIII) but unfortunately, the latter is easily confused with "wall" and it is not always possible to know what the original form was for the many Walcots, Waltons, etc. The Faerpingas were a Middle Anglian folk assessed at 300 hides in the Tribal Hidage (C.S. 297) who settled at Phepson, Wo. (Mawer and Stenton, 1927: xviii), which is very near the core area of the Hwicce, but the exact place in Middle Anglia from which the Faerpingas migrated is unknown and disputed (Brooke, 1929; Anscombe, 1911; Barns, 1911-12; Corbett, 1900; Russell, 1947-8; Williamson, 1947; M.Gelling, 1953). The Arosaetan may have lived by the south Warwickshire River Arrow (Barns, 1911-12; Williamson, 1947; Goyer et al., 1936: xviii) and were assessed at 600 hides (C.S. 297) but opinion is not unanimous about this location either: Brooke (1929) favours Cambridgeshire, Corbett (1900) suggests Northampton, Russell (1947-8) gives Harrow, Mx., while Kirby (1968) names the River Arrow, Hereford. Russell suggests that both the Faerpingas and the

Arosaetan were Frisian merchant settlers with commercial links throughout England. The Pencersaetan (S.199 of 849) occupied territory on the north-east frontier of the Hwicce but nothing more is known of them and the Stoppingas (S.94 of 723-37) also lived on the north-east border, at Wootton Wawen, Wa., but there is nothing more known of them either. Hanbury and Stour, Wo., were in the province of the Usmere or Husmerae, (S. 89 of 736; S.1411 of c.760) which name is preserved in Ismere House, between Kidderminster and Wolverley, Wo., on the northern Hwiccian border (Mawer and Stenton, 1927: 278). Whitsun Brook, Wo., preserves the tribal name of the Wixna, who were subdivided into the East Wixan of 300 hides and the West Wixan of 600 hides (C.S. 297), and who probably lived in Kesteven, Lincs. (Mawer and Stenton, 1927: xix). Reaney (1961: 103) suggested that they split into two groups, one of which migrated to Middlesex and the other up the Welland to the Warwickshire Avon and so into Worcestershire. The Berclingas (S. 1187 of 804) were a religious community but this use of -ingas may be a late one and not necessarily indicative of early settlement. Nor is the place-name Pensax, Wo., proof that Saxons rather than Angles were settled in north Worcestershire (Mawer and Stenton, 1927: 67, give no explanation of this name) but the common Welsh word for Englishman, saes, could be part of this name and I suggest that if this be so no tribal distinction was intended other than the obvious Briton/Anglo-Saxon one. The cases for including Gifle (Brooke, 1929; Taylor, 1889), Hendrica (Barns, 1911-12), Hicce (Brooke, 1929; Corbett, 1900), Sweordora (Brooke, 1929; Taylor, 1889; McClure, 1910) and Wigesta (Brooke, 1929) among the minor folk groups absorbed into the Hwicce are weak and do not bear examination as they are usually based on guesses at similar place-names made before the relevant E.P.N.S. volumes were published and were minority views not generally accepted even when postulated.

The data from the place-names has been presented and where there is evidence for tribal links with other parts of England it has been seen to be most commonly with Middle Anglia. The absence of such links with a Saxon area emphasises the conclusion we must draw from such evidence that we have which points most strongly to a Hwicce/Middle Anglian connection. The place-names have also hinted at the continued occupation of the area by Britons and a future study of the available material by the method Dodgson (1967) has used in his examination of the English arrival in Cheshire might well be fruitful. The archaeological evidence (Pt. II) supports the Middle Anglian link and the craftsmanship of the artifacts found in the West Midlands has been attributed to Roman-British or Celtic peoples (Leeds, 1911-12: 164, 166, 167-8).

Having seen the tribal references in the place-names it is instructive to add the conclusions reached by Mills (1960) in his study of the Hwiccian dialect as preserved in OE charters and ME place-name spellings. Only a brief summary of his work is given here (Table VI) as the linguistic evidence presented by him is beyond the scope of this thesis and I have given his map (Map IX) to illustrate his conclusions. The OE charters are classified by him into West Saxon, Mercian or Hwiccian according to the origin of the grantor; the latter grouping includes both the secular members of the Hwicce and the Bishops of the Hwicce. The Mercian and West Saxon donations conform with the accepted dialect features of each group which suggests that OE charters reflect the dialect of the grantor and not that of the place referred to in the grant. The relationship of the Hwiccian dialect to these two groups is of great importance but unfortunately Mills has not always interpreted the ratios of characteristic phonological features correctly although, as he claims, the ratios do indicate a strong Anglian influence in the



Hwiccian charters. The significance of the ratios is seen best if the samples are normalised (or expressed as a percentage) before analysis, which I have done, despite the limitations of using small quantities to form conclusions. From these normalised ratios it can be seen that there is a significant difference between the Hwiccian and West Saxon charters and some phonological features indicate a difference between the West Mercian and Hwiccian dialects, which implies that the Hwicce may have spoken a different Anglian dialect from the Mercians.

Some OE elements have a limited localised distribution. The variant forms wordig and wordign for OE word seem to indicate West Saxon and West Midland dialects respectively while some elements are thought to have been confined to West Saxon areas (e.g. prop, crundel, *cloppa, splott) or Anglian ones (e.g. bold, *clōh, *wilig). By superimposing the isoglosses produced by such distributions on those produced by ME place-names which reflect dialect forms (Map IX) Mills determined dialect regions: the steep contours indicate marked dialect changes while gradual changes are shown by more widely spaced contours. A wide dialect frontier bisects Gloucestershire into an Anglian north and a West Saxon south showing that there was a considerable amount of intermingling of speech types on the Cotswolds and in the Vale of Berkeley. The Anglian area is subdivided into a Mercian dialectical region west of the Severn, which was in the Magonsaetan diocese based on Hereford, sharply differentiated from another Anglian dialect region to the east of the Severn. Neither the E.P.N.S. volume for Worcestershire (Mawer and Stenton, 1927) nor that for Warwickshire (Gover et al., 1936) has many examples of West Saxon elements, both counties being associated with the Anglian north of Gloucestershire. M. Gelling (1953: xix) points out that the Hwiccian diocesan boundary and the eastern border of Gloucester

Table VI. The seven main phonological features used.

| | <u>grantor</u> | <u>actual no.</u> | <u>normalised no.</u> |
|----|---|--------------------------------------|------------------------------|
| 1. | <u>o</u> for <u>a</u> +nasal. | | |
| | Mercian | 16 <u>a</u> : 13 <u>o</u> | 55 <u>a</u> : 45 <u>o</u> |
| | Hwiccian | 38 <u>a</u> : 48 <u>o</u> | 43 <u>a</u> : 56 <u>o</u> |
| | West Saxon | 31 <u>a</u> : 7 <u>o</u> | 82 <u>a</u> : 18 <u>o</u> |
| 2. | <u>a</u> for <u>ea</u> before <u>l</u> + consonant. | | |
| | Mercian | 14 <u>ea</u> : 12 <u>a</u> | 54 <u>ea</u> : 46 <u>a</u> |
| | Hwiccian | 49 <u>ea</u> : 17 <u>a</u> | 74 <u>ea</u> : 26 <u>a</u> |
| | West Saxon | 34 <u>ea</u> : 3 <u>a</u> | 92 <u>ea</u> : 8 <u>a</u> |
| 3. | <u>e</u> for the <u>i</u> -mutation of <u>ea</u> before <u>r</u> + consonant. | | |
| | Mercian | 2 <u>y</u> : 4 <u>e</u> | 33 <u>y</u> : 67 <u>e</u> |
| | Hwiccian | 1 <u>y</u> + 1 <u>æ</u> : 6 <u>e</u> | 25 <u>y/æ</u> : 75 <u>e</u> |
| | West Saxon | 2 <u>y</u> : 1 <u>e</u> | 67 <u>y</u> : 33 <u>e</u> |
| 4. | <u>e</u> for the <u>i</u> -mutation of <u>ea</u> before <u>l</u> + consonant. | | |
| | Mercian | 13 <u>i/y</u> : 15 <u>e</u> | 46 <u>i/y</u> : 54 <u>e</u> |
| | Hwiccian | 6 <u>i/y</u> : 7 <u>e</u> | 46 <u>i/y</u> : 54 <u>e</u> |
| | West Saxon | 27 <u>i/y</u> : 4 <u>e</u> | 87 <u>i/y</u> : 13 <u>e</u> |
| 5. | <u>ea</u> from the back mutation of <u>æ</u> . | | |
| | Mercian | 1 <u>ea</u> : 1 <u>a</u> | 50 <u>ea</u> : 50 <u>a</u> |
| | Hwiccian | 1 <u>ea</u> : 1 <u>a</u> | 50 <u>ea</u> : 50 <u>a</u> |
| | West Saxon | 0 <u>ea</u> : 3 <u>a</u> | 0 <u>ea</u> : 100 <u>a</u> |
| 6. | <u>æ</u> from the smoothing of <u>ēa</u> | | |
| | Mercian | 8 <u>ea</u> : 1 <u>æ/e</u> | 89 <u>ea</u> : 11 <u>æ/e</u> |
| | Hwiccian | 7 <u>ea</u> : 10 <u>æ/e</u> | 41 <u>ea</u> : 59 <u>æ/e</u> |
| | West Saxon | 10 <u>ea</u> : 4 <u>æ/e</u> | 71 <u>ea</u> : 29 <u>æ/e</u> |
| 7. | <u>e</u> from the smoothing of <u>eo</u> | | |
| | Mercian | 1 <u>e</u> : 8 <u>eo</u> | 11 <u>e</u> : 89 <u>eo</u> |
| | Hwiccian | 4 <u>e</u> : 14 <u>eo</u> | 22 <u>e</u> : 78 <u>eo</u> |
| | West Saxon | 0 <u>e</u> : 7 <u>eo</u> | 0 <u>e</u> : 100 <u>eo</u> |

follow a dialect boundary being $2\frac{1}{2}$ - 3 miles to the west of a change from West Saxon to predominantly Anglian phonological features.

From this evidence, the settlement of the Hwiccian territory would appear to be by a predominantly Middle Anglian folk who absorbed a Saxon group in the extreme south of the territory from whom they may originally have been separated by the Cotswold scarp. The Hwicce were also a distinct folk with speech differences distinguishing them from the Mercians as well as from the West Saxons; rather, as ME place-name evidence suggests, they were associated with the Middle Angles. There is therefore complete agreement between the place-name evidence and the archaeological evidence, as presented in Part II.

2. The relationship of the archaeological evidence to other sources

Having presented the archaeological evidence which shows affinities with other parts of England (Part II) and the literary, charter and place-name material (Part III) for the West Midlands the various links may be examined more closely. Each of six theories of the migration route by which the Hwicce arrived in the West Midlands will be looked at in turn.

For those relying purely on the historical sources the Hwicce have often been classed as Saxons who settled in the West Midlands after the battle of Dyrham in 577 (Stenton, 1947: 44 referring to the lower Severn). Myres (1937: 408) claimed that "there is conclusive archaeological evidence for the presence of the West Saxons at a number of sites in the valley of the Warwickshire Avon at quite an early date". So too Stenton (E.P.N.S. Wo., 1927) thought that the Anglo-Saxon settlers in Worcestershire entered the area from the south and all these statements

are based upon the Anglo-Saxon Chronicle for 577 and 584 (Earle and Plummer, 1892-1900).

"577. Her Cwīne ȝ Ceawlin gefuhton wīð Bryttas. ȝ hi
iii ciningas ofslogon. Coimmagil. ȝ Candidan. ȝ
Farinmagil. in þære stowe þe is gecweden Deorham. ȝ
genamon iii ceastra. Gleawcestre. ȝ Cirenceaster. ȝ
Bapanceaster." (The Laud MS (E))

"584. Her Ceawlin ȝ Cupa gefuhton wīð ða Bryttas on þam
stede ðe man nemnaþ Fepanlea. ȝ Cupan man ofsloh. ȝ
Ceawlin maniga tunas gena(m). ȝ unarimedlice here reaf."
(The Laud MS (E))

"628. Her Kynegils ȝ Cwichelml gefuhton wīð Pendan aet
Cirnceastre. ȝ geþingodon þa." (The Laud MS (E))

The 628 quotation may suggest that the West Saxons were unchallenged in their occupation of the area until Penda's victory and the subsequent settlement of the land by Anglians.

In the mid-seventh century there were marriage links between the royal families of the Hwicce and the Saxon royal families of Essex (Finberg, 1961: 167 ff) and the South Saxons (Earle and Plummer, 1896, Bede IV: 13). These, however, may be purely political moves and cannot be taken as proof of tribal affinities. In Part III we have also seen (III:23) that there is some slight evidence for a Saxon dialect in the south of the territory (Map IX) but place-name evidence cannot be dated accurately and so we do not know at what point of time this was established.

From the study of the archaeological material (Part II) there appear to be only three types of saucer and applied brooch which link the Hwicce solely with Wessex. These are RELOC 17:5,12,13. None of the small-long brooches show this pattern but that is explained by the fact that they are characteristic of Anglian areas and not common in Wessex. The paucity of archaeological links with the Wessex area does

not seem to support the type of claim based purely on the historical sources, and on this basis a claim that the West Midlands was settled by West Saxons cannot be accepted.

If the West Saxons did not settle the West Midlands it is necessary to examine the evidence for an Anglian folk migration to the area, a theory unsupported by historical references. We have seen from Mills (1960 and Part III, above) that both place-name and dialect studies show that there was in fact a strong Anglian strain in the Hwiccian evidence which was in some instances quite different from the Mercian material. This suggests that the Hwicce and the Mercians were both of Anglian stock but used different forms of the language and so the Hwicce were not an offshoot of the Mercians. Place-names preserve the names of Mercian kings (III: 19) but these need not be contemporary, although they do add to the evidence for Anglian links. Smith (1965a: 61) does not think the Hwicce were a purely Anglian peoples (which will be considered below) but stresses their strong connections with Middle Anglia as seen in his linguistic studies and he claims that the archaeological material from the West Midlands is paralleled by that of Middle Anglia. Certainly, the small tribal groups known to be settled in the West Midlands (III: 20), such as the Færpingas, seem to have Anglian rather than Saxon links, and in the case of the Færpingas these point specifically to Middle Anglia.

In Part II we have three types of evidence to use which might indicate cultural affinities between the Hwicce and other groups, namely, the small-long brooches, the saucer and applied brooches and the pots. Of the saucer and applied brooch types four indicate Middle Anglian connections which is one more than the number of types showing West Saxon

links. The types are RELOC 17: 1,6,10,17. Much more strongly is the relationship between the two areas seen in the small-long brooch types, ten of which are found in both the West Midlands and Middle Anglia. The ten types, out of seventeen, are RELOC 17: 3,4,6,7,9,10,12,14,15,16. The metal work gives considerable support for the Middle Anglian migration route and this is emphasised by the Buckelurnen and Hängende Bogen pottery of the fifth century (Myres, 1969: Maps 4A, 4B, 9), which occur in both areas too. It may be suggested that the fifth century pottery, the possibly sixth century small-long brooches and the possibly seventh century saucer and applied brooches indicate a continuing traffic between the two regions but the dating of individual objects must be studied more closely before this can be accepted. It is sufficient to note that there is considerable evidence to support an Anglian area as the origin of the Hwicce and it is very probable that the area in question was Middle Anglia.

It should be noted that Stubbs (1862: 237-8) thought the Hwicce were some people of unspecified affinities who were governed by an exiled offshoot of the Bernician royal family, an Anglian folk too. Alcock (1971: 310) has suggested that the Bernician royal family ruled a British population in the north. Such a theory might help explain the scanty archaeological evidence for Anglo-Saxons in the West Midlands if they also were rulers of a predominantly Celtic people but Stubbs based his theory on the names of the members of the royal families of the Hwicce and the Bernicians. Finberg (1961: 170,175) accepts this idea and adds charter evidence to support it but there are difficulties in proving that two people with the same name, known to exist at different dates, are one rather than two individuals. It is known that the

earliest ecclesiastical links the diocese had were with Northumbria (III: 2), although by whom the people of the West Midlands were converted to Christianity is a mystery, for this had taken place before our documentary sources give reliable information. The Bernician offshoot theory is an interesting one but one which I have no evidence to prove or disprove for the archaeological remains do not show whether the people with which they were buried were a tribally separate ruling class or not and they do not confirm a Northumbrian origin either.

The size of the Hwiccian assessment in the Tribal Hidage, 7,000 hides (C.S. 297), contrasts markedly with the many small units of the East Midlands (Fig. XIX) and this suggests that they were a united group of people rather than a motley assortment of settlers from many places, even if these were united by a ruling family, such as has been suggested by the Bernician offshoot idea. Russell (1947: 208) gives

"an alternative suggestion (which) is that the Romans had moved Germanic foederati into these frontier areas who remained there after the Romans left. Certainly an Alamannic tribe from near the Mainz position on the Rhine was brought into such an area. It would have been ordinary Roman policy to have done this."

Alcock (1971: 178) suggests that the character of the commander of a Roman army unit was a major factor affecting the degree to which Romanisation took place and it is possible to speculate that a powerful leader may have had such control in the West Midlands. The archaeologists seem to support Russell's view for S. Hawkes and Dunning (1961: 41) found that there was "in the eastern parts of Britain some authentic continental military metalwork" in the form of animal-ornamented buckles and other military belt-fittings. They also said that

"we have in southern Britain, and more especially in the west and the midlands, two main classes of British-made versions of this foreign metalwork, which point by their distribution to a hitherto unsuspected military force, possibly a sort of yeomanry, based on the towns. The long life of these buckles in the fifth century suggests that the force was maintained, perhaps with further recruitment of German mercenaries, long after the year 410, when the British were empowered to take measures for their own defence." (1961: 41).

The type 1A buckle found in an Anglo-Saxon burial at Broadway, Wo. and a type 1B buckle, also from an Anglo-Saxon burial, from Stratford-on-Avon, Wa., are the only pieces of this work from the West Midlands, which is slender evidence upon which to conclude that there were Germanic troops in the area. It is however very likely that some such peoples were brought into Britain to defend important Roman centres at places with the importance of Cirencester and Gloucester as well as the smaller centres throughout the region.

Invited Germanic troops may have been few enough in numbers to be absorbed into the local population quite easily, which could explain the paucity of Anglo-Saxon material in the region (and see Alcock, 1971: 311-13). It might also account for the lack of information about the conversion to Christianity of the people, which would also mean that pagan burials would be rare. Bede gives no credit to the British Church for evangelistic work among the Anglo-Saxons even where this is known from other sources (Alcock, 1971: 308). Godfrey (1962: 109) writing of the foundation of the huge see of Lichfield, says

"in the establishment of this midland see there is no evidence of any influence on the part of Rome or Canterbury, or that its earliest bishops showed any concrete allegiance to the Roman Church or had any connections with it. Their spiritual capital was Lindisfarne, and there is nothing to suggest otherwise than that they were followers of the Celtic form of Christianity."

Gilbert (1968: 71 ff) suggests that Deerhurst may have been a Roman-British Christian centre, a Celtic community existed at Malmesbury and it is possible that the border referred to in Bede II:2 (III: 1) was a doctrinal one between the ecclesiastics of Kent and the Celtic church. The problem then becomes one of deciding where the Anglian/Briton border lay - were the people of proximae Brettonum prouinciae living in the West Midlands and if so were they the Hwicce? Alcock (1971: 122) suggests that between 490-634 south-east Wales or the Lower Severn was probably ruled by a British king. It certainly seems likely that there was a strong British tradition continuing in the West Midlands (place-name evidence, III: 20) and that the two peoples coexisted after the numbers of Anglo-Saxon settlers dominated the indigenous population, (Stretton-on-the-Fosse, Wa. cemetery, Ford, 1971: 22). This conclusion does not invalidate the Middle Anglian links, which have been shown to be well established, for the migrants may have dominated the population politically.

The mixture of peoples has been put forward by Smith (1965b: 30ff) as a possible explanation of their origins - Angles (perhaps the true Hwicce), West Saxons and Celts - but this is difficult to prove. True, there is a variety of evidence, all indicating differing degrees of cultural affinity with other peoples, which might be taken as support for the lack of any dominant group but the overriding strength of a Middle Anglian link is more than might be found as a result of casual trading contacts. I do not think that the mixed population with no dominant element is a very sound theory.

There is however another "mixed group" (Mischegruppe) which has been referred to by Myres (1969: 22) and Bidder and Morris (1959: 80).

This was a group of migrants who were so mixed culturally before they left Europe that it is not wise to assign them to any cultural bloc and any variation in their material possessions seen in England was a local development. The Anglian small-long brooches and some Wessex types of saucer and applied brooches have been found in the same cemeteries of the West Midlands. It is unlikely that the communities were markedly different from one another and the labels "Anglian" and "Saxon" should be regarded as convenient terms for describing the major kingdoms and the artifacts and dialects peculiar to them rather than as racial terms. How mixed the Hwicce were is not known but it is probable that they were not of any purer stock than the other settlers. The wide contacts between communities can be seen most clearly from the saucer and applied brooch types RELOC 17:3,4,7,9,11,14 which have examples in the West Midlands, Middle Anglia as well as in Wessex. Of the small-long brooches only two types, RELOC 17:8,17, show this widespread distribution. There is not as much evidence for the more scattered distributions as there is for the West Midland/Middle Anglian one which indicates that that one was the more important.

In summary, it can be said that the correlation of documentary sources, place-name evidence, dialects and several types of pagan Anglo-Saxon archaeological material points to wide trading contacts between the various minor kingdoms of England but the strongest evidence for cultural affinities with the peoples of the West Midlands have been found in Middle Anglia. A connection between the people called the Hwicce and the pagan Anglo-Saxon archaeological remains from the West Midlands cannot be proved but the correlation of "early" place-names with known land-holdings of the Hwiccian royal family at the first charter phase strongly suggests

that these people were the dominant element in the original Anglo-Saxon migrant group in the West Midlands. Whether they formed the numerically largest part of the group or a small, but very powerful, élite who gave their pre-migration name to the mass of the people they ruled can probably never be known but that they were a recognisable folk with defined territorial limits during the Anglo-Saxon era cannot be disputed. This sense of a separate community was strong when our earliest records, the charters especially, begin in the Christian period and this too gives support to the identification of the migrants with the later Christian Hwicce.

3. Conclusion

I have taken selected pagan Anglo-Saxon material remains from the West Midlands for closer analysis than is possible for a larger area. This region has many advantages for such a study: it has some of the earliest extant documentary evidence for its separate tribal identity in Anglo-Saxon England, it was far from the worst destruction caused by Scandinavian invasions in the ninth-tenth centuries, the diocese of the Hwicce was not subjected to subdivisions after its establishment until historical times and may therefore preserve the secular Hwiccian boundaries and it has been the subject of much conflicting theorising about the migrants' route for colonising the region.

The material available for study to the end of 1968 has been plotted (Map II) and commented upon in Part II. Unfortunately, it has not been feasible to make this data more up to date to include finds which have since been discovered as the analysis of the shield-bosses, the saucer and applied brooches, the small-long brooches and the pots has been a lengthy one and extra examples could not be added in the middle of the experiments. Also, my samples were meant to be representative rather than complete corpora for the classes analysed. Many different methods of analysis have been tried and rejected before the cluster analysis results presented were arrived at and these have been accepted because the typologies, after inspection of the actual objects, seem valid and add refinements to those put forward by others. These more detailed studies show how cluster analysis methods may be used to produce typologies which are supported by several different programs and, what is vitally important, are repeatable by others using extended

samples. It has been suggested that the criteria used in the analysis be quantifiable whenever possible as this helps to cut the amount of guess work in coding an object, which is inevitable when qualitative features are used, and it has been shown that for the small-long brooches decorative features alone are not adequate for typological analysis. Using the typologies produced, future studies may be attempted in order to put a sequence to the different artifacts, which I have been pointed out should be fairly simple for the shield-boss sample but requires more work for the other typologies which appear to be based on geographical distributions. The types selected have indicated cultural affinities within England which have been used to provide an answer to the question of the migration route(s) used by the pagan Anglo-Saxon settlers to reach the West Midlands and the various theories about this have been examined in the light of my typologies. An overwhelming amount of evidence supports a West Midland/Middle Anglian link.

In order to see what support there is from written historical sources for the conclusions based upon archaeological data the documentary evidence has been looked at briefly in Part III but this has little to add about the migration problem. These sources are of value in defining the territorial extent of the diocese and, presumably, the secular kingdom of the Hwicce and they tell of the political and social organisation of the community, information about which is rarely available from archaeological sites. Support for the Middle Anglian ties of the Hwicce is found in the place-name and dialect study of Mills (1960) however.

Of the many cultural influences within the pagan Anglo-Saxon West Midlands the Celtic element must have played a major role in the

conversion of the Anglo-Saxons from paganism to Christianity before the mid-seventh century (III: 30). The Primitive Welsh *eglés (church) survives in a place-name in the Avon valley, where the pagan Anglo-Saxon burials are densest, and we know from documentary sources that the Celtic tradition was alive in Mercia, at Malmesbury, Wilts., and west of the Severn before the eighth century, all of which evidence is supported by eighth century sculpture of Celtic and Northumbrian styles (R.J.Cramp - conversation). Celtic settlements may have survived at Cumberwood, Glos., and Comberton, Wo., since the place-names refer to such communities (III: 20). The river names, even in Warwickshire, the most easterly part of the Hwiccian territory, show a strong Celtic influence (e.g. Avon, Alne, Arrow, Itchen) and a Celtic chieftain's court may have existed at Brailes, Wa., (E.P.N.S. Wa., 1936: 277). Penda did not scorn an alliance with Cadwallon and his Welsh forces in battles against the Northumbrians for relations between the Welsh and their nearest Anglo-Saxon neighbours were not a long series of massacres. Archaeological evidence is not very informative about the relative strength and distribution of the Celtic population if the penannular and annular brooches (Map II) be used to indicate this. In Part II (II: 4) the highest ratio of these to inhumations was seen to lie in the Avon valley cemeteries and in the south Cotswolds. The Celtic evidence is therefore of the first period into which the Anglo-Saxon era was divided (III: 9), pre 575, which hints at a loss of separate identity within the group during the eighth century.

The Mercian Angles gained political control of the West Midlands during the second period, 757-825, and the power of the Mercian kings led to the subjection and decline of the smaller, formerly independent tribal units. Pre-Offa Mercian kings (Pybba, Penda, Pinvin, Peada)

may have their names preserved in place-name elements within the West Midlands (III: 19), which might show that contact between the two kingdoms was early but the influence of the Hwicce is also seen in place-names formed from the tribal name in the Anglian area at Wichnor, Staffs., Whiston, Northants. and Witchley Green, Rutland (III: 19). Such names, being early in form, may show a migration from the West Midlands to the East Midlands (E.P.N.S. Wo., 1927), implying that the Hwicce must have arrived in the west at an early date in order for them then to take the folk name back to the east in this form. Other place-names from tribal units also show a Middle Anglian link - the Færpingas at Phepson, Wo., and the Wixna by the Whitsun Brook, Wo., from Kesteven, Lincs. - and these too might be early settlers. Grave-goods, discussed in Part II, also provide information about the first phase. Myres (1969: 45,46) shows that the two Buckelurnen of groups IV and V which occur in Warwickshire, just outside the territory of the Hwicce, are of fifth century date and linked stylistically to those of the Middle Anglian areas (Myres, 1969: n. 116) as too is the mid-sixth century Hängende Bogen decoration on some West Midland pots (Myres, 1969: 55). The small-long brooches, with the greatest density concentrated in the Avon valley burials and at Fairford, Glos., show strong Middle Anglian links at a probable sixth century date while the sugar-loaf shield-bosses (RELOC 7:7), indicate that the Middle Anglian link continued into the seventh century. Throughout the pre-Norman period charters granted by members of the Hwiccian royal family and Bishops of the Hwicce show a higher proportion of Anglian dialect forms than do Mercian charters for the same period which indicates that there was a different Anglian element within the Hwicce from that among the Mercians. This Anglian population was not typified by a high incidence of cremation,

wrist-clasps, chatelaines and cruciform brooches, however, which are usually considered to be indicative of Anglian groups.

Our earliest evidence for Saxon links for the Hwicce occurs in the marriages of the Hwiccian princesses with rulers of Essex and Sussex during the seventh century (III: 2) but these ties are not supported by the archaeological evidence. Only a few saucer and applied brooch types are of a West Saxon pattern (II:53ff) while most show Middle Anglian characteristics. Mills (1970) concluded that there was a slight indication of a Saxon dialect in the extreme south of the territory (III: 23) which may have been a survival from the earliest settlers. The Saxon influences are, therefore, slight until the eighth century and increase as the political supremacy of Mercia declined and the West Saxon kings ruled England.

Other migrants to the area are hinted at by evidence in place-names (III: 20): Kentish people of Conderton, Wo., possible Frisian groups of Arosaetan and Faerpingas (Russell, 1947).

Each of the above influences has shown distinct links with only one area but some indices show associations with both Middle Anglia and North Wessex, especially Oxfordshire, at a very early date. Myres (1969: 88) dates the biconical bowl with faceted carinations from Fairford, Glos., to 450+ A.D. and states that this type of vessel occurs at Barrington and Haslingfield in Middle Anglia as well as at troop settlements along the north bank of the Thames in north Wessex. The crouched burials found in Hwiccian cemeteries are also characteristics of Middle Anglia and North Wessex (Meaney, 1964: 15-7). The maps accompanying the saucer and applied brooch analysis (Maps IVa-q) show that certain types are found in both Anglian and Saxon areas, too, but

even earlier than these grave-goods were the late fourth and fifth century belt buckles examined by S. Hawkes and Dunning (1961), which show links south to Wiltshire and north-east to Huntingdonshire, with objects from the same workshop occurring in Middle Anglia and the southern part of the Hwiccian territory. These mixed associations are all of the very earliest date i.e. before cultural intermingling had had much time to take place within England.

Continental scholars call all the migrants to Britain a Mischegruppe - a mixed group of peoples. We cannot justify a claim that the Hwicce were of pure Anglian or pure Saxon stock and it is very likely that they were originally a mixed group possibly with a more Anglian than Saxon dialect. Probably they arrived in the West Midlands before the close of the fifth century - vide the Fairford bowl, the belt buckles, the Buckelurnen - and they may originally have been an invited group of Germanic settlers to aid in the defence of the territory - again the Fairford bowl and the belt buckles support this suggestion. They intermarried with their Celtic hosts (vide Stretton-on-the-Fosse, Wa. - Ford, 1971: 22) and so we find Celtic penannular and annular brooches buried with Anglo-Saxon objects as well as evidence for the survival of Celtic Christianity in the area. In all probability the Anglo-Saxon people arrived in the West Midlands along Roman roads and ridgeways from Middle Anglia by a northerly route, through Northamptonshire to the Warwickshire Avon valley, and by a southerly route, along the Icknield Way and Akeman Street into Gloucestershire. Therefore the material examined here tends to suggest that an invited group of German settlers, who were of mixed Anglo-Saxon stock before their migration from the continent, via Middle Anglia, intermarried with a not insignificant Celtic population.

We have seen (Map II) that the distribution of the pagan Anglo-Saxon archaeological evidence is not evenly spread throughout the territory of the Hwicce and possible explanations of this have been suggested. It may be significant that the Keuper Marl is found in most of the north and west of the region which suggests that skeletons and any associated grave goods in that area have perished in the damp soils (II.10). If, however, that part of the territory was inhabited by a predominantly Celtic Christian population the burial of grave-goods may have received official disapproval at an early date both from the church, with its important centres at Worcester, Gloucester and Bath before the end of the seventh century (III: 13,16), and from the Hwiccian royal family, who were probably Christian by the mid-seventh century (III: 2). The archaeological evidence, by its distribution and quantity, thus lends support to my claim that the Hwicce, assessed at 7,000 hides (C.S. 297), probably included a large Celtic element in addition to the Anglo-Saxon settlers with Middle Anglian links.

Select bibliography

N.B. The standard text books have not usually been included here in a list which is confined to the more specialised works immediately applicable to the subject.

- Åberg, N. 1926. The Anglo-Saxons in England. Camb.
- Alcock, L. 1971. Arthur's Britain. Allen Lane.
- Alcock, L. 1967. "Roman Britons and Pagan Saxons: an Archaeological Appraisal." Welsh History Review 3:229.
- Allibone, T.E. et al (eds.) 1970. The Impact of the Natural Sciences on Archaeology. Oxford.
- Anscombe, A. 1911-12. "Wigesta". Notes and Queries. 11 ser. 4:304, 5:18.
- Ashbee, P. 1960. The Bronze Age Round Barrows in Britain. London.
- Avon-Severn Research project. 1966. No. 3.
- Baker, A. 1970. "Aerial Reconnaissance" West Midlands Archaeological News Sheet, 13:12.
- Baker, A. 1969. "Aerial and Scientific Reconnaissance" West Midlands Archaeological News Sheet, 12:11.
- Baldwin Brown, G. 1915-1925. The Arts in Early England. 6 vols. John Murray.
- Barker, P. 1970. "The Origins of Worcester". Worcestershire Archaeological Society, Trans. 3 ser. 2.
- Barns, T. 1911-12. "The Making of Mercia". North Staffordshire Field Club, Trans., 46:49.
- Barley, M.W. and Hanson, R.P.C. (eds.) 1968. Christianity in Britain, 300-700. Leicester.
- Beresford, M.W. and St. Joseph, J.K.S. 1958. Medieval England: an Aerial Survey. Camb.
- Bidder, Lt.-Col. H.F. and Morris, J. 1959. "The Anglo-Saxon Cemetery at Mitcham". Surrey Archaeological Collections, 56:51.
- Birch, W. de G. (ed.) 1964. Cartularium Saxonicum. 4 vols. reprint. London.

- Birkhoff, G.D. 1933. Aesthetic Measure. Camb.
- Black, G.A. and Weer, R. 1935. "Proposed terminology for shape classification of artifacts". American Antiquity, 1:280.
- Blair, P.H. 1962. An Introduction to Anglo-Saxon England. Camb.
- Blair, P.H. 1963. Roman Britain and Early England, 55 B.C. - 871 A.D. Nelson.
- Bloxam, N.H. 1840-50. Fragmenta Sepulchralia.
- Bonser, W. 1957. Anglo-Saxon Bibliography, 450 -1087. Blackwell.
- Brainerd, G.W. 1951. "The Place of Chronological Ordering in Archaeological Analysis". American Antiquity, 16:301.
- Branston, B. 1957. The Lost Gods of England. Thames and Hudson.
- British Association for the Advancement of Science. 1950. Birmingham.
- British Association for the Advancement of Science. 1955. Bristol.
- British Association for the Advancement of Science. 1954. Oxford.
- Brooke, F.A. 1929. "The Tribal Hidage". British Archaeological Assoc., Journal. new ser. 35:272.
- Brownbill, J. 1925. "The Tribal Hidage". English Historical Review 40:497.
- Burnham, C.P. 1961. Soils of the West Midlands. London M.Sc. thesis.
- Chenhall, R.G. 1971. "Archaeological data-bank - a progress report". Computers and the Humanities 5:159.
- Chenhall, R.G. 1967. "Description of Archaeological Data in Computer Language". American Antiquity 32:161.
- Chisholm, M. 1964. Rural Settlement and Land Use. Hutchinson.
- Clarke, D.L. 1968. Analytical Archaeology. Methuen.
- Clarke, D.L. 1970. Beaker Pottery of Great Britain and Ireland. Camb.
- Clarke, D.L. 1962. "Matrix analysis and archaeology with particular reference to British Beaker pottery". Prehistoric Society, Proc, 28:371.
- Clifford, E.M. 1961. Bagendon, A Belgic Oppidum. Camb.

- Colgrave, B. and Mynors, R.A.D. (eds.) 1969. Bede's Ecclesiastical History of the English People. Oxford.
- Colgrave, B. (ed.) 1956. Felix's Life of St. Guthlac. Camb.
- Collingwood, R.G. and Myres, J.N.L. 1956. (1936) Roman Britain and the English Settlement. Oxford, 2 edn.
- Copley, G. 1954. The Conquest of Wessex in the Sixth Century. Phoenix.
- Corbett, W.J. 1900. "The Tribal Hidage". Royal Historical Soc., Trans. n.s. 14:189.
- Cormack, R.M. 1971. "A Review of Classification". Royal Statistical Society, Journal, Ser.A, 134:321.
- Crawford, R.M.M., Wishart, D. and Campbell, R.M. 1970. "A Numerical Analysis of High Altitude Scrub Vegetation in Relation to Soil Erosion in the Eastern Cordillera of Peru". Journal of Ecology, 58:173.
- Cunliffe, B. 1969. Roman Bath. Oxford.
- Darby, H.C. 1963. "Place-names and the Geography of the Past". in Brown, A. and Foote, P. (eds.) Studies presented to Hugh Smith. Methuen.
- Darby, H.C. and Terrett, I.B. 1954. The Domesday Geography of Midland England. Camb.
- Dodgson, J. McN. 1967. "The English Arrival in Cheshire". Historical Society of Lancs. and Cheshire. 119:1.
- Dodgson, J. McN. 1966. "The Significance of the Distribution of the English Place-names in -ingas, -inga- in south-east England". Medieval Archaeology 10:1.
- Doran, J. 1970. "Systems Theory, Computer Simulations and Archaeology". World Archaeology 1:289.
- Dunning, G.C. 1932. "Bronze Age Settlements and a Saxon Hut near Bourton-on-the-Water". Antiquaries Journal 12:279.
- Dunning, G.C. et al. 1959. "Anglo-Saxon Pottery: a Symposium". Medieval Archaeology 3:1.

- Earle, J. and Plummer, C. (eds.) 1892-1900. Two of the Saxon Chronicles Parallel. 2 vols. Oxford.
- Earle, J. and Plummer, C. (eds.) 1896. Venerabilis Baedae Opera Historica. Oxford.
- English Place-name Society. Gloucestershire. 1965. Camb.
- English Place-name Society. Oxfordshire. 1953. Camb.
- English Place-name Society. Warwickshire. 1936. Camb.
- English Place-name Society. Worcestershire. 1927. Camb.
- Evans, E.E. 1933. "The Bronze Spear-head in Great Britain". Archaeologia 83:187.
- Evison, V. 1965. Fifth-century Invasions South of the Thames. London.
- Evison, V. 1963 "Sugar-loaf Shield-bosses". Antiquaries Journal 43:38.
- Fennell, K.R. 1964. The Anglo-Saxon Cemetery at Loveden Hill. Nottingham University Ph.D. thesis.
- Finberg, H.P.R. 1961. The Early Charters of the West Midlands. Leicester.
- Finberg, H.P.R. 1957. Gloucestershire studies. Leicester.
- Finberg, H.P.R. 1964. Lucerna. MacMillan.
- Ford, W.J. 1971. "Stretton-on-the-Fosse, Warws.". West Midlands Archaeological News Sheet, 14:22.
- Fowler, E. 1963. "Celtic Metalwork of the Fifth and Sixth Centuries A.D.: a Re-Appraisal". Archaeological Journal 120:98.
- Fowler, E. 1960. "The Origins and Development of the Penannular Brooch in Europe". Proceedings of the Prehistoric Society n.s. 26:149.
- Fox, Sir C. 1947. Personality of Britain. National Museum of Wales, 4 edn.
- Frend - see Barley, M.W. and Hanson, R.P.C.
- Frere, S.S. 1967. Britannia. Routledge and Kegan Paul.
- Gardin, J.C. 1967. "Methods for the Descriptive Analysis of Archaeological Material". American Antiquity 32:13.
- Gelling, M. 1967. "English Place-names Derived from the compound 'wicham'." Medieval Archaeology 11:87.

- Gelling, M. - see E.P.N.S. Oxon.
- Geoffrey of Monmouth - see Thorpe.
- Gilbert, E. 1968. "The First Stone Church at Deerhurst". Bristol and Gloucester Archaeological Society, Trans. 87:71.
- Godfrey, C.J. 1962. The Church in Anglo-Saxon England. Camb.
- Gover, et al. - see E.P.N.S. Wa.
- Haggett, P. 1968. Locational Analysis in Human Geography. Arnold.
- Harden, D.B. (ed.) 1956. Dark Age Britain. Methuen.
- Harmer, F.E. (ed.) 1952. Anglo-Saxon Writs. Manchester.
- Hawkes, S. and Dunning, G.C. 1961. "Soldiers and Settlers". Medieval Archaeology 5:1.
- Hearne, T. (ed.) 1723. Hemingi Chartularium Ecclesiae Wigorniensis.
- Hodgkin, R.H. 1935. History of the Anglo-Saxons. 2 vols. Oxford.
- Hodson, F.R. 1970. "Cluster Analysis in Archaeology". World Archaeology 1:299.
- Hodson, F.R. 1969. "Searching for Structure within Multivariate Archaeological Data". World Archaeology 1:90.
- Hodson, F.R., Kendall, D.G. and Tautu, P. 1971. Mathematics in the Archaeological and Historical Sciences. Edinburgh.
- Hodson, F.R., Sneath, P.H.A. and Doran, J.E. 1966. "Some Experiments in the Numerical Analysis of Archaeological Data." Biometrika 53:311.
- Hoel, P.G. 1962. Introduction to Mathematical Statistics. Wiley.
- Hilton, R.H. 1966. A Medieval Society. Weidenfeld and Nicolson.
- Jesson, K. and Hilbaek, H. 1944. "Cereals in Great Britain and Ireland in Prehistoric and Early Historic Times". K. Danske Viol. Selskab Biol. Skrifter, 3 ii.
- John, E. 1966. Orbis Britannia. Leicester.
- Jones, G. 1961. "Early Territorial Organisation in England and Wales". Geografiska Annaler 43:174.
- Jones, G. 1961. "Settlement Patterns in Anglo-Saxon England. Antiquity 35:221.

- Kemble, J.H. 1857. "Notices of heathen interment in the Codex Diplomaticus". Archaeological Journal. 14: 119.
- Kemble, J.H. (ed.) 1838-48, Codex Diplomaticus Aevi Saxonici. 6 vols. London.
- Kendall, D.G. 1970. (see Allibone, T.E.) "A Mathematical Approach to Seriation..".
- Kendall, D.G. 1963. "A Statistical Approach to Flinders Petrie's Sequence Dating". Bulletin International Statistical Institute 40: 657.
- Kendall, D.G. 1971. "Some Data Analytic Problems in Archaeology and History". I.F.I.P. Congress, Ljubliana, Yugoslavia.
- Kendall, D.G. 1969. "Some Problems and Methods in Statistical Archaeology". World Archaeology 1:68.
- Kendall, M.G. and Stuart, A. 1961. The Advanced Theory of Statistics. Vol. II. Chas. Griffin, London.
- Kirby, D.P. 1967. The Making of Early England. Batsford.
- Kirk, J.R. 1956. "Anglo-Saxon Cremation and Inhumation in the Upper Thames Valley". (See Harden, D.B.).
- Land Utilisation Survey, Glos. 1942. Geographical publications.
- Land Utilisation Survey, Wa. 1946. " "
- Land Utilisation Survey, Wo. 1944. " "
- Leeds, E.T. 1913. Archaeology of the Anglo-Saxon Settlement. Oxford.
- Leeds, E.T. 1945. "The Distribution of the Angles and Saxons Archaeologically Considered". Archaeologia 91:1.
- Leeds, E.T. 1911-12. "The Distribution of the Anglo-Saxon Saucer Brooch". Archaeologia 63:159.
- Leeds, E.T. 1936. Early Anglo-Saxon Art and Archaeology. Oxford
- Leeds, E.T. 1923, 1927, 1947. "A Saxon Village at Sutton Courtenay, Berks". Archaeologia 73:147, 76:59, 92:79.
- Levison, W. 1946. England and the Continent in the Eighth Century. Oxford.
- Loyn, H.R. 1966. Anglo-Saxon England and the Norman Conquest. Longmans.
- McClure, E. 1910. British Place-names in their Historical Setting. London
- Margary, I.D. 1967. Roman Roads in Britain. John Baker. 2 edn.

- Mawer and Stenton - see E.P.N.S. Wo.
- Meaney, A. 1964. A Gazetteer of Early Anglo-Saxon Burial Sites. Allen and Unwin.
- Mills, A.D. 1960. A Linguistic Study of Gloucestershire Place-names. M.A. London thesis.
- Mitchell, J. (ed.) 1962. Great Britain. Camb.
- Myres, J.N.L. 1959. "Anglo-Saxon Pottery." Medieval Archaeology 3:7.
- Myres, J.N.L. 1969. Anglo-Saxon Pottery and the Settlement of England. Oxford.
- Myres, J.N.L. 1956. "Romano-Saxon Pottery". (see Harden, D.B.)
- Myres, J.N.L. 1937, 1956. see Collingwood and Myres.
- Oman, Sir C. 1927. "Concerning Some Gloucestershire Boundaries". in Davis, H.W.C. (ed.) Essays to R.L.Poole. Oxford.
- O'Neil, H. and Grinsell, L.V. 1960. "Gloucestershire Barrows". Bristol and Gloucester Archaeological Soc., Trans. 79:4.
- Ordnance Survey. 1966. Map of Britain in the Dark Ages. Ordnance Survey.
- Ordnance Survey. 1954. Monastic Britain, South Sheet. Ordnance Survey.
- Ordnance Survey. 1964. Roman Britain. Ordnance Survey.
- Ozanne, A. 1962-3. "The Peak Dwellers". Medieval Archaeology 6-7:15.
- Painter, K.S. 1964. The Severn Basin. Cory, Adams, MacKay.
- Peacock, D. 1967. "Fladbury". Current Archaeology 5:123.
- Petrie, W.M.F. 1899. "Sequences in Prehistoric Remains". Anthropological Institute, Journal n.s. 29:295.
- Pickering, J. and Baker, A. 1971. "Aerial Reconnaissance in 1971". West Midlands Archaeological News Sheet. 14 (2nd page).
- Piggott, S. 1958. "Native Economies and the Roman Occupation of North Britain". in Richmond, I.A. (ed.) Roman and Native in North Britain. Nelson.
- Rahtz, P. 1970. "A Possible Saxon Palace near Stratford-on-Avon". Antiquity. 44:137.

- Reaney, P.H. 1961. Origin of English Place-names. Hillary. 2 edn.
- Renfrew, C. and Sterud, G. 1969. "Close-proximity Analysis: a rapid method for the ordering of Archaeological Materials". American Antiquity 34:265.
- Richmond, I.A. 1955. Roman Britain. Penguin.
- Rivet, A.L.F. 1964. Town and Country in Roman Britain. Hutchinson. 2 edn.
- Roberts, B.K. 1968. "A Study of Medieval Colonization in the forest of Arden, Warwickshire". Agricultural History Review. 16:101.
- Robertson, A.J. 1956. Anglo-Saxon Charters. Camb. 2 edn.
- Robinson, W.S. 1951. "A method for chronologically ordering archaeological deposits". American Antiquity. 16:293.
- Russell, J.C. 1947. "The Tribal Hidage". Traditio 5:192.
- Sawyer, P.H. 1968. Anglo-Saxon Charters. Royal Historical Soc. Publication.
- Shepard, A. 1965. Ceramics for the Archaeologist. Washington. 2 edn.
- Shotton, F.W. 1938. "The Distribution of Neolithic, Bronze Age and Iron Age Relics around Coventry". Coventry Natural History Soc., Proc. 1:184.
- Smith, A.H. 1965a. "The Hwicce". in Bessinger, J.B. and Creed, R.P. (eds.) Medieval and Linguistic Studies. Allen and Unwin.
- Smith, A.H. 1965b. - see E.P.N.S. Glos.
- Sokal, R.R. and Sneath, P.H.A. 1963. Principles of Numerical Analysis. Freeman and Co.
- Stenton, F.M. 1947. Anglo-Saxon England. Oxford.
- Stenton, F.M. 1955. The Latin Charters of the Anglo-Saxon Period. Oxford.
- Stevenson, J. (ed.) 1838. Nennii Historia Britonum. London.
- Stone, J. 1969. Animal Ornamentation on Pre-Conquest West Saxon Crosses. Durham B.A. thesis.
- Stubbs, Rev. W. 1862. "The Cathedral, Diocese and Monasteries of Worcester in the Eighth Century". Archaeological Journal 19:236.

- Taylor, C.S. 1909. "The Northern Boundary of Gloucestershire". Bristol and Gloucester Archaeological Soc., Trans. 32:109.
- Taylor, H.M. and Taylor, J. 1965. Anglo-Saxon Architecture. 2 vols. Camb. Thorpe, L. (trans. and ed.) 1966. Geoffrey of Monmouth. Penguin.
- University of Bristol Reconstruction Research Group. 1947. Gloucestershire, Somerset and Wiltshire Land Classification. Arrowsmith.
- Vance, D. 1970. "Museum Data Banks". Information Storage Retrieval 5:203.
- Victoria County History, Gloucestershire. 1907+
- Victoria County History, Worcestershire. 1901+
- Victoria County History, Warwickshire. 1904+
- Wainwright, F.T. 1962. Archaeology and Place-names and History. Routledge and Kegan Paul.
- Webster, G. and Hobley, B. 1964. "Aerial Reconnaissance over the Warwickshire Avon". Archaeological Journal 121:1.
- West Midland Group on Post War Reconstruction and Planning. 1947. Land Classification in the West Midland Regions. Faber and Faber.
- Whitaker, H. 1969. Anglo-Saxon Pagan Cemeteries in the West Midlands. Birmingham University, B.A. thesis.
- Whitelock, D. 1952. The Beginning of English Society. Penguin.
- Whitelock, D. 1955. English Historical Documents. vol. I. Oxford.
- Williamson, F. 1947. "The Tribal Hidage". Notes and Queries. 192:398.
- Wilson, M.E. 1968-9. "The Hwicce". Worcestershire Archaeological Society, Trans. 3 ser. 2:21.
- Wishart, D. 1969. CLUSTAN 1A. St. Andrew's.
- Wishart, D. 1970. - see Crawford, R.M.M., Wishart, D. and Campbell, R.M.
- Wylie, W.M. 1852. Fairford Graves. Oxford.

APPENDIX I

A Concise Gazetteer of Anglo-Saxon Burials Cited in the Hwiccian Territory

Meaney (1964) gives fuller references for most of these sites and should be consulted. This list is not exhaustive but is included to aid those not familiar with the area in an understanding of the nature of the evidence available. The numbering of the cemeteries is that used throughout this thesis.

Warwickshire.

1. Alcester. SP 086 570

There is only dubious information for this burial and as no finds have been preserved, even in drawings, it is impossible to resolve the problem. It was an accidental find in a gravel pit during 1812 where there were reputedly many other early burials but detailed information about those is completely lacking. As Roman coins were frequently found in the area and nothing is known of the pots, the seventh century Anglo-Saxon dating of the burial was presumably based on the badly decayed long straight sword which disintegrated immediately it was exposed. Probably, there was one, extended, male inhumation and possibly two or more cremations.

Ref. Brandish, J. Arch. XVII. 1814: 332-3.

2. Alveston, - Bradley Lodge. SP 213 554

This was an accidental find in the garden of Bradley Lodge and no information has been forthcoming. The owner is reputed to have some brooches - probably small-long ones - in her possession but they have not been dated. The discovery was made since 1939.

Ref. Meaney, A. 1964: 257.

3. Aston Cantlow. SP 134 596

N.B. Meaney's reference should be amended - the site is $\frac{1}{4}$ mile (approx.) south of the church.

A single inhumation, with hands folded across the chest, and head to the north, was found on the brow of a hill during ploughing operations in 1851. It was reported as being in a good state of preservation. By comparison with contemporary records, the burial was very carefully described and is of use for information about grave-groups but unfortunately the absence of illustrations limits its value.

Ref. Fetherstone, J. P.S.A. ser. 2. III. 1867: 424.

4. Bidford. SP 099 518

Finds: Shakespeare New Place Museum, Stratford and Worcester City Museum.

A bucket dated to the sixth century was found in 1860, stray finds were made in 1921 and the site was systematically excavated in 1922-3. A further stray find was made in 1949. Because this site was excavated by the Birmingham Archaeological Society it is one of the best recorded cemeteries in the area. Confusion does arise in the numbering of the graves in different publications and it is unfortunate that the material is so inadequately preserved and labelled as this makes the identification of the finds with those in the reports extremely difficult. The pottery is especially poorly labelled. Therefore, although the associations are known, it is difficult to reconstruct the actual grave-groups except for the unusual or especially distinctive objects. Approximately $\frac{1}{6}$ of the burials are cremations but only seven decorated pots were used. The supine inhumations, which include men, women and children, are orientated generally between south and west, where this fact is recorded, and they range in age from four years to forty-plus. Charcoal was found

in several graves as if the bodies were partially burned after being placed in the grave. Pins resembling Roman ones were found and some saucer brooches were dated to the seventh century but the bulk of the evidence is of sixth century date.

Further excavation (1970) indicates that the cemetery extends further north.

Refs. Humphreys, J. Arch. LXXIII 1923: 89-116.

" Arch. LXXIV 1925: 277-288.

Humphreys, J. Birmingham Arch. Soc., Trans. and Proc. LXIX
1923: 16-25.

" Birmingham Arch. Soc., Trans. and Proc. L
1924: 32-35.

Humphreys, J. A.N.L. I, no. 12 1949: 16.

Ford, W.J., "Bidford-on-Avon, Warws." West Midlands
Archaeological News Sheet, 1971; 14:21.

5. Long Compton - Little Rollright. SP 295 309

Finds: British Museum.

The brief account of these finds suggests that not all the objects were preserved - especially the possible saucer brooches discovered in 1836. As is usual with reports of this date, associations are not known and the site is of limited value in this study. Of the thirteen inhumations, it is known that one was buried with the head to the west and there was probably a cremation. No date has been suggested.

Ref. Beesley, T.N. Oxon. Arch. Soc., Trans. I 1853-5.

6. Compton Verney. SP 310 528

Finds: Ashmolean Museum, Oxford.

This was an eighteenth century accidental find preserved, one suspects, more for the value of the metal - gold - than the interest the discoverer had in the archaeological significance. Other than that the two pendants were with two or three skulls no more information is available except that one of the pendants is an imitation sceatta of 650-750 and so the burials may be eighth century. This was a primary barrow burial and it seems strange that nothing else was discovered.

Ref. Pegge, The Rev. Arch. III 1775: 371-5.

7. Emscote (Myton). SP 206 652

Finds: Warwick County Museum, British Museum.

One inhumation was accidentally discovered in 1851 and at least seven more inhumations were also found by chance in 1923. Both sites were in the workings of a large gravel pit and although they were widely separated there is no evidence to prove that they were part of one huge cemetery or two small burial sites because many graves could well have been destroyed without being reported. Because of the nature of the discoveries, no associations are known. The square-headed brooch, which Åberg gives as a parallel to the Barrington, Camb., find, is dated to the early seventh century.

Refs. Chatwin, P.B. Birmingham Arch. Soc., Trans. LI 1926: 39-41.

Chatwin, P.B. Ant. J. V 1925: 268-72.

8. Halford Bridge. SP 259 453

Accidental finds were made in 1790 and 1858, the latter being made during stone quarrying activities. Nothing is known of the exact location of the finds and neither discovery was well recorded or illustrated. There may have been three inhumations, of which one at

least was male, and although the orientation is recorded as north/south, in which direction the head pointed is not clear. No date has been suggested.

Ref. V.C.H.Warwickshire I 1904: 259-60.

9. Kineton. SP 326 516

This site is known from a brief mention in the P.S.A. which gives no details other than the fact that ten skeletons were found during stone quarrying operations, with a javelin and a sword to identify them as Anglo-Saxon. Roman pottery was also present but no date has been suggested.

Ref. Shirley, E.P. P.S.A. ser. 2. II 1862: 119.

10. Longbridge Park, Warwick. SP 275 632

Finds: Warwick Museum, British Museum

During gravel digging in one of the Avon terraces several inhumations were found in 1875. The finds were recorded but not the graves so it is not possible to know how many there were, nor whether others were left undisturbed. Very few associations were noted. Apparently there was no regular plan for the burials, which were in several different positions.

Ref. Burgess, J.T. Arch. J. XXXIII 1876: 378-381.

11. Meon Hill - Clopton. SP 175 454

Finds: Birmingham Museum

One inhumation burial was found in 1957, but the material has not been dated.

Ref. Birmingham Museum Records.

12. Ragley Park, Arrow. SP 079 557

Finds: Ragley Hall.

This single, female inhumation was discovered in approximately 1833. It was quite a rich burial and although no account was made of the arrangement of the objects in the grave, it does give some information about associations of objects - both Roman and Anglo-Saxon finds occurring together here. The square-headed brooch suggests a seventh century date.

Ref. Bloxam, M.H. 1840-50: 64.

13. Stratford-on-Avon, - Alveston. SP 210 547 and SP 2085 5472

Finds: Shakespeare New Place Museum, Stratford.

No detailed report has been made of this site and Warwick Museum does not appear to have the notes referred to by Meaney and so information about the number of burials, their layout and associated finds is unknown. The cemetery was discovered during gravel working.

Conflicting numbers of burials are found in Meaney's notes when compared with Wellstood's report. The finds are poorly housed, inadequately labelled and not, with the information so far discovered, likely to be reassembled in their grave-groups. If this cemetery could be reconstructed accurately, it might be of great help in understanding the nature of the relationship of successive cultures one with another in one small area for pre-Anglo-Saxon cemeteries have been found here too. The material suggests the cemetery had a long period of use, possibly from the beginning of the sixth century. Approximately one third of the burials are cremations and hearths have also been found. The sixty four or more inhumations of men, women and children, were normally

orientated with their heads to the south-west. Usually the bodies were extended but some were on the side. Charcoal was found indicating partial cremation of the body after placing it in the grave. Excavation has begun at the site again (1970) and seven inhumations and three cremations, together with grave goods, have been found.

Refs. Meaney, A. 1964: 262-3.

Wellstood, F.C. Report of Proc. of Annual Meeting of the Trustees and Guardians of Shakespeare's Birthplace 1935.

Ford, B. "Alveston Manor Hotel, Stratford-on-Avon" West Midlands Archaeological News Sheet, 1970; 13:41.

Ford, B. "Alveston, Stratford-on-Avon, Warws." West Midlands Archaeological News Sheet, 1971; 14:21.

14. Stretton on the Fosse. SP 220 381 and SP 216 383

This site is not yet fully published but sixty seven inhumations have been found with indications that the women were buried with fabric woven in the Roman-British fashion. This cemetery provides strong evidence for Celtic continuity in the West Midlands.

Refs. Ford, W.J. "Stretton-on-the-Fosse Saxon Cemetery, Warws." West Midlands Archaeological News Sheet, 1969; 12: 29.

Ford, W.J. "Stretton-on-the-Fosse, Warws." West Midlands Archaeological News Sheet, 1971; 14: 22.

Worcestershire

15. Beckford A. SO 964 355

Whilst a mechanical excavator was being operated in a gravel pit five inhumations were discovered but the graves are not certainly known to be

grave groups noted and illustrated. There were nine or more inhumations of which four were male and three were female. The burials, with heads to the west, were normally supine and Miss Cook dates them to the late-fifth-mid-sixth centuries.

Ref. Cook, J.M. Ant. J. XXXVIII 1958: 58-84.

22. Evesham. SP 040 430

Skeletons were found whilst tests were being made prior to building a new housing estate and Anglo-Saxon objects were then rescued from a spoil-heap. This material is of use in comparative studies but the size of the cemetery and associations are not generally known. One skeleton had its head to the west and presumably the cemetery contained both men and women - judging from the objects found. Baylis dates the saucer brooch to the late sixth or early seventh century.

Ref. Baylis, T.J.S. Worcs. Arch. Soc., Trans. new ser. XXXI 1954: 39-42.

23. Fladbury. SP 994 463

This site may not be strictly in place here. The Anglo-Saxon material is post-pagan in the form of an eighth-century oven and a hut, but ten Roman (or possibly pagan Anglo-Saxon ?) burials were found too, with evidence for earlier cultures. The site has not yet been fully reported and therefore no conclusions can be drawn.

Ref. Peacock, D. Current Arch. No. 5 1967: 123-124.

24. Little Hampton. SP 026 432

Finds: British Museum.

A gold union pin was discovered in 1862 at a time when the gold pin was

of greater interest than the other details of the find. This may have come from a single burial and is dated to the mid-seventh century.

Ref. Franks, A.W. P.S.A. ser. 2 III 1864: 27.

25. Upton Snodsbury. SO 944 544

Finds: Worcester City Museum.

This site was discovered by labourers in 1866 whilst digging for gravel for road repairs. They reported that the objects found were with the skeletons in a thirty foot long trench. The cruciform brooch may be late sixth or early seventh century.

Ref. Ponting, W. P.S.A. ser. 2 III 1866: 342.

Ponting, W. Arch. J. XXIV 1867: 351-3.

No number. Worcester SO 850 545

Thirty three inhumations, probably of a tenth century date have been found.

Ref. Clarke, H. 1970, "Worcester Cathedral, South Passage and College Green". West Midlands Archaeological News Sheet, 13: 40.

26. Wyre Piddle. SO 961 473

While the nave of the church was being extended, before 1888, two crouched male skeletons, facing north-east, were discovered. No date has been suggested for the grave goods.

Ref. Hopkins, Mr. Report Assoc. Archit. Studies XIX 1888: 427-8.

Gloucestershire

27. Broadwell. SP 192 271

Two crouched female bodies were found in a quarry in 1926 (approx.) but reports are too meagre to be of much use and the finds have not been dated.

Ref. Donovan, H.E. and Dunning, G.C. Bristol and Glos. Arch. Soc.,
Trans. LVIII 1936: 167.

28. Burn Ground, Hampnett. SP 105 156

Finds: Gloucester City Museum.

This excavation is well recorded and illustrated. Unfortunately the ten poorly equipped inhumations and four cremations provide little evidence and the site is of minor value in a study of the pagan grave goods. It is a secondary burial group in a barrow.

Refs. note Ant. J. XXVIII 1948: 32.

Grimes, W. 1960: 113-26.

29. Chavenage. ST 877 960

Finds: Ashmolean Museum, Oxford.

Eight or more inhumations were discovered by labourers levelling two round barrows in 1847 and the records are very brief, noting only the number of bodies, which were in stone defined graves, and the objects. These were secondary barrow burials. The grave groups are not given and no dating has been attempted.

Refs.

J.B.A.A. IV 1849: 50-54.

Playne, G.C. Proc. of Cotteswold Naturalists' Field Club. V
1872: 282.

30. Cirencester, - The Barton. SP 016 023

Finds: British Museum, Corinium Museum.

This is a poorly recorded site - the inhumations being variously described as 'Roman', 'Commonwealth' or ignored completely. Two male skeletons were found in some gravel pits under a Roman pavement but information about the finds is very confused. There may have been more inhumations and no dates have been suggested.

Refs. Buckman, J. and Newmarsh, 1850 figs. 4,5.

Whatley, E. Bristol and Glos. Arch. Soc., Trans. XIX

1895: 394-8.

31. Ebrington. SP 184 400

Finds: British Museum, Ashmolean Museum, Oxford.

Forty inhumations had been discovered in approximately 1830 but nothing more is known of them, nor of their grave goods. In 1862 eight more inhumations were found and recorded, but the associated objects are merely listed. A stray find was made at some date before 1958. There is a local tradition of a battle in the vicinity, which is near Meon Hill, and this may mean that skeletons were found earlier in this area. No dates have been suggested.

Ref. Hadow, W.E. Gent. Mag. Lib. Arch. 1862 : 176-7.

32. Fairford. SP 145 015.

Finds: Ashmolean Museum, Oxford.

This cemetery attracted much attention in the nineteenth century and the report gives us the number of inhumations (about-130) and

cremations (possibly 4) which were discovered during quarrying work. It is possible to reconstruct the associated grave groups for fifteen graves, although it is not possible to know which specific object came from any one inhumation. The cemetery contained men, women and children and usually the head was to the south. Charcoal was noted in some graves where the bodies were partially cremated after being placed in position. The nature of the report and recording of the finds at this period in archaeological research does not allow us to get as much information from this important site as one would wish. The animal ornament on some saucer brooches is Salin I and so the site may have been occupied during the early sixth century. Myres has dated one of the pots to c. 450+.

Refs. Buckman, J. Arch. J. XXV 1868: 137-8.

Smith, C.R. Arch. XXXIV 1852: 77-82.

Wylie, W.M. 1852.

33. Foxcote Manor, Withington. SP 012 180

Three crouched female inhumations were found at this site, which had pre-Roman and Roman occupation also. The contents of the graves was limited in value for comparative analysis, but they are dated tentatively to the sixth or seventh centuries.

Ref. Donovan, H.E. and Dunning, G.C. Bristol and Glos. Arch. Soc.,
Trans. LVIII 1936: 157-70.

34. Hidcote Bartrim. SP 175 428

Find: Shakespeare New Place Museum, Stratford.

There is no information about this site or its discovery which may be

an inhumation but as the finds in this museum are generally poorly labelled it may well be from another site. No date has been suggested.

Ref. The above museum.

35. Kemble I. ST 989 978

The report for this site, which was found in 1856, is typical of its period listing the objects found but not recording their associations. There were twenty-six inhumations orientated east-west. The known grave goods are few, suggesting either that this was a poor community, or a late burial group with a few people retaining the tradition of burying grave goods, or that only the objects considered by the discoverers to be of interest were recorded.

Ref. Akerman, J.Y. Arch. XXXVII 1857: 113-5.

36. Kemble II. ST 971 966

Finds: lost.

It is known that a cemetery was found at approximately 1837 in a stone quarry but all the objects were lost or sold before any record was made of them. Akerman states that the grave goods were similar to those found at Kemble I. There were many skeletons.

Ref. Akerman, J.Y. Arch. XXXVII 1857: 119.

37. Kempsford. SU 155 974

Find: Gloucester City Museum.

A single inhumation was found in 1961 during the construction of an air-field. A bronze cauldron covered the skull but details of the actual burial are not given.

Ref. Abbot, R.D. Bristol and Glos. Arch. Soc., Trans. LXXXI
1962: 196.

38. Leckhampton Hill. SO 946 186

This is an extremely dubious site and most probably was Romano-British. The finds were made in the eighteen forties. The possible Anglo-Saxon date of the finds is suggested because of the black urns with characteristic Anglo-Saxon stamps and incisions found with the two or three inhumations. The description of the urns cannot be proved or disproved as they are lost and so the site remains very suspect.

Ref. Way, A. Arch. J. XII 1855: 9 - 21.

39. Oddington. SP 216 253

Six to ten secondary inhumations in a barrow were found in 1787. Apparently they were of both sexes. The records are too meagre to be of any help in understanding the nature of this burial group - it is not known whether all or only some of the finds are recorded. No date has been suggested.

Refs. Gent. Mag. Lib. Arch. II 1787+: 292-3, 158-60.

Smith, C.R. Arch. XXXIV 1851: 82.

40. Ready Token, Poulton. SP 105 045

Finds: Gloucester City Museum.

Possibly two inhumations were discovered here in the years before 1931 - they may have been male. As nothing is published of the find no details are known of the burials and no dating has been attempted.

Ref. Meaney, A. 1964: 92-3.

41. Salmondsbury, Bourton-on-the-Water. SP 177 204

It would seem likely from the Ordnance Survey records that a cemetery

was suspected here in 1931 as seven or more inhumations were discovered. No excavation was carried out and nothing has been published from the site.

Ref. Meaney, A. 1964: 93.

42. Stow-on-the-Wold, Broadwell. SP 191 258

A single, probably male, inhumation is referred to when the Bristol and Gloucester Archaeological Society visited the locality. It may have been a warrior but nothing more is known of the site.

Ref. Royce, D. Bristol and Glos. Arch. Soc., Trans. VII 1883: 72.

43. Stratton. SP 012 038

A single, male inhumation was found a little while before 1894 in or near the ruins of a possibly Roman building. As this burial was merely mentioned in passing no more details are known.

Ref. Whatley, E. Bristol and Glos. Arch. Soc., Trans. XIX 1894-5: 397.

44. Temple Guiting. SP 123 264

This is a secondary burial in a Bronze Age round barrow beside an ancient ridgeway track. A single grave was discovered, head to the north-west, but it had been rifled in the past and the dating is speculative. Eighteen feet away was a sceatta of c. 730 A.D. There was no body and the only objects, two gaming boards, are undated. There is evidence of burning in the grave.

Ref. O'Neil, H.E. Bristol and Glos. Arch. Soc., Trans. LXXXVI

1967: 19, 26-7.

45. Upper Swell I - Pole's Wood South Barrow. SP 167 263

Finds: Ashmolean Museum, Oxford.

There is confusion in the records about this site and No. 46. Possibly three secondary inhumations were discovered here but there are references to two males, one female and an infant being found - supine - in the area in 1874.

Refs. Crawford, O.G.S. 1925: 127.

Greenwell, W. 1877: 524.

46. Upper Swell II - Pole's Wood East Barrow. SP 171 265

Finds: Stow-on-the-Wold Museum.

See No. 45. There may have been three secondary inhumations here, but the records are extremely confused.

Refs. Crawford, O.G.S. 1925: 125.

Rhodes, J.F. Bristol and Glos. Arch. Soc., Trans. LXXXIII

1964: 13-14.

Appendix Ia. Table of contents - burials, grave goods

The sites are referred to by number in the gazetteer.

Column heading numbers are listed here:

- 1 Site
- 2 Number of inhumations
- 3 Number of cremations
- 4 Date - approximate - in Roman numerals to indicate centuries
- 5 Annular brooches
- 6 Penannular brooches
- 7 Disc brooches
- 8 Applied brooches
- 9 Saucer brooches
- 10 Swastika brooches
- 11 Cruciform brooches
- 12 Great square-headed brooches
- 13 Small-long brooches
- 14 Other forms of brooch and unspecified brooch types
- 15 Bucket
- 16 Cauldron, bowl
- 17 Hanging bowl
- 18 Workbox, needles etc.
- 19 Spindle whorls
- 20 Loom weights
- 21 Plain pottery
- 22 Decorated pottery
- 23 Glass
- 24 Chatelaine
- 25 Rings
- 26 Bracelets
- 27 Wrist clasps
- 28 Beads, necklaces
- 29 Comb
- 30 Toilet implements
- 31 Buckles
- 32 Strap ends, attachment plates
- 33 Sword, chape

- 34 Shield boss, shield hand grip
 35 Spear, lance
 36 Knives

Other objects

Site Objects

- 4 whetstone, shears, 3 ?keys, Roman coins, 12 pins (R), bracteates,
 2 arrow heads, animal bones (ox, boar).
 6 2 bracteates
 8 animal bones (red deer)
 10 1 gold bracteate, 1 silver bracteate
 13 purses, Roman coins, animal bones (unspec.)
 21 rivet, 1 pin, 1 clip
 22 tab end, animal bones (unspec.)
 23 querns, oven
 24 1 gold union pin
 27 1 pin
 28 Roman coin, bone disc, bronze plate, animal bones (red deer)
 29 ear-rings, pin
 30 Roman coin, arrows
 31 1 pin, silver ornament, ?coin, horse trappings
 32 shears, box, hook, nails, rivets, 2 ear-rings, 1 belt plate, hair pin,
 4 Roman coins, horse trappings
 35 spoon (R), 2 hair pins, ear-rings, 1 Roman coin
 38 3 Roman coins, A.S.coins, horse bit
 39 pins, iron disc
 44 sceatta (c. 730), Roman coins

Abbreviations

- R Roman
 * primary burial in a barrow
 * secondary burial in a barrow
 r radiate headed brooches
 + some present but exact number unknown
 ? possibly some present.

| 1 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | | | | | | | | | | | | |
|----|----|----|----|----|----|----|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|---|---|---|---|----|---|---|
| 1 | | | | | | | ?2 (R) | | | | | 1 | | | | | | | | 1 | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | 1 | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | |
| 4 | 4 | 3 | | 2 | 1 | | ?35 | ?7 | + | 4 | 9 | 1 | ?8 | + | 5 | + | 24 | | | 1 | 11 | 33 | 72 | | | | | | | | | | | |
| 5 | | | | | | | 1 | | | | | 1 | | + | | | | | | | | | 1 | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | 1 | 2 | | | | 1 | | | + | | | | | | + | 4 | | | | | | | | | | | | | |
| 8 | | | | | | | + | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | | | | | | | | | | |
| 9 | | | | | | | R | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | | | | |
| 10 | 3 | | | | | | | | 1 | 1 | 1 | 1 | 1 | + | | | | | | | 1 | 6 | + | + | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | | | | | | | | | | | |
| 12 | | | | | | + | | | | | | | | | | | | | | | | | | 1/2 | | | | | | | | | | |
| 13 | 2 | + | | | | 1 | 25+ | 2+ | | | | + | + | | + | | | | | | + | 16 | | 6 | 14 | 21 | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | | | | | | | | |
| 16 | | | | | | | + | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | + | 1+ | | 1 | | | | + | | | | | | | | | | 1 | 2 | 1 | | | | | | | | |
| 18 | | | | | | | | | | | | | | | + | | | | | | | | | 1 | 4 | 4 | 1 | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | 2 | | | | | | | | | | | 5 | | | + | | | | | | | | | 4 | 2 | 1 | 2 | 2 | 5 | | | | | |
| 22 | | | | | | | | | | | | 1 | | | + | | | | | | | | | | | | ?1 | 1 | | | | | | |
| 23 | | | | | | | + | + | | | | | | | | | | | | | | | | | | | | | + | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 6 | | | |
| 26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | | |
| 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | |
| 28 | | | | | | | 1 | 3 | | | | | | | + | | | | | | | | | | | | | | | 3 | 6 | | | |
| 29 | | | | | | | | | | | | 1 | | | + | | | | | | | | | | | | | | | 1 | + | + | | |
| 30 | | | | | | | + | + | | | | | | | | | | | | | | | | | | | | | | | 1 | 2+ | + | 1 |

The Corpora

Abbreviations used

No. These refer to the appropriate photographic files in the Department of Archaeology, University of Durham.

| | | |
|---------|------------|---|
| Museums | A.M. | Ashmolean Museum, Oxford. |
| | B'ham | Birmingham City Museum, Birmingham. |
| | B.M. | British Museum, London. |
| | Camb. | Museum of Archaeology and Ethnology, Cambridge. |
| | Cov. | Herbert Museum, Coventry. |
| | Glos. | Gloucester City Museum, Gloucester. |
| | Northants. | Northampton County Museum, Northampton. |
| | Southend. | Southend-on-Sea Museum. |
| | Stratford. | New Place Museum, Stratford-on-Avon. |
| | Warwick. | County Museum, Warwick. |
| | Worcs. | City Museum, Worcester. |

Note. Some of the Camb. photographs were taken by another member of the Archaeology Department, who has not made the exact provenance of each small-long brooch available, but numbers 1-50 of that sample are from the Camb. region. It was considered more important to include as wide a range of material as was possible than to risk missing any significant features these brooches may show by omitting them.

The shield-boss sample. (for Table I).

| <u>Boss no.</u> | <u>Provenance.</u> | <u>Museum.</u> | <u>Boss no.</u> | <u>Provenance.</u> | <u>Museum</u> |
|-----------------|--------------------|----------------|-----------------|--------------------|--------------------------------|
| 1 | Fairford | A.M. | 29-31 | Fairford | A.M. |
| 2 | Blockley | A.M. | 32 | Meon Hill | Warwick. |
| 3-4 | Alveston | Stratford | 33 | Alveston | Stratford |
| 5-7 | Fairford | A.M. | 34 | Enscote (Myton) | B.M. |
| 8 | Bidford-on-Avon | Stratford | 35-38 | Longbridge | B.M. |
| 9-11 | Fairford | A.M. | 39 | Baginton | Cov. |
| 12-14 | Bidford-on-Avon | Worcs. | 40-41 | Marton | Warwick. |
| 15 | Fairford | A.M. | 42 | Churchover | Warwick. |
| 16-18 | Bidford-on-Avon | Worcs. | 43-48 | Baginton | Cov. |
| 19 | Ready Token | Glos. | 49-54 | Bensford Bridge | Warwick. |
| 20-24 | Alveston | Stratford | 55-57 | Baginton | Cov. |
| 25-28 | Eckington? | Worcs. | 58 | Napton | Leamington Spa (Library) |

The Shield-boss Sample. Table I.

| No. | Features. | No. | Features. |
|-----|--------------------|-----|--------------------|
| 1; | 2,4,7,11,15,17,21, | 30; | 1,5,8,10,14,16,19, |
| 2; | 1,4,8,10,13,18,20, | 31; | 1,5,9,11,13,16,19, |
| 3; | 1,5,8,11,13,16, | 32; | 1,5,10,15,17,19, |
| 4; | 2,5,8,11,13,17, | 33; | 1,5,8,11,13,16,21, |
| 5; | 1,5,8,11,14,17,19, | 34; | 1,5,8,11,13,17,21, |
| 6; | 2,4,8,11,14,18,19, | 35; | 2,4,9,11,15,17,19, |
| 7; | 1,4,8,11,13,17,20, | 36; | 2,5,8,11,15,17,19, |
| 8; | 2,5,9,11,13,17,19, | 37; | 2,5,8,11,15,17,21, |
| 9; | 2,4,8,11,14,17,21, | 38; | 2,6,8,10,14,16,19, |
| 10; | 2,5,8,10,13,18,20, | 39; | 2,6,9,12,13,17,19, |
| 11; | 1,5,8,10,14,16,20, | 40; | 2,5,8,10,14,17,21, |
| 12; | 2,4,11,14,17,21, | 41; | 4,18,21, |
| 13; | 2,5,8,11,13,17,19, | 42; | 1,5,8,12,15,17,20, |
| 14; | 2,5,8,11,13,17,19, | 43; | 1,5,8,11,15,17,19, |
| 15; | 1,5,8,11,13,17,19, | 44; | 6,16, |
| 16; | 1,8,11,15,17, | 45; | 1,5,8,11,14,18,21, |
| 17; | 2,5,11,14,17,20, | 46; | 2,6,7,11,15,17,21, |
| 18; | 2,8,11,15,17,20, | 47; | 1,5,8,11,15,17,19, |
| 19; | 1,5,8,11,15,17,20, | 48; | 6,16, |
| 20; | 2,4,8,12,14,16,20, | 49; | 1,5,8,10,14,17,19, |
| 21; | 2,5,8,11,15,16,19, | 50; | 2,6,7,11,15,17,20, |
| 22; | 2,4,8,10,13,17,20, | 51; | 1,5,7,11,14,17,20, |
| 23; | 2,5,8,11,14,16,19, | 52; | 1,5,8,12,15,17, |
| 24; | 2,5,9,12,13,17,19, | 53; | 17,20, |
| 25; | 2,6,8,12,15,17,19, | 54; | 1,5,8,11,14,17,20, |
| 26; | 2,5,8,11,14,17,19, | 55; | 1,6,8,11,13,17,19, |
| 27; | 1,6,8,11,15,16, | 56; | 1,5,8,11,15,17, |
| 28; | 1,6,11,13,17, | 57; | 3,5,7,11,15,16,19, |
| 29; | 1,5,8,11,14,17,20, | 58; | 3,6,7,10,13,16, |

Binary variable frequencies.

26,26,2,10,34,11,6,39,5,10,38,6,18,17,19,14,39,5,23,15,10,

Percentage occurrence for binary variables.

8; 67.3: 17; 67.3: 11; 65.6: 5; 58.7: 2; 44.9: 1; 44.9: 19; 39.7:
 15; 32.8: 13; 31.1: 14; 29.4: 20; 25.9: 16; 24.2: 6; 19.0: 4; 17.3:
 21; 17.3: 10; 17.3: 7; 10.4: 12; 10.4: 18; 8.7: 9; 8.7: 3; 3.5:

The saucer and applied brooch corpus (for Table II).

| <u>Brooch</u> <u>no.</u> | <u>Provenance.</u> | <u>Museum.</u> | <u>Brooch</u> <u>no.</u> | <u>Provenance.</u> | <u>Museum</u> |
|-----------------------------|--------------------|----------------|-----------------------------|--------------------|---------------|
| 1-2 | Haslingfield | Camb. | 67-81 | Long Wittenham | B.M. |
| 3-4 | Barrington B | Camb. | 82-86 | Longbridge | B.M. |
| 5-6 | Cambridge | Camb. | 87-90 | Linton Heath | Camb. |
| 7 | Holywell Row | Camb. | 91 | Leighton | |
| 8 | Barrington B | Camb. | | Buzzard I | B.M. |
| 9-10 | Little | | 92-103 | Kempston | B.M. |
| | Wilbraham | Camb. | 104 | Kempston | A.M. |
| 11-15 | Barrington | Camb. | 105-106 | Kemble I | |
| 16 | Cassington | A.M. | 107-108 | Islip | Northants. |
| 17-18 | Cratendune | Camb. | 109-111 | Howletts | B.M. |
| 19 | Coleshill | | 112-113 | Horton | B.M. |
| 20-21 | Winchester | B.M. | 114-115 | Holdenby | Northants. |
| 22-24 | Wheatley | A.M. | 116 | Haslingfield | A.M. |
| 25 | Upton Snodsbury | Worcs. | 117-121 | Haslingfield | Camb. |
| 26 | Stone II | B.M. | 122-123 | Haslingfield | A.M. |
| 27 | Standlake | A.M. | 124 | Harwell | A.M. |
| 28-29 | Southend-on-Sea | Southend | 125-132 | Harnham Hill | B.M. |
| 30 | Silchester | A.M. | 133-134 | Frilford I | A.M. |
| 31-32 | Shefford | Camb. | 135-136 | Frilford | B.M. |
| 33-36 | Remenham | B.M. | 137-140 | Frilford | A.M. |
| 37-38 | Petersfinger | | 141 | Filkins | A.M. |
| 39-40 | Northampton | Northants. | 142 | Faversham | B.M. |
| 41-42 | Newnham | Northants. | 143-144 | Fairford | A.M. |
| 43-44 | Mitchell's Hill | A.M. | 145 | Fairford | B.M. |
| 45-48 | Mitcham | Camb. | 146-148 | Fairford | A.M. |
| 49-53 | Mitcham | B.M. | 149 | Fairford | B.M. |
| 54 | Mildenhall | A.M. | 150-151 | Fairford | A.M. |
| 55-56 | Mentmore | B.M. | 152 | Fairford | B.M. |
| 57 | Marston | Warwick | 153-164 | Fairford | A.M. |
| 58-59 | Marston | | 165 | Evesham | |
| | St. Lawrence | Northants. | 166 | Emscote (Myton) | B.M. |
| 60-66 | Luton | | 167 | Emscote (Myton) | Warwick. |

The saucer and applied sample (contd.)

| <u>Brooch</u> <u>no.</u> | <u>Provenance.</u> | <u>Museum.</u> | <u>Brooch</u> <u>no.</u> | <u>Provenance.</u> | <u>Museum.</u> |
|-----------------------------|------------------------|----------------|-----------------------------|--------------------|----------------|
| 168 | Emscote (Myton) | B.M. | 246 | Beddington | Camb. |
| 169-172 | East Shefford | B.M. | 247 | Barrington B | A.M. |
| 173 | East Shefford | A.M. | 248-249 | Barrington B | Camb. |
| 174-178 | East Shefford | B.M. | 250 | Barrington B | A.M. |
| 179-190 | Duston | Northants. | 251-253 | Barrington A | A.M. |
| 191-193 | Droxford | B.M. | 254 | Barrington A | Camb. |
| 194 | Croydon | B.M. | 255-256 | Barrington A | A.M. |
| 195 | Chavenage (Avening) | A.M. | 257 | Barrington A | Camb. |
| 196-201 | Cassington I | A.M. | 258-260 | Baginton | Cov. |
| 202 | Cambridge | Camb. | 261-271 | Alveston | Stratford |
| 203-204 | Cambridge I | Camb. | 272-273 | Abingdon | A.M. |
| 205 | Burn Ground | Glos. | 274 | near Abingdon | A.M. |
| 206-207 | Broughton Poggs | A.M. | 275-287 | Abingdon | A.M. |
| 208 | Broughton Poggs | | 288-289 | Abingdon I | A.M. |
| 209-211 | Broadway | | 290-291 | near Abingdon I | A.M. |
| 212-222 | Brighthampton | A.M. | 292-294 | unknown | B.M. |
| 223-244 | Bidford | Stratford | 295 | unknown | Camb. |
| 245 | Beddington | A.M. | 296 | unknown | B.M. |

The small-long brooch corpus (For Table III)

| <u>Brooch no.</u> | <u>Provenance</u> | <u>Museum</u> | <u>Brooch no.</u> | <u>Provenance</u> | <u>Museum</u> |
|-------------------|-------------------------|-------------------------|-------------------|-------------------|-------------------------|
| 1-50 | ?Camb. | Camb. | 159 | Hauxton | Camb. |
| 51-52 | Little Wilbraham | Camb. | 160-166 | Haslingfield | A.M. |
| 53-54 | Barrington A | Camb. | 167-173 | Haslingfield | Camb. |
| 55-56 | Barrington B | Camb. | 174-176 | Haslingfield | A.M. |
| 57 | Exning | Camb. | 177-180 | Haslingfield | Camb. |
| 58-59 | Little Wilbraham | Camb. | 181-190 | Haslingfield | A.M. |
| 60-61 | Holywell Row | Camb. | 191 | Harwell | A.M. |
| 62 | Wheatley | A.M. | 192-202 | Girton | Camb. |
| 63 | West Stow | A.M. | 203-206 | Frilford | A.M. |
| 64 | West Stow | Camb. | 207-210 | Freckenham | Camb. |
| 65-66 | Wallingford | A.M. | 211 | Fornham | Camb. |
| 67 | Upton Snodsbury | Worcs. | 212-214 | Filkins | A.M. |
| 68-73 | Trumpington | Camb. | 215-220 | Fairford | A.M. |
| 74 | Soham | Camb. | 221-232 | Exning | Camb. |
| 75-76 | Rothwell | Camb. | 233 | Emscote | B.M. |
| 77-78 | Rothwell | A.M. | 234 | East Shefford | A.M. |
| 79-83 | Rothwell | Camb. | 235-240 | Duston | N ^o rthants. |
| 84 | Mildenhall | B ^o ham. | 241 | Dovercourt | A.M. |
| 85 | near Mildenhall | A.M. | 242-243 | Darlington | A.M. |
| 86-89 | Marston St. Lawrence | N ^o rthants. | 244 | Churchover | A.M. |
| 90-94 | Marston St. Lawrence | A.M. | 245-262 | Chessell Down | B.M. |
| 95-96 | Long Wittenham | A.M. | 263-267 | Chatham Lines | A.M. |
| 97-98 | Longbridge | B.M. | 268-284 | Cambridge | Camb. |
| 99 | Londesbrough | Camb. | 285-288 | Broughton Poggs | A.M. |
| 100-123 | Little Wilbraham | Camb. | 289-293 | Brixworth | N ^o rthants. |
| 124 | Little Downham | Camb. | 294-299 | Brighthampton | A.M. |
| 125-133 | Linton Heath | Camb. | 300 | Blockley | A.M. |
| 134-142 | Lakenheath | Camb. | 301-323 | Bidford-on-Avon | Stratford. |
| 143 | Kenninghall | A.M. | 324-329 | Bensford Bridge | Warw. |
| 144 | Islip | N ^o rthants. | 330-335 | Barrington | A.M. |
| 145-152 | Icklingham | A.M. | 336 | Barrington B | A.M. |
| 153-155 | Holywell Row | Camb. | 337 | Barrington | A.M. |
| 156-158 | Holdenby | N ^o rthants. | 338 | Barrington A | A.M. |
| | | | 339 | Barrington B | Camb. |

Small-long brooch corpus (cont.)

| | | | | | |
|---------|-----------------|-------|---------|--------------|-------|
| 340-343 | Barrington | A.M. | 387-409 | Barrington A | Camb. |
| 344-356 | Barrington B | Camb. | 410-412 | Barrington B | A.M. |
| 357-359 | Barrington (?A) | A.M. | 413-427 | Baginton | Cov. |
| 360-386 | Barrington B | Camb. | 428-431 | Abingdon | A.M. |

The pottery corpus (for Table IV)

| <u>Pot no.</u> | <u>Museum</u> | <u>Pot no.</u> | <u>Museum</u> |
|----------------|--------------------------|----------------|---------------------------|
| 1 | Gloucester A2564 | 39 | Stratford S/A62 |
| 2 | Gloucester A2568 | 40 | Stratford S/A63 |
| 3 | Gloucester A2567 | 41 | Stratford S/A64 |
| 4 | (Bourton-on-the-Water) | 42 | Stratford 15 |
| 5 | (Bourton-on-the-Water) | 43 | Stratford 20 |
| 6 | (Bourton-on-the-Water) | 44 | Stratford 29 |
| 7 | (Bourton-on-the-Water) | 45 | Stratford S/A90 |
| 8 | (Bourton-on-the-Water) | 46 | Stratford 10 |
| 9 | (Bourton-on-the-Water) | 47 | Stratford S/A12 |
| 10 | (Bourton-on-the-Water) | 48 | Stratford S/A77 |
| 11 | Warwick (Burton Dassett) | 49 | Stratford 11 |
| 12 | (Fairford) | 50 | Stratford S/A8 |
| 13 | B.M.1925, 6-8, 10 | 51 | Stratford 37 |
| 14 | Ashmolean - | 52 | Stratford 138 |
| 15 | Worcester 1965:54 | 53 | Stratford 22 |
| 16 | Worcester 1965:53 | 54 | Stratford 187 |
| 17 | Stratford S/A43 | 55 | Stratford - |
| 18 | Stratford - | 56 | Stratford - |
| 19 | Stratford S/A13 | 57 | Stratford 155 |
| 20 | Stratford - | 58 | Stratford 51 |
| 21 | Stratford - | 59 | Stratford 93 |
| 22 | Stratford - | 60 | Stratford 42 |
| 23 | Stratford - | 61 | Stratford 87 |
| 24 | Stratford - | 62 | Gloucester A2566 |
| 25 | Stratford 145 | 63 | Warwick (Long Itchington) |
| 26 | Stratford 38 | 64 | Warwick A58 |
| 27 | Stratford 137 | 65 | Warwick (Marton) |
| 28 | Stratford 55 | 66 | Warwick (Marton) |
| 29 | Stratford - | 67 | Coventry A/1014/67 |
| 30 | Stratford - | 68 | Coventry A/1014/54 |
| 31 | Stratford 80 | 69 | Coventry A/1014/43 |
| 32 | Stratford 68 | 70 | Coventry A/1014/38 |
| 33 | Stratford 213 | 71 | Coventry A/1014/34 |
| 34 | Stratford 80 | 72 | Coventry A/1014/24 |
| 35 | Stratford - | 73 | Coventry A/1014/18 |
| 36 | Stratford - | 74 | Coventry A/1014/12 |
| 37 | Stratford S/A1935 | 75 | Coventry A/1014/9 |
| 38 | Stratford S/A4 | 76 | Coventry A/1014/7 |

Pottery corpus (continued)

| | | | |
|-----|--------------------|-----|-----------------------|
| 77 | Coventry A/1014/3 | 103 | Coventry A/1014/55 |
| 78 | Coventry A/1014/2 | 104 | Coventry A/1014/48 |
| 79 | Coventry A/1014/1 | 105 | Coventry - |
| 80 | Coventry A/1014/50 | 106 | Coventry A/1014/8 |
| 81 | Coventry A/1014/36 | 107 | Coventry A/1014/5 |
| 82 | Coventry A/1014/51 | 108 | Coventry A/1014/20 |
| 83 | Coventry A/1014/37 | 109 | Coventry A/1014/21 |
| 84 | Coventry A/1014/29 | 110 | Coventry A/1014/27 |
| 85 | Coventry A/1014/63 | 111 | Coventry A/1014/6 |
| 86 | Coventry A/1014/62 | 112 | Coventry A/1014/33 |
| 87 | Coventry A/1014/61 | 113 | Coventry A/1014/31 |
| 88 | Coventry A/1014/60 | 114 | Coventry A/1014/19 |
| 89 | Coventry A/1014/52 | 115 | Coventry A/1014/53 |
| 90 | Coventry A/1014/41 | 116 | Coventry A/1014/40 |
| 91 | Coventry A/1014/56 | 117 | Coventry A/1014/42 |
| 92 | Coventry A/1014/22 | 118 | Coventry A/1014/11 |
| 93 | Coventry A/1014/49 | 119 | Coventry A/1014/10 |
| 94 | Coventry A/1014/39 | 120 | Coventry A/1014/13 |
| 95 | Coventry A/1014/25 | 121 | Coventry A/1014/14 |
| 96 | Coventry A/1014/35 | 122 | Coventry A/1014/16 |
| 97 | Coventry 49/14 | 123 | Coventry A/1014/17 |
| 98 | Coventry A/1014/23 | 124 | Coventry A/1014/15 |
| 99 | Coventry A/1014/45 | 125 | Leamington (Baginton) |
| 100 | Coventry A/1014/32 | 126 | Birmingham A/1014/26 |
| 101 | Coventry A/1014/44 | 127 | Birmingham A/1014/28 |
| 102 | Coventry - | 128 | Birmingham A/1014/4 |

Table V. The Charters Used

Sawyer

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 |
| 63 | 64 | 70 | 73 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 83 | 84 |
| 89 | 94 | 95 | 97 | 99 | 101 | 102 | 103 | 109 | 112 | 113 | 114 | 115 |
| 116 | 117 | 118 | 120 | 121 | 122 | 124 | 126 | 133 | 137 | 139 | 141 | 142 |
| 145 | 146 | 147 | 148 | 154 | 155 | 163 | 167 | 171 | 172 | 174 | 179 | 180 |
| 181 | 182 | 185 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 198 | 199 | 201 |
| 202 | 203 | 205 | 206 | 207 | 209 | 211 | 212 | 215 | 216 | 218 | 219 | 222 |
| 223 | 226 | 231 | 234 | 269 | 305 | 320 | 322 | 401 | 404 | 406 | 412 | 414 |
| 415 | 428 | 467 | 544 | 550 | 553 | 576 | 579 | 610 | 633 | 664 | 720 | 726 |
| 731 | 751 | 773 | 786 | 788 | 833 | 841 | 862 | 873 | 886 | 891 | 896 | 898 |
| 901 | 906 | 911 | 935 | 937 | 967 | 991 | 1000 | 1026 | 1038 | 1043 | 1052 | 1057 |
| 1058 | 1097 | 1143 | 1144 | 1145 | 1146 | 1156 | 1157 | 1158 | 1159 | 1169 | 1174 | 1175 |
| 1177 | 1185 | 1187 | 1214 | 1223 | 1226 | 1227 | 1232 | 1238 | 1250 | 1251 | 1254 | 1255 |
| 1257 | 1260 | 1261 | 1262 | 1272 | 1273 | 1278 | 1279 | 1280 | 1281 | 1282 | 1283 | 1289 |
| 1290 | 1297 | 1298 | 1299 | 1300 | 1301 | 1302 | 1303 | 1304 | 1305 | 1306 | 1308 | 1309 |
| 1310 | 1312 | 1313 | 1314 | 1315 | 1316 | 1317 | 1318 | 1319 | 1320 | 1321 | 1322 | 1323 |
| 1324 | 1325 | 1326 | 1327 | 1329 | 1330 | 1331 | 1332 | 1333 | 1334 | 1335 | 1336 | 1337 |
| 1338 | 1339 | 1340 | 1341 | 1342 | 1343 | 1344 | 1345 | 1346 | 1347 | 1348 | 1349 | 1350 |
| 1351 | 1352 | 1353 | 1355 | 1356 | 1357 | 1359 | 1360 | 1361 | 1362 | 1363 | 1364 | 1365 |
| 1366 | 1367 | 1368 | 1369 | 1370 | 1372 | 1373 | 1374 | 1381 | 1384 | 1385 | 1388 | 1392 |
| 1393 | 1394 | 1395 | 1396 | 1397 | 1398 | 1399 | 1405 | 1406 | 1408 | 1409 | 1411 | 1413 |
| 1415 | 1416 | 1421 | 1423 | 1424 | 1426 | 1429 | 1430 | 1431 | 1432 | 1433 | 1436 | 1437 |
| 1441 | 1442 | 1446 | 1459 | 1460 | 1475 | 1480 | 1488 | 1501 | 1510 | 1534 | 1536 | 1548 |
| 1550 | 1552 | 1553 | 1554 | 1555 | 1556 | 1573 | 1587 | 1590 | 1591 | 1592 | 1593 | 1594 |
| 1596 | 1598 | 1599 | 1600 | 1601 | 1664 | 1692 | 1782 | 1822 | 1826 | 1827 | 1839 | 1861 |

Birch

30 174 297 297A 297B

Kemble

289 815

Finberg

5 7 17 31 45 47 60 74 81 236 267 412

SHIELD-BOSS FEATURES AND CODE NUMBERS

| <u>Code no.</u> | <u>Meaning</u> | |
|-----------------|---|--|
| 1. | Height - less than mean | ($\leq 3\frac{5}{8}$ ") |
| 2. | Height - mean plus σ | ($3\frac{3}{4}$ " - $5\frac{1}{4}$ " inclusive) |
| 3. | Height - greater than mean plus 2σ | ($\geq 5\frac{3}{8}$ ") |
| 4. | Dome diameter - less than mean minus σ | ($\leq 4\frac{1}{4}$ ") |
| 5. | Dome diameter - mean $\pm \sigma$ | ($4\frac{3}{8}$ " - $5\frac{1}{8}$ " inclusive) |
| 6. | Dome diameter - greater than mean plus σ | ($\geq 5\frac{1}{4}$ ") |
| 7. | Flange width - less than mean minus σ | ($\leq \frac{5}{8}$ ") |
| 8. | Flange width - mean $\pm \sigma$ | ($\frac{3}{4}$ " - $1\frac{1}{4}$ " inclusive) |
| 9. | Flange width - greater than mean plus σ | ($\geq 1\frac{3}{8}$ ") |
| 10. | Waist - concave |) (|
| 11. | Waist - straight | |
| 12. | Waist - sloping | / \ |
| 13. | Shoulder - marked carination | ∟ ∟ |
| 14. | Shoulder - slight carination | ∟ |
| 15. | Shoulder - no carination | / |
| 16. | Dome - convex | (\ |
| 17. | Dome - straight | / \ |
| 18. | Dome - concave | ∩ |
| 19. | Spike terminal - large button | |
| 20. | Spike terminal - small button, flattened end of spike | |
| 21. | Spike terminal - point (or decayed terminal) | |

Table Ia. Shield-boss features

Saucer and applied brooch features and code numbers

| <u>Code no.</u> | <u>Meaning</u> |
|-----------------|-------------------------------------|
| 1. | Square |
| 2. | Cross |
| 3. | Heart |
| 4. | Mask - in centre |
| 5. | Mask - in field |
| 6. | Star |
| 7. | Petal |
| 8. | Scroll, spiral. |
| 9. | Catherine wheel |
| 10. | Legs |
| 11. | Zoomorphic |
| 12. | Plait |
| 13. | Guilloche |
| 14. | Tooth, zig-zag |
| 15. | Light and shade |
| 16. | ∪ |
| 17. | Triangle |
| 18. | Egg and tongue |
| 19. | Dots, bull's eye |
| 20. | (o) (o) |
| 21. | Ribbing |
| 22. | oo ≅ oo ≅ oo |
| 23. | Imitation jewel, wedges - in centre |
| 24. | Imitation jewel - in field |
| 25. | Applied method of manufacture |
| 26. | Saucer, cast method of manufacture |

Table IIa. Saucer and applied brooch features

Small-long brooch features and code numbers

| <u>Code no.</u> | <u>Meaning</u> |
|-----------------|--|
| 1. | Lappets |
| 2. | Finial |
| 3. | Base of foot - notched, lobed, complex |
| 4. | Base of foot - convex |
| 5. | Base of foot - straight |
| 6. | Sides of foot - convex |
| 7. | Sides of foot - concave |
| 8. | Sides of foot - straight |
| 9. | Bow - faceted |
| 10. | Bow - median ridge |
| 11. | Bow - plain |
| 12. | Head details - appendages |
| 13. | Head details - notches |
| 14. | Head details - holes |
| 15. | Head details - panel (imitation or real) |
| 16. | Sides of head-plate - complex |
| 17. | Sides of head-plate - convex |
| 18. | Sides of head-plate - concave |
| 19. | Sides of head-plate - straight |
| 20. | Decoration - simple punched repetitive design |
| 21. | Decoration - complex, often with jewel, chip-carving |
| 22. | Decoration - none |

Table IIIa. Small-long-brooch features

Table IVa. Pottery features and code numbers

All measurements are to one decimal place, in inches, and the first fourteen categories have been selected by the use of the mean for the total sample and the apparently most significant standard deviations. This is an artificial subdivision of the sample which might be classified more accurately by the use of continuous variables rather than binary variables but the latter are more suited to the classification of decorative features.

For details of each pot see Table IV.

| <u>Code no.</u> | <u>Limits and meaning</u> |
|-----------------|--|
| 1. | $\leq .7$ ratio. Mouth diam: max. diam. |
| 2. | $> .7$ ratio. Mouth diam: max. diam. |
| 3. | $\leq .7$ ratio. Height: max. diam. |
| 4. | .8, .9 ratio. Height: max. diam. |
| 5. | ≥ 1.0 ratio. Height: max. diam. |
| 6. | $\leq .3$ ratio. Base diam: max. diam. |
| 7. | .4, .5 ratio. Base diam: max. diam. |
| 8. | $\geq .6$ ratio. Base diam: max. diam. |
| 9. | ≤ 4.4 Maximum diameter |
| 10. | 4.5 - 9.4 Maximum diameter |
| 11. | 9.5 - 13.4 Maximum diameter |
| 12. | $\leq .3$ ratio. Variation of thickness: average thickness of fabric |
| 13. | .4 - .7 ratio. Variation of thickness: average thickness of fabric |
| 14. | $\geq .8$ ratio. Variation of thickness: average thickness of fabric |
| 15. | Structure - unrestricted |
| 16. | Structure - simple restricted |
| 17. | Structure - independent restricted |
| 18. | Contour - simple |
| 19. | Contour - inflected |
| 20. | Contour - composite |
| 21. | Contour - complex |
| 22. | Geometric shape - spherical |
| 23. | Geometric shape - ovaloid |
| 24. | Geometric shape - inverted ovaloid |

25. Rim angle - inturned
26. Rim angle - everted
27. Rim angle - upright
28. Rim profile - straight
29. Rim profile - curved
30. Rim profile - thickened
31. Rim profile - unthickened
32. Base - unmoulded
33. Base - moulded
34. Base - sagging
35. Base - flat
36. Base - dished
37. Fabric - included vegetable matter
38. Fabric - uniform paste
39. Fabric - non-uniform paste
40. Fabric surface appearance - smooth
41. Fabric surface appearance - fine
42. Fabric surface appearance - sandy
43. Fabric surface appearance - gritty
44. Finish - unslipped/unburnished
45. Finish - unslipped/burnished
46. Finish - pimply/unburnished
47. Paste colour - even
48. Paste colour - uneven
49. Paste colour - brown
50. Paste colour - black
51. Workmanship - apparently even firing
52. Workmanship - apparently uneven firing
53. Workmanship - apparently good finish
54. Workmanship - apparently medium quality finish
55. Workmanship - apparently poor finish
56. Bosses - applied
57. Bosses - pierced
58. Bosses - vertical
59. Bosses - horizontal
60. Bosses - long

61. Position of decoration - on neck
62. Position of decoration - above max. diam.
63. Position of decoration - below max. diam.
64. Arrangement of decoration - horizontal
65. Arrangement of decoration - vertical
66. Type of decoration - simple linear
67. Type of decoration - complex linear
68. Type of decoration - stamps in restricted bands
69. Type of decoration - stamps in panels
70. Type of decoration - stamps in clusters

Table III. The small-brooch sample.

NUMBER OF CASES = 431
NUMBER OF BINARY VARIABLES = 22
NUMBER OF NUMERIC VARIABLES = 0

BINARY DATA FILED
COEFFICIENTS MATRIX NOT FILED

RAM BINARY DATA

Table with 22 columns representing binary variables and rows for each sample from 1 to 431. Each row contains a sequence of 0s and 1s.

BINARY VARIABLE FREQUENCIES

Table showing the frequency of each binary variable across the samples, with values ranging from 1 to 309.

PERCENTAGE OCCURRENCE FOR BINARY VARIABLES

Table showing the percentage occurrence for each binary variable, with values ranging from 0.23 to 71.47.

PCTS Table IV. The pottery sample.

NUMBER OF CASES = 128
 NUMBER OF BINARY VARIABLES = 70
 NUMBER OF NUMERIC VARIABLES = 0

BINARY DATA FILED
 COEFFICIENTS MATRIX NOT FILED
 NUMERIC DATA FILE ABSENT

RAW BINARY DATA

| | | | | | | | | | | | | | | | | | | | |
|-----------|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| SAMPLE 1 | LENGTH 20 | 2 | 4 | 7 | 10 | 13 | 17 | 19 | 22 | 26 | 28 | 30 | 32 | 34 | 37 | 42 | 44 | 48 | 49 |
| SAMPLE 2 | LENGTH 25 | 52 | 55 | 7 | 10 | 13 | 17 | 21 | 22 | 26 | 29 | 31 | 32 | 34 | 39 | 43 | 44 | 48 | 49 |
| SAMPLE 3 | LENGTH 27 | 52 | 55 | 62 | 64 | 65 | 67 | 68 | 22 | 26 | 28 | 31 | 32 | 35 | 39 | 42 | 43 | 45 | 48 |
| SAMPLE 4 | LENGTH 19 | 49 | 50 | 52 | 54 | 61 | 62 | 64 | 66 | 68 | 27 | 28 | 31 | 32 | 35 | 39 | 42 | 44 | 47 |
| SAMPLE 5 | LENGTH 19 | 54 | 2 | 4 | 7 | 9 | 13 | 15 | 19 | 26 | 29 | 31 | 32 | 35 | 39 | 42 | 44 | 48 | 49 |
| SAMPLE 6 | LENGTH 20 | 54 | 1 | 5 | 6 | 9 | 13 | 17 | 20 | 23 | 26 | 29 | 31 | 32 | 34 | 39 | 42 | 44 | 48 |
| SAMPLE 7 | LENGTH 16 | 52 | 54 | 11 | 13 | 17 | 19 | 22 | 26 | 28 | 31 | 37 | 42 | 44 | 48 | 49 | 52 | 54 | |
| SAMPLE 8 | LENGTH 16 | 2 | 10 | 13 | 17 | 19 | 22 | 26 | 28 | 31 | 39 | 42 | 44 | 48 | 49 | 52 | 54 | | |
| SAMPLE 9 | LENGTH 20 | 2 | 2 | 4 | 6 | 10 | 13 | 16 | 20 | 23 | 26 | 29 | 31 | 32 | 34 | 39 | 42 | 44 | 48 |
| SAMPLE 10 | LENGTH 17 | 52 | 54 | 10 | 13 | 17 | 19 | 22 | 26 | 28 | 31 | 39 | 41 | 42 | 44 | 48 | 49 | 52 | 55 |
| SAMPLE 11 | LENGTH 16 | 2 | 10 | 13 | 17 | 19 | 22 | 27 | 28 | 31 | 39 | 41 | 44 | 47 | 50 | 52 | 54 | | |
| SAMPLE 12 | LENGTH 20 | 2 | 5 | 7 | 10 | 13 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 35 | 39 | 43 | 44 | 48 | 49 |
| SAMPLE 13 | LENGTH 20 | 52 | 54 | 2 | 4 | 7 | 9 | 13 | 17 | 19 | 27 | 28 | 31 | 32 | 35 | 39 | 43 | 44 | 48 |
| SAMPLE 14 | LENGTH 26 | 54 | 55 | 2 | 3 | 7 | 9 | 12 | 17 | 21 | 24 | 26 | 29 | 31 | 32 | 34 | 39 | 42 | 44 |
| SAMPLE 15 | LENGTH 20 | 52 | 53 | 58 | 60 | 61 | 62 | 64 | 66 | 22 | 26 | 28 | 31 | 32 | 34 | 39 | 42 | 46 | 48 |
| SAMPLE 16 | LENGTH 20 | 2 | 4 | 7 | 9 | 13 | 17 | 19 | 22 | 26 | 28 | 31 | 32 | 34 | 39 | 42 | 44 | 48 | 49 |
| SAMPLE 17 | LENGTH 17 | 52 | 54 | 2 | 4 | 7 | 10 | 13 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 34 | 39 | 42 | 44 |
| SAMPLE 18 | LENGTH 16 | 52 | 54 | 7 | 10 | 13 | 17 | 19 | 24 | 32 | 34 | 39 | 42 | 43 | 44 | 47 | 49 | 52 | 54 |
| SAMPLE 19 | LENGTH 18 | 7 | 10 | 13 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 34 | 37 | 42 | 46 | 48 | 49 | 52 | 55 |
| SAMPLE 20 | LENGTH 21 | 2 | 4 | 7 | 11 | 14 | 17 | 19 | 22 | 26 | 29 | 30 | 33 | 35 | 39 | 40 | 42 | 44 | 47 |
| SAMPLE 21 | LENGTH 21 | 50 | 52 | 53 | 7 | 10 | 13 | 16 | 18 | 22 | 25 | 28 | 30 | 32 | 34 | 39 | 42 | 43 | 44 |
| SAMPLE 22 | LENGTH 21 | 50 | 52 | 53 | 8 | 9 | 13 | 16 | 18 | 23 | 27 | 28 | 31 | 32 | 34 | 39 | 42 | 43 | 44 |
| SAMPLE 23 | LENGTH 25 | 50 | 51 | 53 | 7 | 10 | 14 | 17 | 19 | 22 | 26 | 28 | 31 | 33 | 36 | 37 | 42 | 43 | 44 |
| SAMPLE 24 | LENGTH 21 | 50 | 52 | 54 | 55 | 56 | 57 | 58 | 22 | 27 | 28 | 30 | 32 | 34 | 39 | 40 | 42 | 43 | 44 |
| SAMPLE 25 | LENGTH 26 | 5 | 7 | 10 | 13 | 17 | 19 | 22 | 27 | 28 | 30 | 32 | 34 | 39 | 40 | 42 | 43 | 44 | 48 |
| SAMPLE 26 | LENGTH 20 | 49 | 52 | 53 | 5 | 7 | 11 | 13 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 34 | 39 | 42 | 44 |
| SAMPLE 27 | LENGTH 21 | 52 | 53 | 1 | 4 | 7 | 11 | 13 | 17 | 19 | 22 | 26 | 28 | 31 | 32 | 34 | 37 | 40 | 45 |
| SAMPLE 28 | LENGTH 29 | 52 | 53 | 1 | 4 | 6 | 11 | 13 | 16 | 20 | 24 | 27 | 28 | 30 | 32 | 34 | 37 | 40 | 42 |
| SAMPLE 29 | LENGTH 23 | 49 | 52 | 53 | 6 | 11 | 13 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 34 | 39 | 42 | 43 | 45 |
| SAMPLE 30 | LENGTH 23 | 50 | 52 | 53 | 62 | 63 | 64 | 65 | 66 | 68 | 64 | 65 | 66 | 68 | 45 | 47 | 50 | 51 | 53 |
| SAMPLE 31 | LENGTH 22 | 60 | 62 | 65 | 66 | 68 | 17 | 21 | 24 | 26 | 29 | 31 | 32 | 35 | 39 | 40 | 41 | 42 | 44 |
| SAMPLE 32 | LENGTH 25 | 48 | 49 | 50 | 52 | 53 | 10 | 13 | 17 | 19 | 22 | 26 | 29 | 30 | 32 | 34 | 39 | 40 | 41 |
| SAMPLE 33 | LENGTH 29 | 48 | 49 | 52 | 53 | 10 | 12 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 34 | 39 | 42 | 43 | 45 |
| SAMPLE 34 | LENGTH 26 | 50 | 51 | 53 | 62 | 64 | 67 | 68 | 21 | 22 | 26 | 28 | 31 | 32 | 34 | 38 | 41 | 42 | 45 |
| SAMPLE 35 | LENGTH 23 | 50 | 51 | 53 | 59 | 60 | 61 | 62 | 64 | 65 | 66 | 68 | 31 | 32 | 34 | 39 | 41 | 42 | 45 |
| SAMPLE 36 | LENGTH 20 | 2 | 3 | 7 | 10 | 13 | 17 | 19 | 22 | 26 | 29 | 30 | 32 | 34 | 39 | 40 | 42 | 43 | 44 |
| SAMPLE 37 | LENGTH 18 | 50 | 52 | 53 | 5 | 7 | 10 | 13 | 16 | 19 | 24 | 26 | 29 | 30 | 33 | 36 | 39 | 42 | 46 |
| SAMPLE 38 | LENGTH 17 | 52 | 53 | 14 | 17 | 21 | 22 | 25 | 28 | 31 | 39 | 42 | 43 | 46 | 48 | 49 | 50 | 52 | 54 |
| SAMPLE 39 | LENGTH 20 | 17 | 11 | 13 | 17 | 19 | 22 | 32 | 34 | 39 | 40 | 42 | 44 | 47 | 50 | 52 | 53 | 54 | 49 |
| SAMPLE 40 | LENGTH 21 | 4 | 7 | 10 | 14 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 34 | 39 | 42 | 43 | 44 | 47 | 49 |
| SAMPLE 41 | LENGTH 21 | 52 | 54 | 55 | 7 | 10 | 12 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 34 | 39 | 42 | 44 | 48 |
| SAMPLE 42 | LENGTH 22 | 2 | 4 | 7 | 10 | 13 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 34 | 39 | 42 | 43 | 46 | 48 |
| SAMPLE 43 | LENGTH 21 | 49 | 52 | 53 | 54 | 5 | 7 | 11 | 13 | 17 | 19 | 22 | 26 | 28 | 31 | 32 | 34 | 39 | 40 |
| SAMPLE 44 | LENGTH 21 | 49 | 52 | 53 | 54 | 5 | 7 | 11 | 14 | 17 | 20 | 22 | 27 | 28 | 31 | 32 | 34 | 37 | 43 |
| SAMPLE 45 | LENGTH 23 | 52 | 54 | 55 | 7 | 10 | 13 | 17 | 19 | 22 | 27 | 29 | 30 | 32 | 34 | 39 | 42 | 44 | 48 |
| SAMPLE 46 | LENGTH 20 | 50 | 52 | 55 | 7 | 10 | 13 | 17 | 19 | 22 | 27 | 29 | 30 | 32 | 34 | 39 | 42 | 44 | 48 |
| SAMPLE 47 | LENGTH 21 | 48 | 49 | 52 | 54 | 55 | 7 | 10 | 13 | 17 | 19 | 22 | 26 | 28 | 31 | 32 | 34 | 39 | 40 |
| SAMPLE 48 | LENGTH 22 | 2 | 4 | 7 | 10 | 14 | 17 | 19 | 24 | 26 | 29 | 31 | 32 | 35 | 37 | 40 | 42 | 44 | 48 |
| SAMPLE 49 | LENGTH 21 | 49 | 52 | 54 | 55 | 7 | 10 | 12 | 17 | 19 | 22 | 26 | 28 | 30 | 32 | 34 | 39 | 40 | 42 |
| SAMPLE 50 | LENGTH 21 | 49 | 52 | 54 | 55 | 8 | 10 | 13 | 17 | 19 | 22 | 26 | 28 | 31 | 32 | 34 | 39 | 43 | 46 |
| SAMPLE 51 | LENGTH 22 | 50 | 52 | 55 | 7 | 10 | 14 | 17 | 20 | 24 | 27 | 28 | 31 | 32 | 35 | 39 | 42 | 43 | 44 |
| SAMPLE 52 | LENGTH 20 | 1 | 4 | 6 | 9 | 12 | 17 | 21 | 24 | 26 | 29 | 31 | 32 | 35 | 39 | 42 | 43 | 44 | 48 |
| SAMPLE 53 | LENGTH 20 | 49 | 52 | 54 | 55 | 7 | 9 | 13 | 16 | 18 | 24 | 25 | 28 | 31 | 32 | 35 | 39 | 42 | 44 |
| SAMPLE 54 | LENGTH 27 | 52 | 55 | 2 | 4 | 8 | 9 | 13 | 17 | 19 | 22 | 26 | 28 | 30 | 32 | 34 | 39 | 42 | 46 |
| SAMPLE 55 | LENGTH 28 | 52 | 55 | 1 | 4 | 7 | 10 | 14 | 17 | 21 | 22 | 26 | 29 | 31 | 32 | 34 | 37 | 42 | 45 |
| SAMPLE 56 | LENGTH 20 | 52 | 54 | 58 | 60 | 62 | 64 | 65 | 66 | 68 | 64 | 65 | 66 | 68 | 31 | 32 | 34 | 37 | 42 |
| SAMPLE 57 | LENGTH 28 | 49 | 52 | 55 | 58 | 60 | 61 | 62 | 64 | 66 | 68 | 68 | 31 | 32 | 34 | 37 | 42 | 43 | 45 |
| SAMPLE 58 | LENGTH 23 | 1 | 5 | 8 | 10 | 12 | 17 | 19 | 23 | 26 | 29 | 31 | 32 | 35 | 37 | 42 | 44 | 48 | 49 |
| SAMPLE 59 | LENGTH 20 | 52 | 53 | 54 | 58 | 60 | 62 | 64 | 65 | 66 | 68 | 68 | 31 | 32 | 34 | 39 | 43 | 46 | 48 |
| SAMPLE 60 | LENGTH 22 | 2 | 3 | 7 | 10 | 13 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 34 | 39 | 43 | 44 | 48 | 49 |
| SAMPLE 61 | LENGTH 28 | 52 | 54 | 58 | 60 | 62 | 63 | 64 | 65 | 66 | 68 | 68 | 31 | 32 | 34 | 39 | 42 | 43 | 45 |
| SAMPLE 62 | LENGTH 27 | 52 | 54 | 58 | 60 | 62 | 63 | 64 | 65 | 66 | 68 | 68 | 31 | 32 | 34 | 39 | 42 | 43 | 45 |
| SAMPLE 63 | LENGTH 26 | 1 | 4 | 8 | 10 | 14 | 17 | 19 | 22 | 27 | 28 | 30 | 32 | 34 | 39 | 43 | 44 | 48 | 49 |
| SAMPLE 64 | LENGTH 21 | 52 | 53 | 54 | 62 | 63 | 64 | 65 | 66 | 68 | 68 | 31 | 32 | 34 | 37 | 40 | 42 | 44 | 48 |
| SAMPLE 65 | LENGTH 21 | 3 | 7 | 10 | 13 | 17 | 19 | 22 | 32 | 35 | 38 | 40 | 45 | 48 | 49 | 52 | 54 | 58 | 59 |
| SAMPLE 66 | LENGTH 21 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 68 | 68 | 68 | 31 | 32 | 34 | 37 | 40 | 42 | 44 | 48 |
| SAMPLE 67 | LENGTH 29 | 1 | 4 | 6 | 10 | 13 | 17 | 19 | 22 | 26 | 28 | 30 | 32 | 35 | 38 | 40 | 42 | 44 | 48 |
| SAMPLE 68 | LENGTH 28 | 49 | 52 | 54 | 58 | 60 | 62 | 64 | 65 | 66 | 68 | 68 | 31 | 32 | 34 | 37 | 42 | 43 | 44 |
| SAMPLE 69 | LENGTH 20 | 49 | 52 | 54 | 58 | 60 | 61 | 62 | 64 | 65 | 66 | 68 | 31 | 32 | 34 | 37 | 42 | 43 | 44 |
| SAMPLE 70 | LENGTH 22 | 2 | 4 | 7 | 10 | 13 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 34 | 39 | 43 | 46 | 48 | 49 |
| SAMPLE 71 | LENGTH 27 | 52 | 54 | 58 | 60 | 62 | 63 | 64 | 65 | 66 | 68 | 68 | 31 | 32 | 34 | 39 | 42 | 43 | 45 |
| SAMPLE 72 | LENGTH 20 | 49 | 52 | 54 | 58 | 60 | 62 | 63 | 64 | 65 | 66 | 68 | 68 | 31 | 32 | 34 | 39 | 42 | 43 |
| SAMPLE 73 | LENGTH 23 | 2 | 4 | 8 | 10 | 13 | 16 | 18 | 22 | 25 | 29 | 31 | 33 | 35 | 37 | 42 | 44 | 48 | 49 |
| SAMPLE 74 | LENGTH 20 | 52 | 55 | 3 | 6 | 10 | 13 | 17 | 19 | 22 | 26 | 29 | 30 | 32 | 34 | 39 | 42 | 44 | 48 |
| SAMPLE 75 | LENGTH 27 | 52 | 54 | 56 | 57 | 58 | 10 | 13 | 17 | 19 | 22 | 26 | 29 | 31 | 32 | 35 | 37 | 42 | 44 |
| SAMPLE 76 | LENGTH 21 | 1 | 5 | 8 | 11 | 13 | 17 | 21 | 24 | 32 | 34 | 38 | 43 | 44 | 48 | 50 | 52 | 54 | 58 |
| SAMPLE 77 | LENGTH 26 | 59 | 60 | 62 | 63 | 64 | 65 | 66 | 68 | 69 | 68 | 68 | 31 | 32 | 34 | 39 | 42 | 44 | 48 |
| SAMPLE 78 | LENGTH 26 | 52 | 54 | 55 | 58 | 60 | 62 | 64 | 65 | 66 | 68 | 68 | 31 | 32 | 34 | 39 | 42 | 44 | 48 |
| SAMPLE 79 | LENGTH 21 | 1 | 4 | 7 | 10 | 12 | 32 | 34 | 38 | 42 | 45 | 48 | 49 | 52 | 53 | 62 | 63 | 64 | 65 |
| SAMPLE 80 | LENGTH 14 | 66 | 68 | 70 | 10 | 13 | 32 | 35 | 39 | 42 | 43 | 46 | 48 | 49 | 52 | 55 | | | |
| SAMPLE 81 | LENGTH 14 | 2 | 3 | 6 | 9 | 12 | 32 | 39 | 42 | 43 | 44 | 48 | 49 | 52 | 55 | | | | |
| SAMPLE 82 | LENGTH 14 | 2 | 3 | 7 | 10 | 12 | 32 | 34 | 39 | 42 | 44 | 48 | 49 | 52 | 55 | | | | |
| SAMPLE 83 | LENGTH 15 | 1 | 4 | 7 | 9 | 12 | 32 | 34 | 37 | 42 | 44 | 48 | 49 | 50 | 52 | 55 | | | |

NUMBER OF CASES = 296
 NUMBER OF BINARY VARIABLES = 26
 NUMBER OF NUMERIC VARIABLES = 0

BINARY DATA FILED
 COEFFICIENTS MATRIX NOT FILED

RAW BINARY DATA

| | | | | | | | | |
|------------|----------|----|----|----|----|----|----|----|
| SAMPLE 1 | LENGTH 3 | 11 | 23 | 25 | | | | |
| SAMPLE 2 | LENGTH 3 | 11 | 23 | 25 | | | | |
| SAMPLE 3 | LENGTH 6 | 5 | 10 | 11 | 19 | 21 | 25 | |
| SAMPLE 4 | LENGTH 6 | 5 | 10 | 11 | 19 | 21 | 25 | |
| SAMPLE 5 | LENGTH 6 | 5 | 10 | 11 | 21 | 23 | 25 | |
| SAMPLE 6 | LENGTH 6 | 5 | 10 | 11 | 21 | 23 | 25 | |
| SAMPLE 7 | LENGTH 3 | 6 | 19 | 25 | | | | |
| SAMPLE 8 | LENGTH 3 | 5 | 19 | 25 | | | | |
| SAMPLE 9 | LENGTH 5 | 11 | 13 | 21 | 23 | 25 | | |
| SAMPLE 10 | LENGTH 5 | 11 | 13 | 21 | 23 | 25 | | |
| SAMPLE 11 | LENGTH 3 | 11 | 23 | 25 | | | | |
| SAMPLE 12 | LENGTH 3 | 11 | 23 | 26 | | | | |
| SAMPLE 13 | LENGTH 6 | 5 | 10 | 11 | 21 | 23 | 25 | |
| SAMPLE 14 | LENGTH 6 | 5 | 10 | 11 | 21 | 23 | 25 | |
| SAMPLE 15 | LENGTH 6 | 5 | 10 | 11 | 21 | 23 | 25 | |
| SAMPLE 16 | LENGTH 4 | 7 | 11 | 19 | 26 | | | |
| SAMPLE 17 | LENGTH 4 | 9 | 11 | 19 | 26 | | | |
| SAMPLE 18 | LENGTH 4 | 9 | 11 | 19 | 26 | | | |
| SAMPLE 19 | LENGTH 2 | 11 | 26 | | | | | |
| SAMPLE 20 | LENGTH 4 | 5 | 12 | 15 | 25 | | | |
| SAMPLE 21 | LENGTH 4 | 11 | 17 | 19 | 26 | | | |
| SAMPLE 22 | LENGTH 3 | 19 | 23 | 25 | | | | |
| SAMPLE 23 | LENGTH 4 | 11 | 23 | 24 | 26 | | | |
| SAMPLE 24 | LENGTH 4 | 11 | 23 | 24 | 26 | | | |
| SAMPLE 25 | LENGTH 4 | 10 | 19 | 21 | 26 | | | |
| SAMPLE 26 | LENGTH 4 | 2 | 15 | 24 | 26 | | | |
| SAMPLE 27 | LENGTH 5 | 2 | 8 | 23 | 24 | 26 | | |
| SAMPLE 28 | LENGTH 5 | 5 | 19 | 23 | 24 | 26 | | |
| SAMPLE 29 | LENGTH 5 | 5 | 19 | 23 | 24 | 26 | | |
| SAMPLE 30 | LENGTH 2 | 4 | 26 | | | | | |
| SAMPLE 31 | LENGTH 4 | 11 | 14 | 15 | 26 | | | |
| SAMPLE 32 | LENGTH 4 | 11 | 14 | 15 | 26 | | | |
| SAMPLE 33 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 34 | LENGTH 5 | 5 | 15 | 23 | 24 | 26 | | |
| SAMPLE 35 | LENGTH 5 | 5 | 15 | 23 | 24 | 26 | | |
| SAMPLE 36 | LENGTH 5 | 5 | 19 | 23 | 24 | 26 | | |
| SAMPLE 37 | LENGTH 5 | 11 | 19 | 23 | 24 | 26 | | |
| SAMPLE 38 | LENGTH 5 | 11 | 19 | 23 | 24 | 26 | | |
| SAMPLE 39 | LENGTH 4 | 6 | 14 | 19 | 26 | | | |
| SAMPLE 40 | LENGTH 4 | 1 | 6 | 11 | 26 | | | |
| SAMPLE 41 | LENGTH 4 | 9 | 19 | 21 | 26 | | | |
| SAMPLE 42 | LENGTH 4 | 9 | 19 | 21 | 26 | | | |
| SAMPLE 43 | LENGTH 6 | 5 | 10 | 11 | 21 | 23 | 25 | |
| SAMPLE 44 | LENGTH 4 | 11 | 21 | 23 | 25 | | | |
| SAMPLE 45 | LENGTH 4 | 8 | 19 | 21 | 26 | | | |
| SAMPLE 46 | LENGTH 4 | 8 | 19 | 21 | 26 | | | |
| SAMPLE 47 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 48 | LENGTH 3 | 6 | 19 | 26 | | | | |
| SAMPLE 49 | LENGTH 4 | 5 | 19 | 21 | 25 | | | |
| SAMPLE 50 | LENGTH 5 | 2 | 5 | 19 | 21 | 25 | | |
| SAMPLE 51 | LENGTH 3 | 9 | 11 | 26 | | | | |
| SAMPLE 52 | LENGTH 3 | 6 | 19 | 26 | | | | |
| SAMPLE 53 | LENGTH 4 | 9 | 15 | 19 | 26 | | | |
| SAMPLE 54 | LENGTH 5 | 5 | 13 | 21 | 26 | | | |
| SAMPLE 55 | LENGTH 5 | 2 | 3 | 19 | 21 | 26 | | |
| SAMPLE 56 | LENGTH 3 | 10 | 19 | 26 | | | | |
| SAMPLE 57 | LENGTH 5 | 5 | 19 | 23 | 24 | 26 | | |
| SAMPLE 58 | LENGTH 4 | 1 | 6 | 19 | 26 | | | |
| SAMPLE 59 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 60 | LENGTH 4 | 10 | 17 | 19 | 26 | | | |
| SAMPLE 61 | LENGTH 4 | 11 | 14 | 19 | 26 | | | |
| SAMPLE 62 | LENGTH 3 | 11 | 19 | 26 | | | | |
| SAMPLE 63 | LENGTH 5 | 5 | 9 | 19 | 21 | 26 | | |
| SAMPLE 64 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 65 | LENGTH 4 | 3 | 17 | 19 | 26 | | | |
| SAMPLE 66 | LENGTH 4 | 6 | 14 | 19 | 26 | | | |
| SAMPLE 67 | LENGTH 4 | 2 | 5 | 19 | 25 | | | |
| SAMPLE 68 | LENGTH 3 | 2 | 5 | 26 | | | | |
| SAMPLE 69 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 70 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 71 | LENGTH 5 | 1 | 10 | 18 | 19 | 26 | | |
| SAMPLE 72 | LENGTH 4 | 11 | 14 | 23 | 26 | | | |
| SAMPLE 73 | LENGTH 3 | 11 | 19 | 26 | | | | |
| SAMPLE 74 | LENGTH 3 | 11 | 19 | 26 | | | | |
| SAMPLE 75 | LENGTH 5 | 7 | 10 | 14 | 19 | 26 | | |
| SAMPLE 76 | LENGTH 5 | 7 | 10 | 14 | 19 | 26 | | |
| SAMPLE 77 | LENGTH 3 | 11 | 19 | 26 | | | | |
| SAMPLE 78 | LENGTH 5 | 2 | 9 | 23 | 24 | 26 | | |
| SAMPLE 79 | LENGTH 5 | 2 | 9 | 23 | 24 | 26 | | |
| SAMPLE 80 | LENGTH 4 | 6 | 18 | 23 | 25 | 26 | | |
| SAMPLE 81 | LENGTH 5 | 8 | 11 | 14 | 19 | 26 | | |
| SAMPLE 82 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 83 | LENGTH 4 | 9 | 11 | 23 | 26 | | | |
| SAMPLE 84 | LENGTH 4 | 9 | 11 | 23 | 26 | | | |
| SAMPLE 85 | LENGTH 3 | 7 | 19 | 26 | | | | |
| SAMPLE 86 | LENGTH 3 | 7 | 19 | 26 | | | | |
| SAMPLE 87 | LENGTH 6 | 5 | 10 | 11 | 19 | 23 | 25 | |
| SAMPLE 88 | LENGTH 6 | 5 | 10 | 11 | 19 | 23 | 25 | |
| SAMPLE 89 | LENGTH 5 | 8 | 14 | 19 | 21 | 26 | | |
| SAMPLE 90 | LENGTH 5 | 8 | 14 | 19 | 21 | 26 | | |
| SAMPLE 91 | LENGTH 6 | 8 | 19 | 26 | | | | |
| SAMPLE 92 | LENGTH 6 | 5 | 10 | 19 | 21 | 23 | 25 | |
| SAMPLE 93 | LENGTH 7 | 5 | 10 | 11 | 19 | 21 | 23 | 25 |
| SAMPLE 94 | LENGTH 7 | 5 | 10 | 11 | 19 | 21 | 23 | 25 |
| SAMPLE 95 | LENGTH 6 | 5 | 10 | 11 | 21 | 23 | 25 | |
| SAMPLE 96 | LENGTH 6 | 5 | 10 | 11 | 21 | 23 | 25 | |
| SAMPLE 97 | LENGTH 5 | 5 | 10 | 19 | 21 | 25 | | |
| SAMPLE 98 | LENGTH 5 | 5 | 19 | 20 | 21 | 25 | | |
| SAMPLE 99 | LENGTH 2 | 6 | 25 | 26 | | | | |
| SAMPLE 100 | LENGTH 4 | 4 | 14 | 15 | 26 | | | |
| SAMPLE 101 | LENGTH 4 | 11 | 21 | 23 | 25 | | | |
| SAMPLE 102 | LENGTH 5 | 5 | 18 | 19 | 23 | 25 | | |
| SAMPLE 103 | LENGTH 4 | 2 | 5 | 19 | 25 | | | |
| SAMPLE 104 | LENGTH 4 | 7 | 19 | 21 | 26 | | | |
| SAMPLE 105 | LENGTH 5 | 2 | 10 | 19 | 23 | 26 | | |
| SAMPLE 106 | LENGTH 5 | 2 | 10 | 19 | 23 | 26 | | |
| SAMPLE 107 | LENGTH 5 | 6 | 14 | 21 | 23 | 25 | | |
| SAMPLE 108 | LENGTH 2 | 8 | 25 | 21 | 23 | 25 | | |
| SAMPLE 109 | LENGTH 3 | 4 | 21 | 26 | | | | |
| SAMPLE 110 | LENGTH 3 | 4 | 21 | 26 | | | | |
| SAMPLE 111 | LENGTH 3 | 4 | 21 | 26 | | | | |
| SAMPLE 112 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 113 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 114 | LENGTH 5 | 11 | 15 | 19 | 21 | 26 | | |
| SAMPLE 115 | LENGTH 5 | 11 | 15 | 19 | 21 | 26 | | |
| SAMPLE 116 | LENGTH 6 | 5 | 10 | 11 | 21 | 23 | 25 | |
| SAMPLE 117 | LENGTH 4 | 8 | 16 | 19 | 26 | | | |
| SAMPLE 118 | LENGTH 5 | 2 | 5 | 21 | 23 | 26 | | |
| SAMPLE 119 | LENGTH 5 | 2 | 5 | 21 | 23 | 26 | | |
| SAMPLE 120 | LENGTH 4 | 8 | 19 | 21 | 26 | | | |
| SAMPLE 121 | LENGTH 3 | 11 | 23 | 25 | | | | |
| SAMPLE 122 | LENGTH 3 | 10 | 19 | 26 | | | | |
| SAMPLE 123 | LENGTH 3 | 10 | 19 | 26 | | | | |
| SAMPLE 124 | LENGTH 4 | 3 | 19 | 21 | 25 | | | |
| SAMPLE 125 | LENGTH 2 | 4 | 26 | | | | | |
| SAMPLE 126 | LENGTH 2 | 4 | 26 | | | | | |
| SAMPLE 127 | LENGTH 4 | 8 | 14 | 21 | 26 | | | |
| SAMPLE 128 | LENGTH 4 | 8 | 14 | 21 | 26 | | | |
| SAMPLE 129 | LENGTH 4 | 6 | 14 | 23 | 25 | | | |
| SAMPLE 130 | LENGTH 4 | 6 | 14 | 23 | 25 | | | |
| SAMPLE 131 | LENGTH 4 | 11 | 21 | 23 | 26 | | | |
| SAMPLE 132 | LENGTH 4 | 11 | 21 | 23 | 26 | | | |
| SAMPLE 133 | LENGTH 6 | 5 | 10 | 11 | 19 | 23 | 25 | |
| SAMPLE 134 | LENGTH 6 | 5 | 10 | 11 | 19 | 23 | 25 | |
| SAMPLE 135 | LENGTH 3 | 6 | 19 | 26 | | | | |
| SAMPLE 136 | LENGTH 3 | 6 | 19 | 26 | | | | |
| SAMPLE 137 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 138 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 139 | LENGTH 5 | 11 | 13 | 21 | 23 | 25 | | |
| SAMPLE 140 | LENGTH 5 | 11 | 13 | 21 | 23 | 25 | | |
| SAMPLE 141 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 142 | LENGTH 4 | 11 | 23 | 24 | 26 | | | |
| SAMPLE 143 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 144 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 145 | LENGTH 4 | 11 | 17 | 19 | 26 | | | |
| SAMPLE 146 | LENGTH 4 | 10 | 14 | 19 | 26 | | | |
| SAMPLE 147 | LENGTH 4 | 10 | 14 | 19 | 26 | | | |
| SAMPLE 148 | LENGTH 4 | 10 | 14 | 19 | 26 | | | |
| SAMPLE 149 | LENGTH 4 | 11 | 18 | 23 | 26 | | | |
| SAMPLE 150 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 151 | LENGTH 4 | 8 | 19 | 26 | | | | |
| SAMPLE 152 | LENGTH 4 | 6 | 14 | 19 | 26 | | | |
| SAMPLE 153 | LENGTH 5 | 6 | 11 | 14 | 19 | 26 | | |
| SAMPLE 154 | LENGTH 5 | 6 | 11 | 14 | 19 | 26 | | |
| SAMPLE 155 | LENGTH 3 | 6 | 19 | 26 | | | | |
| SAMPLE 156 | LENGTH 3 | 6 | 19 | 26 | | | | |
| SAMPLE 157 | LENGTH 6 | 1 | 6 | 9 | 19 | 21 | 25 | |
| SAMPLE 158 | LENGTH 4 | 6 | 19 | 21 | 25 | | | |
| SAMPLE 159 | LENGTH 4 | 6 | 19 | 21 | 25 | | | |
| SAMPLE 160 | LENGTH 4 | 4 | 11 | 21 | 26 | | | |
| SAMPLE 161 | LENGTH 4 | 4 | 11 | 21 | 26 | | | |
| SAMPLE 162 | LENGTH 5 | 5 | 13 | 19 | 21 | 25 | | |
| SAMPLE 163 | LENGTH 4 | 8 | 11 | 19 | 26 | | | |
| SAMPLE 164 | LENGTH 4 | 8 | 10 | 19 | 26 | | | |
| SAMPLE 165 | LENGTH 4 | 15 | 21 | 23 | 26 | | | |
| SAMPLE 166 | LENGTH 5 | 7 | 8 | 19 | 23 | 26 | | |
| SAMPLE 167 | LENGTH 4 | 7 | 8 | 19 | 23 | 26 | | |
| SAMPLE 168 | LENGTH 5 | 7 | 8 | 19 | 23 | 26 | | |
| SAMPLE 169 | LENGTH 5 | 4 | 5 | 19 | 22 | 26 | | |
| SAMPLE 170 | LENGTH 5 | 4 | 5 | 19 | 22 | 26 | | |
| SAMPLE 171 | LENGTH 6 | 10 | 11 | 14 | 15 | 23 | 26 | |
| SAMPLE 172 | LENGTH 5 | 6 | 11 | 15 | 19 | 26 | | |
| SAMPLE 173 | LENGTH 3 | 11 | 23 | 26 | | | | |
| SAMPLE 174 | LENGTH 4 | 10 | 18 | 19 | 26 | | | |
| SAMPLE 175 | LENGTH 4 | 15 | 22 | 23 | 26 | | | |
| SAMPLE 176 | LENGTH 4 | 15 | 22 | 23 | 26 | | | |
| SAMPLE 177 | LENGTH 5 | 14 | 18 | 19 | 23 | 25 | | |
| SAMPLE 178 | LENGTH 5 | 14 | 18 | 19 | 23 | 25 | | |
| SAMPLE 179 | LENGTH 5 | 5 | 11 | 18 | 19 | 25 | | |
| SAMPLE 180 | LENGTH 5 | 5 | 11 | 18 | 19 | 25 | | |
| SAMPLE 181 | LENGTH 5 | 11 | 18 | 22 | 23 | 25 | | |
| SAMPLE 182 | LENGTH 5 | 11 | 18 | 22 | 23 | 25 | | |
| SAMPLE 183 | LENGTH 6 | 10 | 11 | 14 | 21 | 23 | 25 | |
| SAMPLE 184 | LENGTH 6 | 10 | 11 | 14 | 21 | 23 | 25 | |
| SAMPLE 185 | LENGTH 3 | 6 | 21 | 26 | | | | |
| SAMPLE 186 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 187 | LENGTH 4 | 7 | 21 | 23 | 26 | | | |
| SAMPLE 188 | LENGTH 4 | 7 | 21 | 23 | 26 | | | |
| SAMPLE 189 | LENGTH 4 | 11 | 19 | 24 | 26 | | | |
| SAMPLE 190 | LENGTH 4 | 11 | 19 | 24 | 26 | | | |
| SAMPLE 191 | LENGTH 2 | 4 | 26 | | | | | |
| SAMPLE 192 | LENGTH 2 | 4 | 26 | | | | | |
| SAMPLE 193 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 194 | LENGTH 3 | 2 | 5 | 26 | | | | |
| SAMPLE 195 | LENGTH 4 | 1 | 6 | 19 | 26 | | | |
| SAMPLE 196 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 197 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 198 | LENGTH 4 | 10 | 19 | 21 | 26 | | | |
| SAMPLE 199 | LENGTH 4 | 10 | 19 | 21 | 26 | | | |
| SAMPLE 200 | LENGTH 4 | 7 | 15 | 19 | 26 | | | |
| SAMPLE 201 | LENGTH 4 | 7 | 15 | 19 | 26 | | | |
| SAMPLE 202 | LENGTH 4 | 14 | 15 | 19 | 26 | | | |
| SAMPLE 203 | LENGTH 4 | 11 | 21 | 23 | 25 | | | |
| SAMPLE 204 | LENGTH 4 | 11 | 21 | 23 | 25 | | | |
| SAMPLE 205 | LENGTH 4 | 9 | 11 | 23 | 25 | | | |
| SAMPLE 206 | LENGTH 2 | 4 | 26 | | | | | |
| SAMPLE 207 | LENGTH 2 | 4 | 26 | | | | | |
| SAMPLE 208 | LENGTH 4 | 10 | 19 | 23 | 26 | | | |
| SAMPLE 209 | LENGTH 6 | 11 | 13 | 14 | 19 | 23 | 25 | |
| SAMPLE 210 | LENGTH 4 | 8 | 19 | 21 | 26 | | | |
| SAMPLE 211 | LENGTH 4 | 10 | 18 | 19 | 26 | | | |
| SAMPLE 212 | LENGTH 2 | 4 | 26 | | | | | |
| SAMPLE 213 | LENGTH 2 | 4 | 26 | | | | | |
| SAMPLE 214 | LENGTH 3 | 6 | 19 | 26 | | | | |
| SAMPLE 215 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 216 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 217 | LENGTH 4 | 9 | 15 | 19 | 26 | | | |
| SAMPLE 218 | LENGTH 4 | 9 | 15 | 19 | 26 | | | |
| SAMPLE 219 | LENGTH 4 | 10 | 19 | 21 | 26 | | | |
| SAMPLE 220 | LENGTH 4 | 10 | 19 | 21 | 26 | | | |
| SAMPLE 221 | LENGTH 6 | 11 | 16 | 19 | 21 | 23 | 25 | |
| SAMPLE 222 | LENGTH 6 | 11 | 16 | 19 | 21 | 23 | 25 | |
| SAMPLE 223 | LENGTH 2 | 6 | 26 | | | | | |
| SAMPLE 224 | LENGTH 3 | 6 | 19 | 26 | | | | |
| SAMPLE 225 | LENGTH 3 | 6 | 19 | 26 | | | | |
| SAMPLE 226 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 227 | LENGTH 3 | 8 | 19 | 26 | | | | |
| SAMPLE 228 | LENGTH 4 | 7 | 11 | 19 | 26 | | | |
| SAMPLE 229 | LENGTH 4 | 7 | 11 | 19 | 26 | | | |
| SAMPLE 230 | LENGTH 4 | 7 | 17 | 23 | 26 | | | |
| SAMPLE 231 | LENGTH 4 | 7 | 17 | 23 | 26 | | | |
| SAMPLE 232 | LENGTH 3 | 11 | 21 | 25 | 26 | | | |
| SAMPLE 233 | LENGTH 5 | 9 | 11 | 21 | 23 | 25 | | |
| SAMPLE 234 | LENGTH 5 | 9 | 11 | 21 | 23 | 25 | | |
| SAMPLE 235 | LENGTH 4 | 11 | 18 | 23 | 26 | | | |
| SAMPLE 236 | LENGTH 4 | 11 | 18 | 23 | 26 | | | |
| SAMPLE 237 | LENGTH 3 | 11 | 19 | 26 | | | | |
| SAMPLE 238 | LENGTH 3 | 11 | 23 | 26 | | | | |
| SAMPLE 239 | LENGTH 4 | 2 | 15 | 19 | 26 | | | |
| SAMPLE 240 | LENGTH 4 | 2 | 15 | 19 | 26 | | | |
| SAMPLE 241 | | | | | | | | |