Scottish Early Bronze Age Metalwork

by John M. Coles

The aim of this paper is to complete the publication of Scottish Bronze Age metalwork, following a study of that of the Late Bronze Age (Coles 1960) and the Middle Bronze Age (Coles 1964). The evidence available for studies based on Early Bronze Age metalwork differs markedly from that for the later periods. The arrangement of material nominally of the Middle Bronze Age (*c.* 1500–900 B.C.), flanged axes, palstaves, looped-spearheads and rapiers, depends almost entirely upon typology, in the absence of associated finds, either of graves or of hoards. For the Late Bronze Age (*c.* 900–600 B.C.), numbers of hoards are available for study, but graves are practically unknown. Lack of evidence of burial practices involving the deposition of metal artifacts during the period from *c.* 1400 to *c.* 600 B.C. makes it necessary to study the metal products in virtual isolation. For the Early Bronze Age, however, there is a range of evidence available which allows a study based upon several different approaches. These include not only typology and distributions as in previous studies, and associations in hoards, but also grave-groups with pottery associations, metal-analyses and correlations with stone moulds, not generally available for post-Early Bronze Age metalwork. In this paper all of these avenues are explored, but in varying degrees of detail. Typology and distributions continue to have a dominant role, in any attempt to organise the mass of material generally described only as 'of the Early Bronze Age'. Hoards and grave-associations are employed in correlating the various industries or traditions found in Scotland, and in providing some chronological positioning. Pottery remains a disappointing element in this particular study, primarily because much of the basic work on grouping, dating and publication remains to be done. Although some aspects of the associated Beaker and Food Vessel traditions have been examined recently, the precise relationship between these wares and their contemporary metal products is not treated in this paper.

An attempt has been made to relate the stone moulds of the Early Bronze Age with their metal products, and some degree of correlation is claimed not only on a presence, but also on an absence, basis. The absence of suitable moulds for certain distinctive metal artifacts suggests outside sources for some products. An independent assessment of this claim is possible through the use of metal analyses provided by the Arbeitsgemeinschaft für Metallurgie at Stuttgart; all available analyses of Scottish Early Bronze Age metalwork are listed and groups are distinguished. Further work on the analyses is at present being carried out by the writer and Mr A. Balfour, Heriot-Watt University, Edinburgh, and it is hoped to present the results in due course.

The metalwork is treated in the same way as was that of the Middle Bronze Age (Coles 1964). Each basic type of artifact is described and illustrated and the analyses are then discussed. This is followed by a general discussion of the nature of the grouping of the industries. A chronological scheme is presented, which purports to distinguish the various traditions or industrial schools present in Early Bronze Age Scotland. Throughout the paper a 'traditional' chronology is maintained. The bulk of the paper, however, lies in the catalogue (Appendices A–E) which lists all metal finds believed to be of the Early Bronze Age. The lists have been compiled from

periodicals and monographs, and from museum tours in Scotland and England. They probably contain over 95% of all material in museums and known private collections, but there is a considerable quantity of Bronze Age artifacts now lost, and referred to only as 'celts' or 'axeheads' in early papers. These may have been of bronze, but may also have been of flanged or socketed types. It is profitless to include these in a chronologically limited paper such as this is. The notes to Appendix A provide further information on material which, on checking, has been found to be lacking in verifiable detail as to find-spot and/or association.

It must be remembered that this paper is only concerned with metalwork, and that the typologies described are purely internal. They do not necessarily apply elsewhere, and are designed solely to indicate the range and development of metal industries in Early Bronze Age Scotland. Any such regional scheme may well have to be defined again before incorporation in any wider geographical system, such as may develop for the British Isles in due course.

FLAT AXES

Of the 300 axes with Scottish provenances, only 9 are of the type generally called broad-butted axes or thick-butted axes (Britton 1963), Lough Ravel type axes (Harbison 1968; 1969), or Type A axes (Case 1966). For convenience these will be called Type A axes.

Type A axes are roughly trapezoidal in plan, with a butt wide in relation to the blade-width (fig. 1). Generally the blade is less than twice as wide as the butt, in contrast to the axes of Type B (see below) where the blade is almost always two or three times as wide as the butt. The sides of Type A axes may be straight or may form a smooth concave line from butt to blade. The butt is flat and generally straight, forming a right angle with the sides. The sides of Type A axes are also flat, or very slightly rounded, so that the junction of side and axe-faces form an abrupt angle. It is likely that several distinct typological groups are present in the axes of Type A, but the small quantity of axes involved here does not allow any subdivision. In general, all of the shapes of the Scottish Type A axes are represented in the several hundred surviving examples of Irish Type A axes (Harbison 1969).

Type A axes from Britain and Ireland have a basic resemblance to trapeze-shaped axes of western and central Europe. Case has shown, however, that very few of the Irish Type A axes compare closely in dimensions with axes from continental Europe, the continental axes tending to be rather angular in shape with straight sides and butt. Some of the Scottish Type A axes are of this angular type, but others possess the concave sides that characterises a majority of Irish Type A axes, and which have been taken to represent a local production of Type A axes altered by the knowledge of a second axe shape, that of Type B axes (see below).

The distribution of Type A axes (fig. 2) is too sparse for comment. All of those analysed are copper without tin, with lead, nickel, bismuth and iron undetected or with only a trace present. Arsenic, antimony and silver, however, are present in medium to high quantities. This metal is often described as typical of Coghlan and Case's Group I (Coghlan and Case 1957), and is generally reckoned to be Irish in origin (see p. 54).

A minor group of Scottish axes, only 6 in number, should also be considered here. In plan these are Type A but they have thin butts in side-view, a feature of Type B axes. These hybrids (fig. 3) are described in the catalogue as Type AB. They conform in all respects to the abundant Irish Ballybeg axes (Harbison 1969). These too are without tin, except one axe, and are of the same general composition as the axes of Type A.

Type A axes have no associations in Scotland. In Ireland the Knocknague, Co. Galway, hoard contains three flat axes, of which one has a thinned-butt, three awls and one flat tanged-

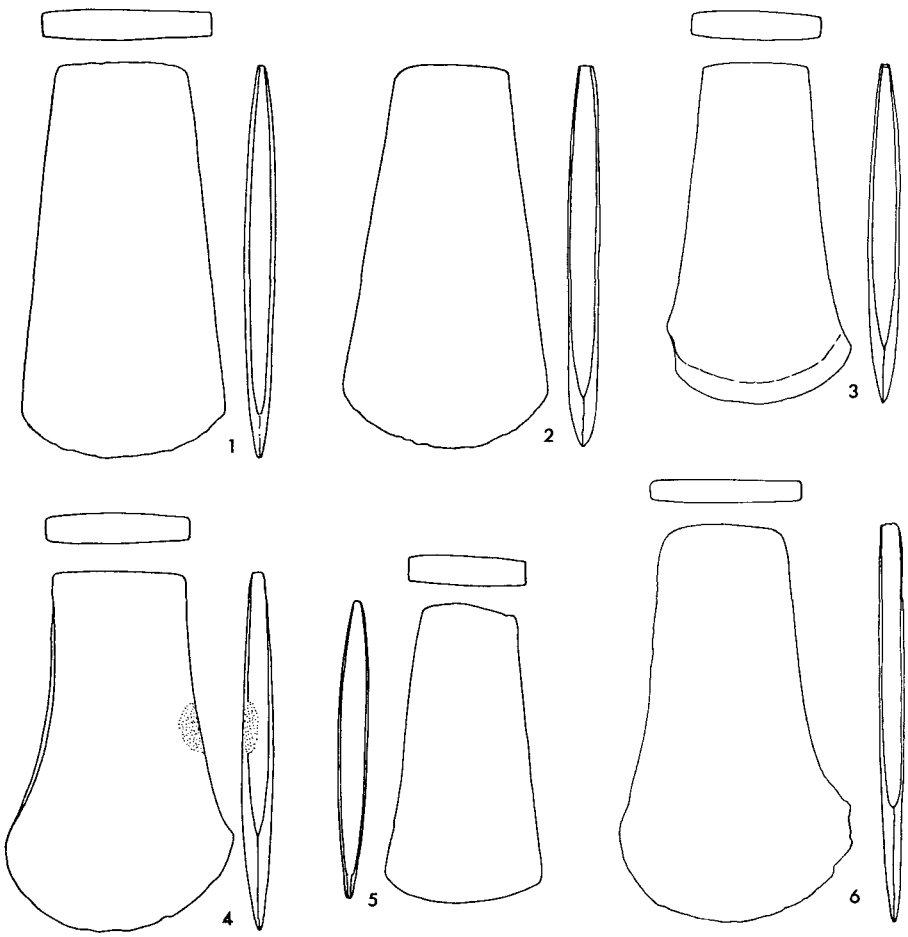

FIG. 1. Axes of Type A: 1 St Andrew's-Lhanbryd (Mr 24); 2 Cumbernauld (Dn 1); 3 Knock and Maize (Wg 10); 4 (Ln 8); Pitlochry (Pr 22); 6 Minto (Rx 9). $\frac{1}{3}$

dagger (Harbison 1968, 53). Another associated find, from Whitespots, Co. Down, links a grooved dagger, a flat and probably tanged-dagger, and a flat axe which appears to be a hybrid between Types A and B. This hoard has been taken to demonstrate the association of Beaker-type objects (Type A axe and tanged-dagger) with objects connected with the 'impact-phase' of Case, when central European technological advances were extended to the British Isles (Case 1966, and see p. 9 below).

An overwhelming majority (fig. 4) of Scottish axes are of Type B. Type B axes are characterised above all by their thin butt, the two faces of the axe converging to a thin and sometimes sharp edge at the butt. In plan these axes exhibit considerable variation, but generally the width of the axe-blade is two or three times greater than that of the butt. The blade-edge may be shallow or deep, and the sides of the blade may extend into barbed or recurved tips. The butt of the axe is often rather square, but the arched butt is also characteristic. The faces of the Type B axe are generally convex in longitudinal section, occasionally angled from mid-point, and more or less flat in transverse section. The sides of the axe may be convex or bevelled, and may further have been hammered up into slight flanges which project above the plane of the axe-faces to a

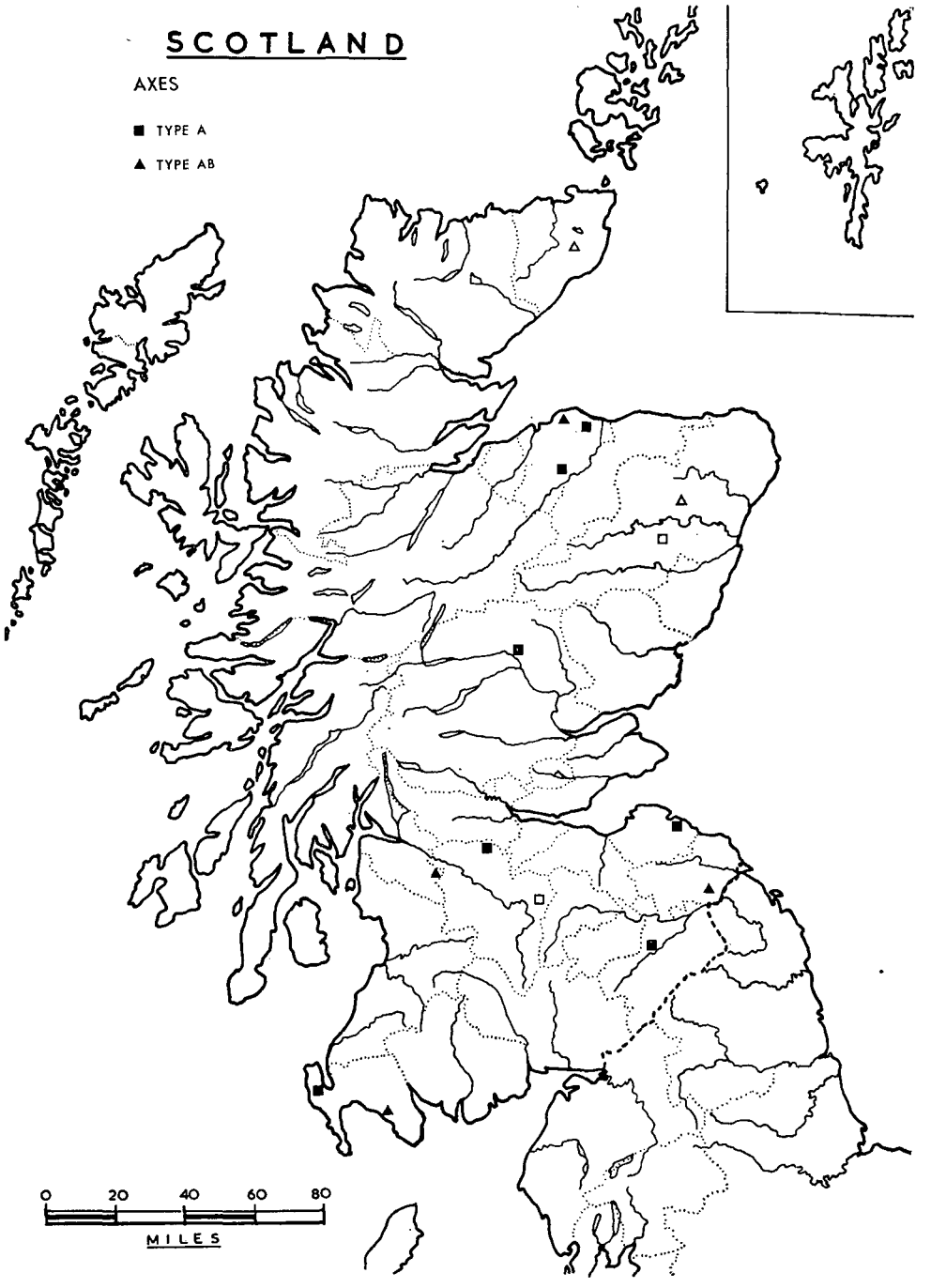

FIG. 2. Distribution of Types A and AB axes: open symbols, county provenance only.

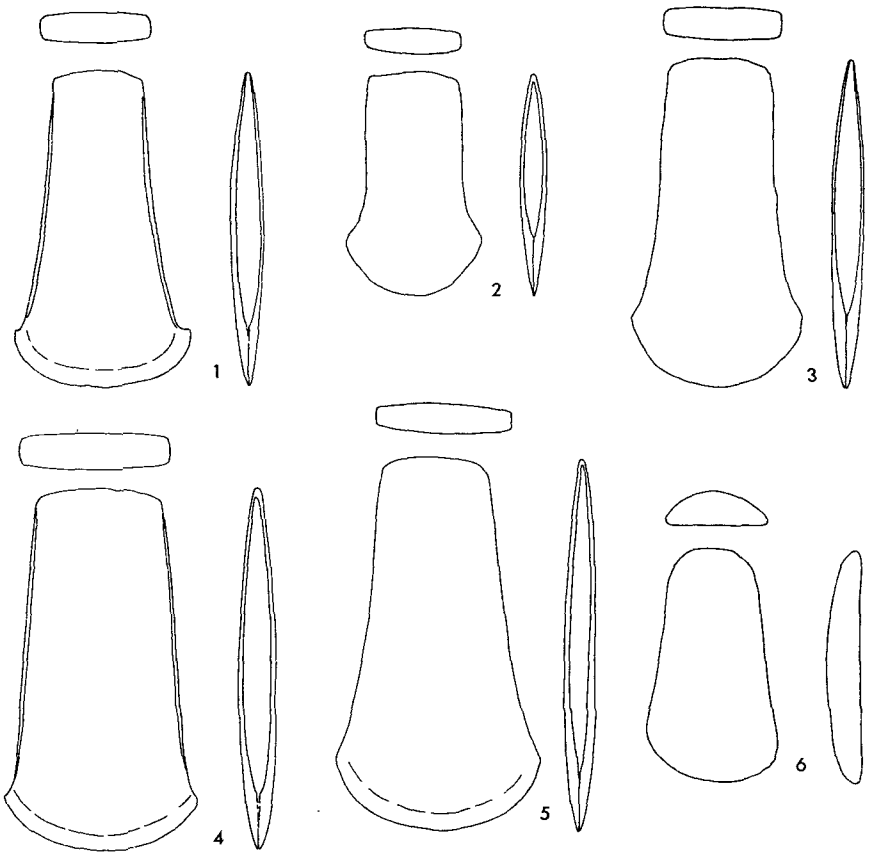

FIG. 3. Axes of Type AB, and ingot (no. 6): 1 Fogorig (Br 2); 2 (Ca 4); 3 Spean St, Glasgow (Rf 4); 4 (Ab 45); 5 Barrach (Wg 1); 6 near Perth (Pr 19). ½

height of up to 1·5 mm. Whether entirely flat or hammer-flanged, the axes were finished by extensive forging after the casting of the axe-blanks in stone moulds (see below). The sides of the axe at this stage would be beaten into the common convex shape, occasionally into a bevelled pattern or worked into flanges. A number of Type B axes are decorated, on the face and/or on the sides (see below). Most of the axes of Type B are bronze.

Axes of this type have been described under the terms thin-butted axes (Coghlan and Case 1957), developed flat axes and low-flanged axes (Butler 1963), Migdale axes (Britton 1963), Killaha and Ballyvalley axes (Harbison 1969), and narrow-butt flat axes and hammer-flanged axes (Coles 1965). They are called here Type B axes for convenience, a practice adopted from the recent work of Case (Case 1966), although the term thin-butted seems the most useful descriptive name.

The origin of the Type B axe has generally been considered to lie within the sphere of influence of the Únětician culture of central Europe. Certainly the Únětician industry possessed all the necessary materials and techniques for the production of such axes, and more, but the products of this industry do not really compare closely with the Type B axes of the British Isles, if it is accepted that at least some, and probably a majority, of these axes were entirely functional, that is, used physically as axes or chisels. The principal advantage of the Type B axe over the

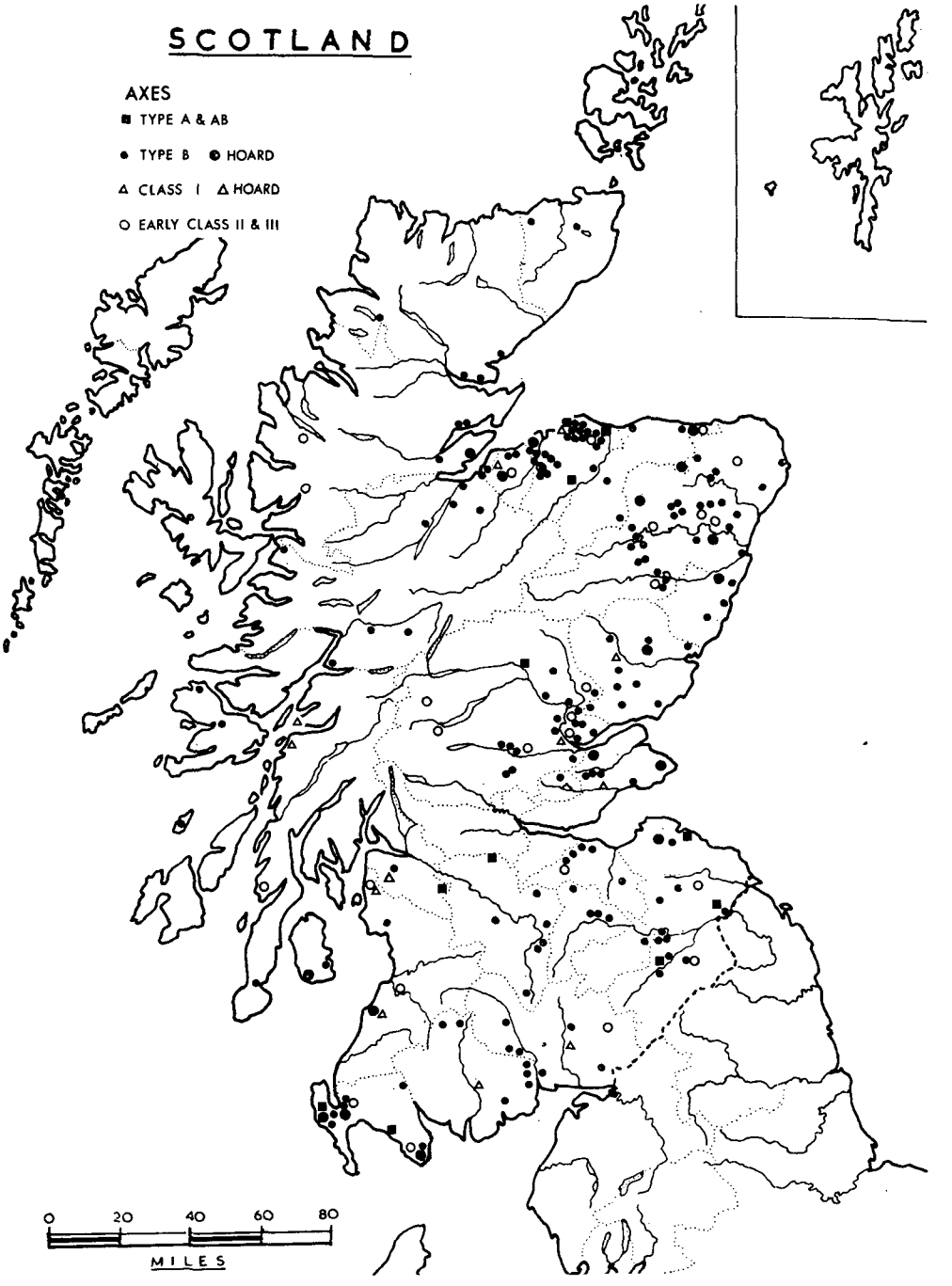

FIG. 4. Distribution of flat axes of types A, AB and B, and flanged axes of Classes I, early II and early III

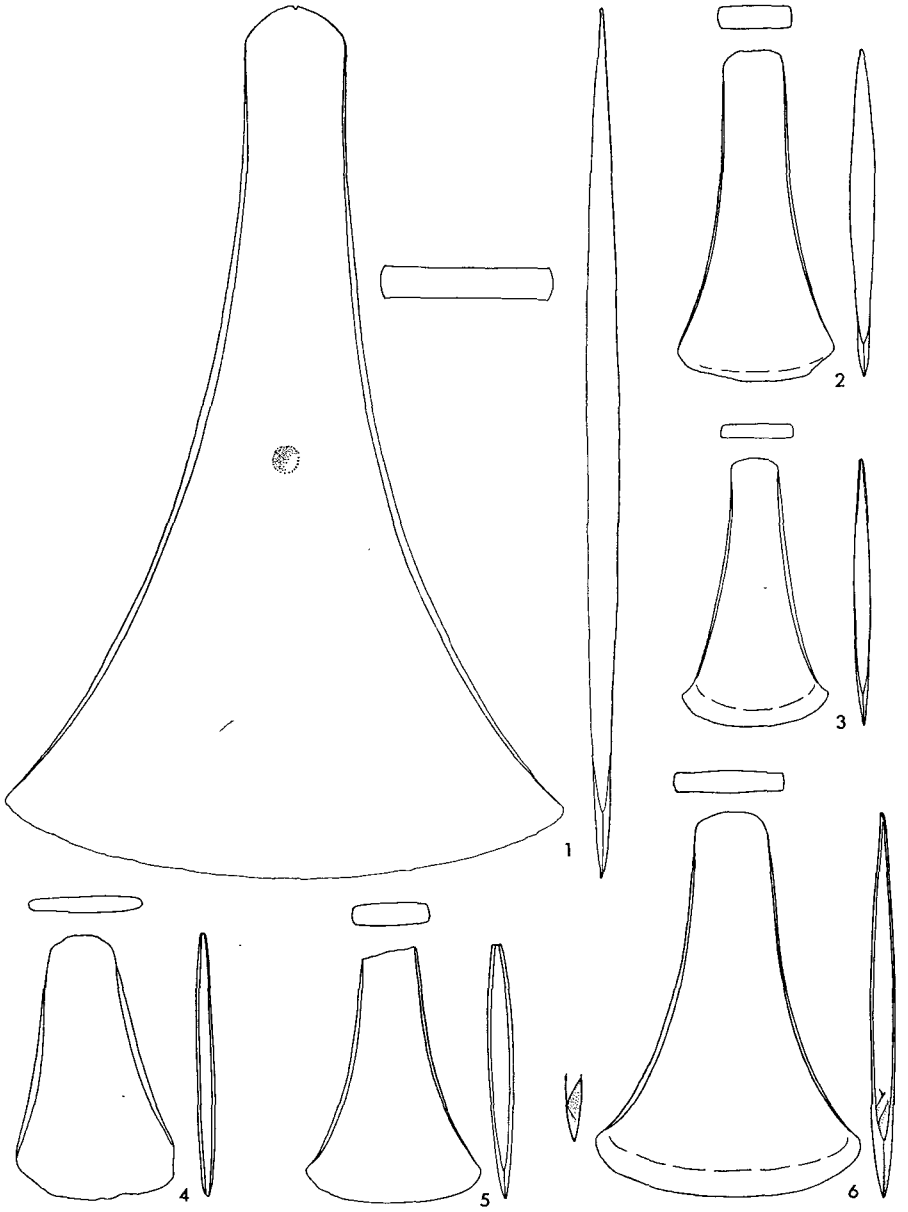

FIG. 5. Axes of Type Bb: 1 Lawhead Farm (Ln 6); 2 Forfar (An 11); 3 Cottown Muir (An 10); 4 Kilmacolm (Rf 3); 5 Aboyne (Ab 1); 6 Drum Farm (Kk 6). ¼

Type A axe was the allowance in design for successful hafting. Instead of the clumsy side mounting of the Type A axe, on a straight haft, in tomahawk fashion, a simple split-haft would involve only a little more preparation, and the butt of the axe would fit closely into the split. It would then, of course, be bound to prevent undue side-movement. The bronze axe from Kütten-Drobitz shows such a binding in skeuomorphic form (von Brunn 1959, pl. 57). Such lateral movement would always have been a problem, even with a tight binding, because the pressure

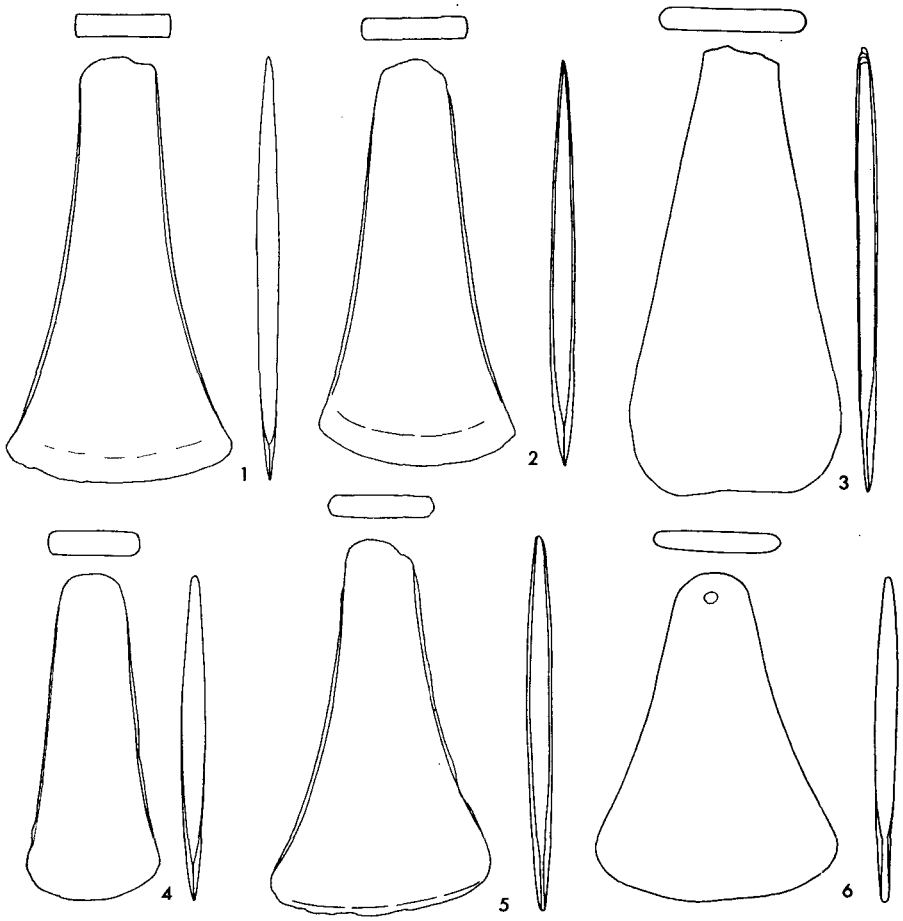

FIG. 6. Axes of Type Bb: 1 Ashybank (Rx 1); 2 Drumlanrig (Pr 10); 3 (An 6); 4 Cree Moss (Wg 5); 5 Glenrickard (Bu 3); 6 (Ln 9). ⅓

exerted on the axe-blade in use would force the axe back into the binding and into the haft loosening the one and splitting the other. One method of preventing the development of a loose binding and a split-haft would be to constrict the axe in its middle part, so that whichever way the axe moved, the binding would meet a wider part of the axe. Many of the Únětician axes are waisted, and an interesting group of British-Irish axes possesses this feature. But more important still is the provision made by the Únětician metal-workers to contain the haft within side flanges on the axe, and the characteristic axe of this school has cast flanges. The functional value of these cannot be over-stressed. In contrast, the British-Irish Type B axes do not possess cast flanges, and most are entirely flat. It is possibly that the technical knowledge of the British-Irish metal-workers did not include the ability to cast from two-piece moulds (see below), and that it was only later that such knowledge was obtained or developed. However, this technical difficulty in connecting British-Irish Type B axes and Únětician axes cannot stand in the way of the admission of some Únětician influences percolating through to Britain and Ireland, as this seems incontestable. In terms of axes of Type B there is nevertheless much to be said for a great deal of purely local development, the functional advantages of the thin-butt, and to a much smaller extent the waisting

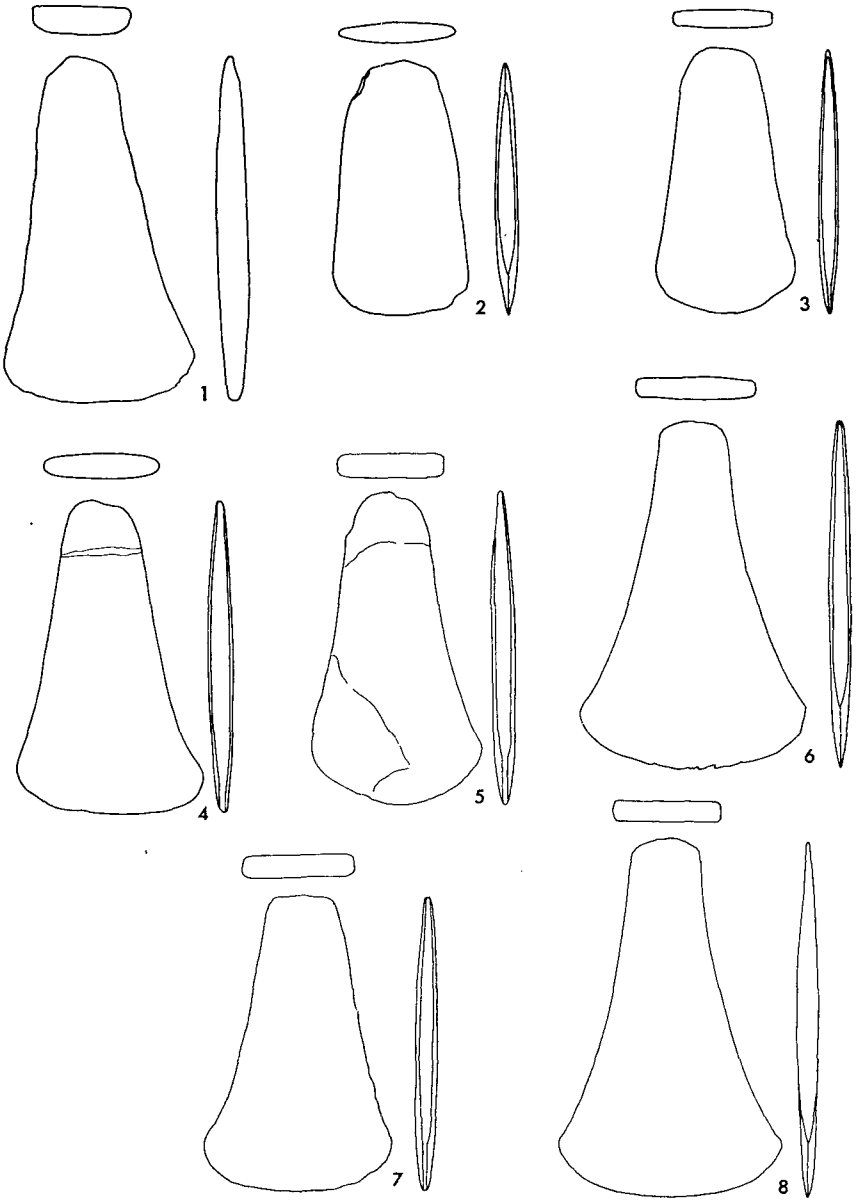

FIG. 7. Axes of Type Bb, other than no. 2: 1 Canongate (Ml 1); 2 Glenelg (In 8); 3 (Rf 5); 4 near Kintore (Ab 25); 5 near Spynie (Mr 30); 6 Drumlanrig (Pr 9); 7 Redford (Pr 23); 8 no provenance (NMA DA111). $\frac{1}{3}$

of the axe-form, being within the immediate capabilities of the metal-workers. There are no Únětician flanged axes known from the British Isles.

Case has pointed out that Irish flat axes with hybrid features of Types A and B are most common in Ulster and Leinster, and he suggests that it was through Scotland that the Únětician influence reached eastern Ireland (Case 1966). The possibility should also be considered, how-

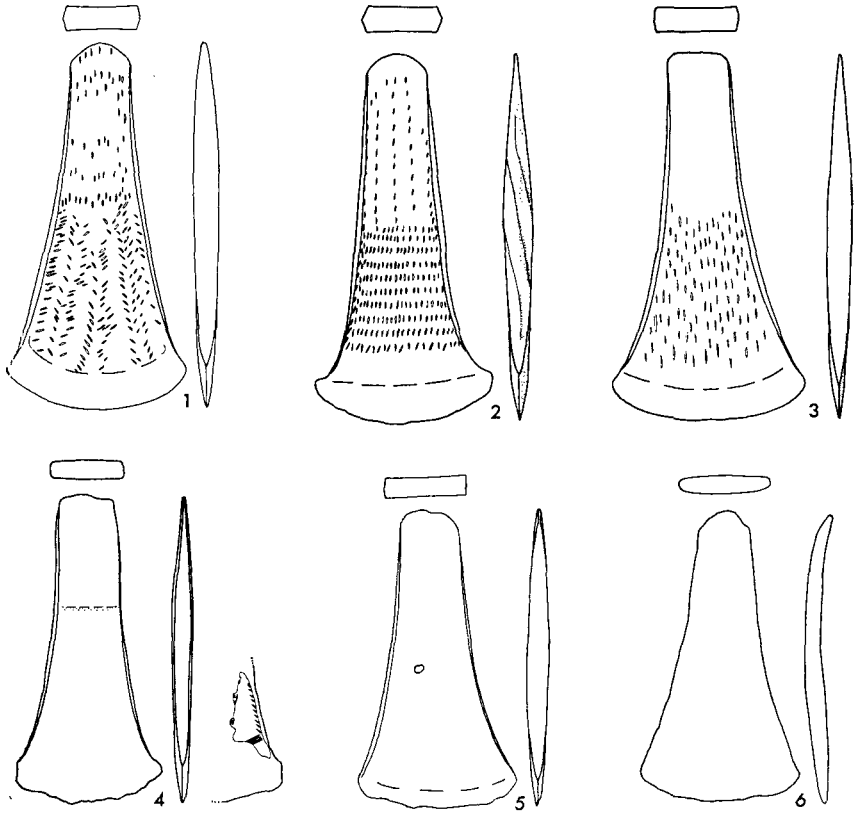

FIG. 8. Axes of Type Bb: 1 no provenance (NMA DA48); 2 Cornhill (Br 1); 3 near Darnaway (Mr 11); 4 Monikie (An 14); 5 Greenhill (Se 1); 6 Dunino (Fi 4). ⅓

ever, that such 'hybrid' axes are in fact transitional forms leading from Type A towards Type B axes. The theories, hybrid or transitional, are not mutually exclusive in this case.

The Scottish Type B axes exhibit considerable variation in size and in proportion. The suggested differences have been tested by simple quantitative analyses, involving the relations between such measurements as blade-width, total length, butt-width, medium-width and so on. The general shapes of Type B axes are now described.

Superficially, Type B axes appear to fall into three forms, a common form (*a*) with rather squared butt and widened blade, a less abundant form (*b*) generally long and triangular in plan, and a third form (*c*) with more or less parallel sides and abruptly widened blade. It is believed that these three forms are more or less mutually exclusive, not only in theory but in practice, and in Appendix A these are listed under their form names for general guidance.

A large group of Type B axes are approximately triangular in shape (Type Bb) with a relatively narrow butt and widened blade (figs. 5–11). The sides of the axe may be either straight or concave, and diverge towards the blade forming a wide cutting-edge. The blade may be further splayed by hammering until the tips are turned outwards and, very rarely, upwards (recurved). These Type Bb axes are comparable to Harbison's Killaha and most of his Ballyvalley axes; there are over 1,000 axes of this character in Ireland. In length these axes range from 9 cm to 17 cm, but two very large examples exist, one (fig. 5:1) fully 34 cm long and correspondingly wide. (The

abbreviated county names and numbers in the text and in captions refer to Appendix A, p. 79; abbreviations are listed for reference on p. 79.)

Among the axes of this form is a small group which probably was cast from the same mould. The axes are asymmetrical in plan and by their shape and size it is possible that one of the moulds from the Culbin Sands was used (p. 29). The axes are all from north-east Scotland (fig. 7:4, 5, 7). Additionally there is an unfinished axe from Midlothian (fig. 7:1), which could conceivably have come from this mould, with subsequent hammering of the blade only; these typological similarities seem to be supported by spectrographic analyses of 3 of these axes, for all possess similar ranges of trace elements, and belong to metal-cluster C (p. 58).

It is difficult to be positive about any correlation between axe and mould, however, because of the uncertain and doubtless variable amount of expansion by hammering of the blade, butt and sides of the axe. If an ingot, such as that from Perthshire (fig. 3:6), was to be beaten into a flat axe, the amount of expansion of the blade might be as much as 25 mm. in width, and that of the length about 10 mm or more. In fact, the Perthshire ingot is a copper product, without tin, and as such it would not serve as a blank for Scottish Type B axes which are almost entirely of bronze, with very high tin content. In any case, an ingot of this shape could hardly be correlated with the finished product. But most of the axe matrices on the Scottish moulds are not for ingots as such, but are for flat axe forms with expanded blades and narrow butts. In such instances it is believed that the finishing work on the casting would not in fact expand the shape by anything approaching 2 cm; in addition, several of the matrices are sloped at the ends so that the casting would be thinned at blade and butt. In these circumstances the hammering might not expand the axe very much at all. In the case in point, the general shape of the axes suggests that they may have been cast in the Culbin mould, and that subsequent hammering did not alter the basic asymmetry of the casting.

Another 4 axes (fig. 7:6, 8; for list of all matched 'sets' see Appendix D, p. 101) are also closely comparable with one another, and probably represent the products of a single unknown mould. Two of the 4 have been analysed, and belong to metal-cluster A (p. 58). Likewise, 2 small and slender-butted axes with splayed blades may be from the matrix of an unknown mould (fig. 8:5, 6) as are 2 others (fig. 8:4) including one decorated axe. Only one axe of each of these pairs has been analysed.

It is striking, to the writer at least, that only the single matrix on the Culbin mould would produce a flat axe superficially of this form of axe, which above all is triangular in shape. All of the other matrices are basically of a different shape, and would produce axes of the most common Scottish form (see below). It should be noted, however, that the shape of these Type Bb axes recalls certain ground-stone axes of Britain (e.g., Glenluce, Wigtown; Shetland; Croach, Wigtownshire; NMA AF 57, AF 226, AF 329), and the basic form may have been a simple translation into metal of a stone axe. In particular, a few Bb axes of squat shape (fig. 7:2, 3) are closely comparable with stone axe-forms, as well as to the shape of the ingot from Perth (fig. 3:6).

Nearly 90 axes of Type Bb have been recognised in Scotland, and of these, nearly 30 are decorated. This contrasts strongly with the relevant figures for the other abundant axe-form, the common form (Type Ba) with over 130 axes and only 3 decorated; Type Bc axes number 27, with 12 decorated. The correlation between these forms and their metal content is discussed below (p. 54).

A number of decorated axes of form *b* are generally similar in treatment; all have hammered flanges and almost all have very narrow butts. There are no mould-matrices from Scotland that approach the shape of these axes, and this, with their decoration, suggests immediately that the Irish metal-industries may have been responsible. Certainly several of the Irish Early Bronze

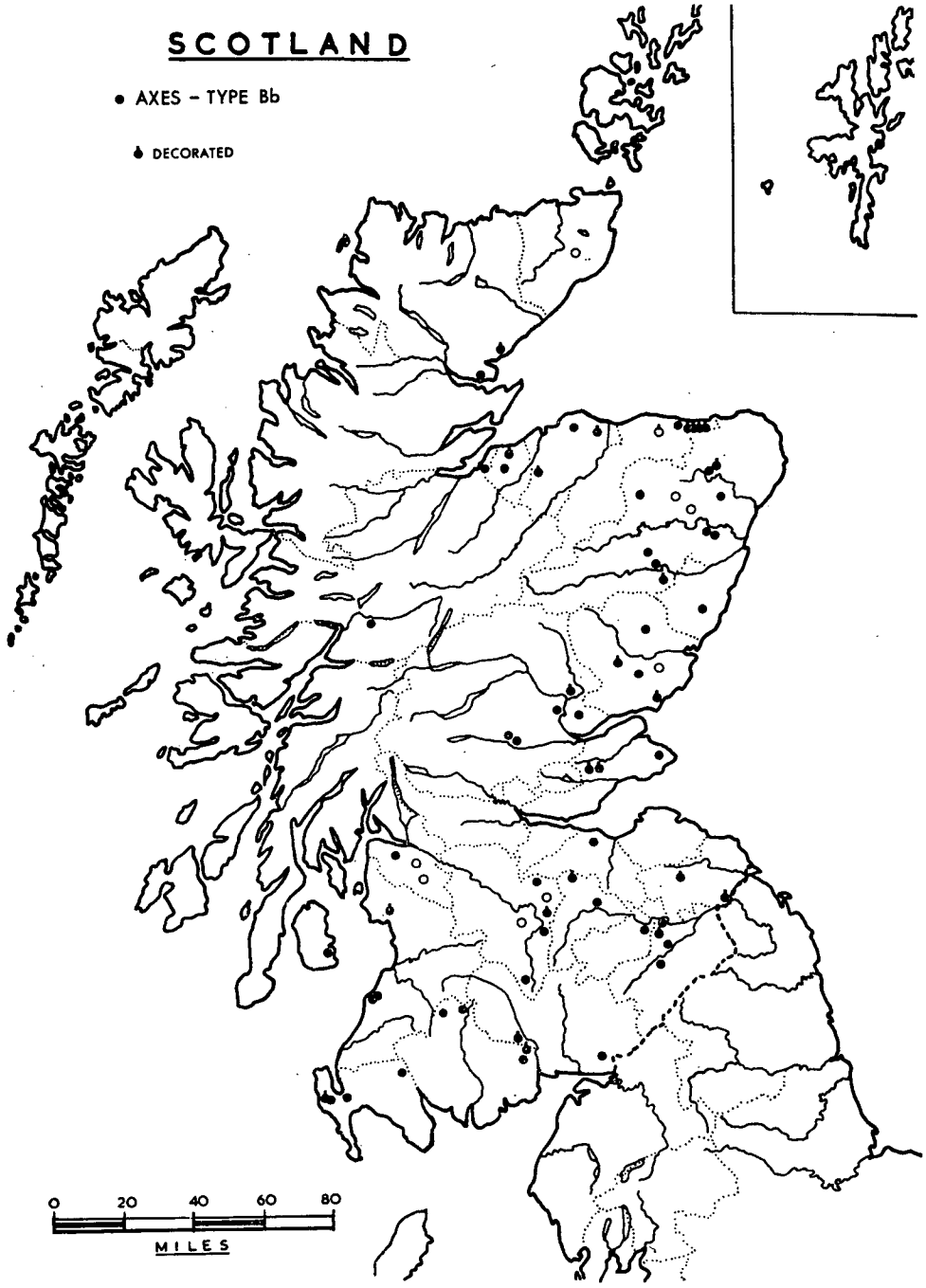

FIG. 9. Distribution of Type Bb axes: open circles, county provenance only.

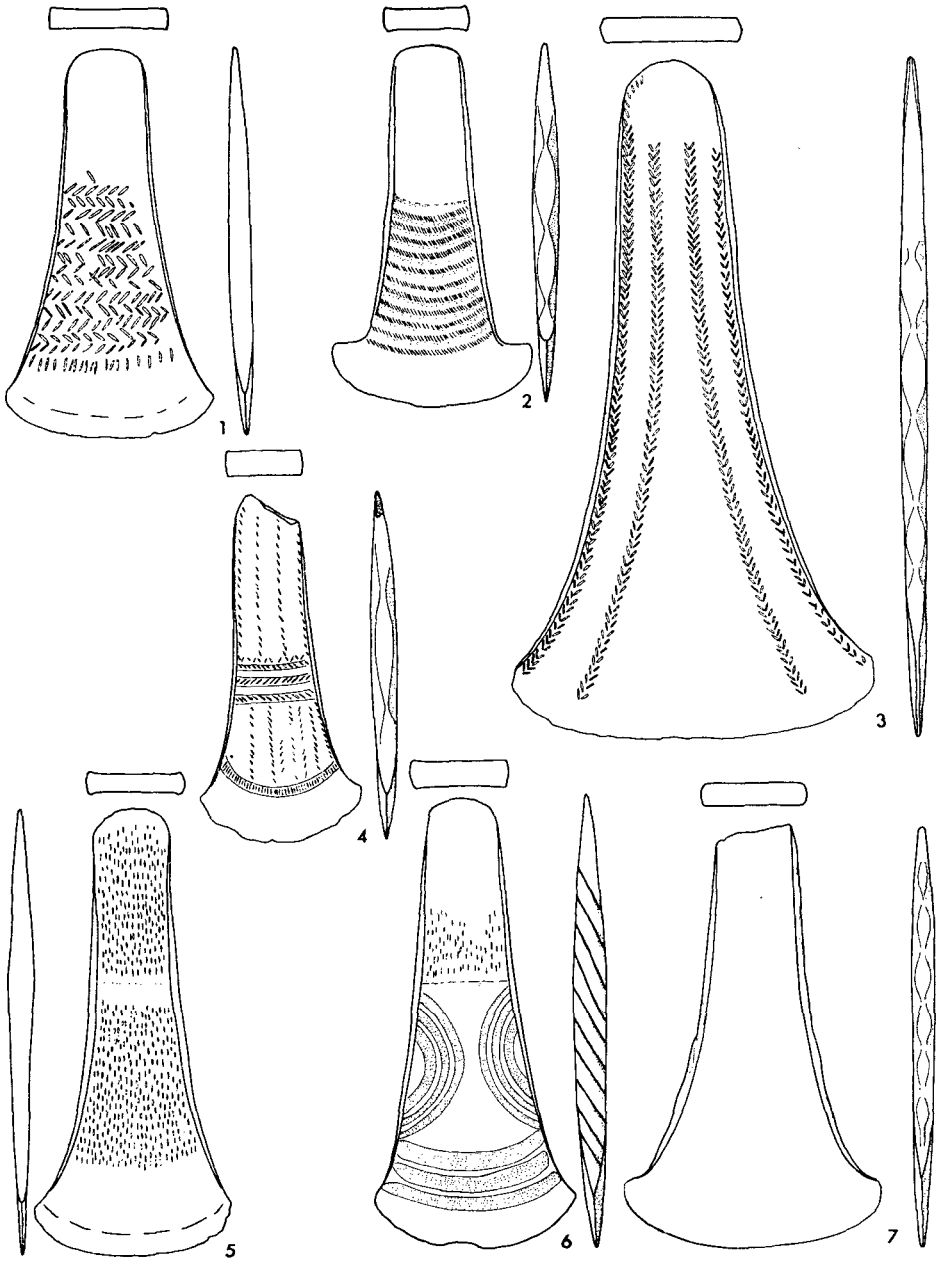

FIG. 10. Axes of Type Bb: 1 (Bf 13); 2 Steilston (Df 8); 3 near Nairn (Nr 4); 4 Terregles (Kk 8); 5 near Eildon (Rx 3); 6 Greenlees (Br 5); 7 Cranleigh (Pt 7). ½

Age moulds carry matrices for axes of this general shape, with excessively narrow butts and wide blades (Coghlan and Raftery 1961, pl. 1). Some of the Scottish axes have particularly narrow butts, generally arched, and most of them are from southern Scotland. Of course, this absence of suitable moulds is in some respect a negative argument, as no moulds at all are known for some

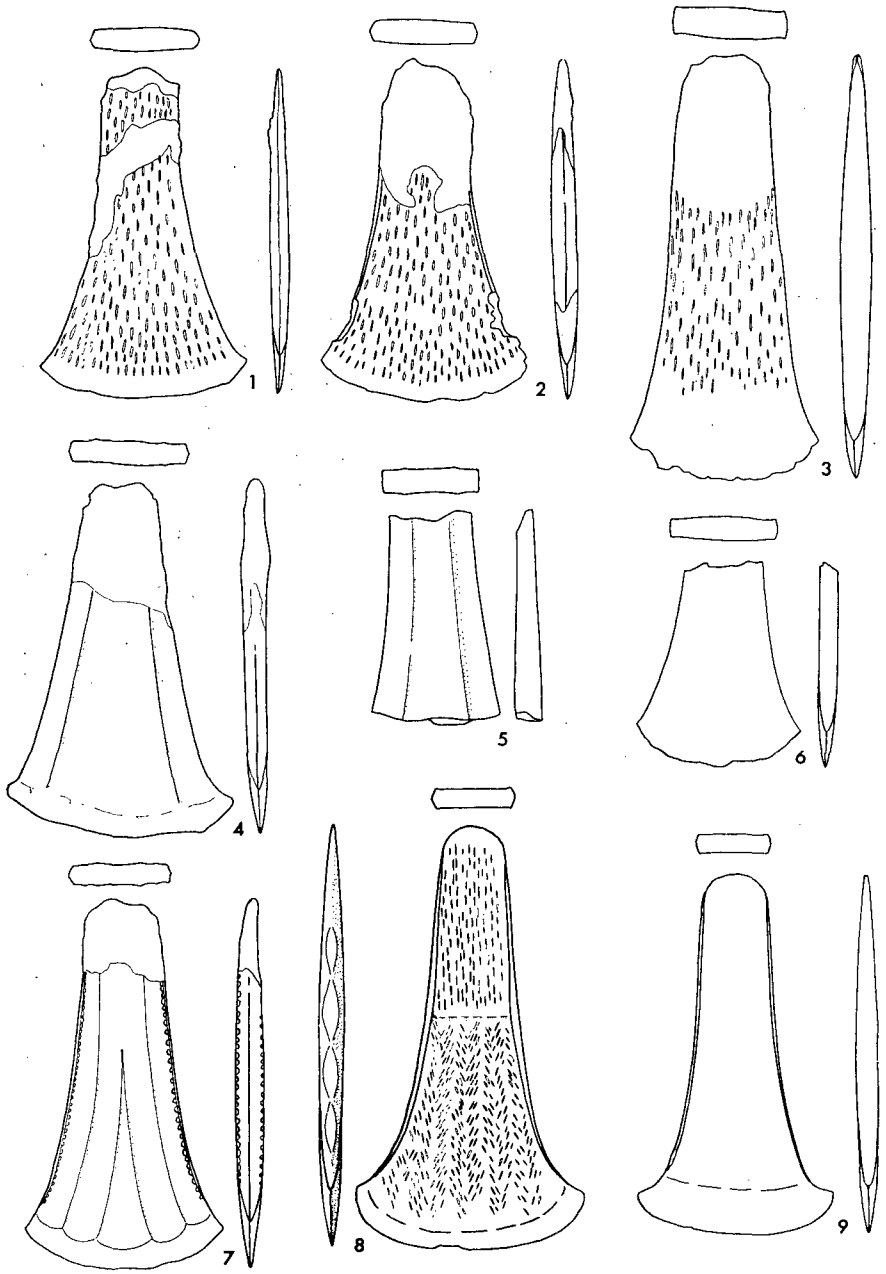

FIG. 11. Axes of Type Bb, other than no. 3: 1–7 Colleonard (Bf 5, 6, 8, 3, 9, 7, 4); 8–9 Low Glenstockdale (Wg 11, 12). ½

Early Bronze Age objects (Britton 1963), but the evidence is at least suggestive of an Irish source. Four of these decorated axes (fig. 8:1–3) may have come from the same mould, and were subsequently beaten into slightly different sizes. Their decoration too is similar in technique. The metal of 2 of these decorated axes belongs to metal-cluster B (p. 59).

Overall, however, this decorated group is quite widely scattered over much of Scotland

(fig. 9) although it can be seen that the southern part of the country possesses rather more than its share of these axes, when compared with the distribution of all Type B axes (fig. 4). The decoration of these axes consists almost entirely of rain patterns on the axe-faces. This may be entirely vertical and cover the entire face (figs. 10:5; 11:1, 2), or it may cover only the lower part of the blade (fig. 8:3). Other axes carry rain decoration arranged partly in vertical and partly in chevron pattern (fig. 11:8), entirely as chevrons (fig. 10:1), or in rows (figs. 8:2; 10:2). The Nairn axe (fig. 10:3) deserves special mention by virtue of its size. Decoration of the sides, in cable or lozenge fashion, also occurs. Other axes have side decoration only (fig. 10:7), or more elaborate facial decoration consisting of arcs or panels (fig. 10:4, 6). Two axes have fluted decoration on the faces (fig. 11:7). It is perhaps of some interest to note that the rain decoration on one axe (fig. 8:2) is partly obscured at one side of a face by the hammering up of a slight flange, showing the sequence of events forming this axe.

In cross-section most of these axes have flat or rounded sides, but some have the sides worked by hammering into bevels (figs. 8:1, 2; 10:3), and many of these are decorated. Case has already commented upon this as a variety known in Ireland, where over 50 examples are recorded (Case 1966, 150), and it may therefore strengthen the argument for Irish connections responsible for these particular axes, as the latter do not conform in all respects with the more abundant forms of Scottish Type B axes which appear to have been produced from local stone-moulds. A list of Scottish bevelled axes appears on p. 102; there are only a few double-bevelled axes recorded from Scotland (Fi 6, Ab 33, no prov. NMA DA 27; abbreviations on p. 79).

Another form of Type B axe, Type Bc, is characterised by straight sides which extend more or less parallel from the butt to a point where the blade expands suddenly into a wide splay which is sometimes recurved, the blade tips turned back towards the butt (fig. 12). Almost all of these axes have flanged sides, hammered up after casting. Type Bc axes are similar to Harbison's Derryniggin axes, of which there are over 300 in Ireland (Harbison 1969). In size the axes range from 9 cm to 15 cm. The 2 smallest axes of this form appear to be products of the same mould and hammering process (fig. 12:3), but suspicion must be cast upon one of these axes as a possible modern reproduction (Ln 12, see p. 93). Three other axes (fig. 12:4) are also likely to have come from another single mould, but were subsequently hammered into slightly different sizes; two others, both decorated (fig. 12:7), are also closely matched. These axes differ from the normal form of axe in this category because the blade is only slightly widened although the sides are straight and more or less parallel. The distinction between these axes and certain Type Bb axes is fine.

Another group of axes of this general form is decorated with two exceptions. These axes are rather small, from 10 to 12 cm in length, and have straight flanged sides leading into widely splayed blades. All have a transverse bevel across the mid-point of the faces, so that each face consists of two roughly flat planes meeting at a slight angle from the horizontal. The decoration consists of elaborate panels of lines or dots on the lower part of the faces, and cable or lozenge moulding on the sides (fig. 12:1, 2, 5, 6, 8). Although no matching axes are known, the general size and appearance of these axes suggest the products of a single tradition, if not workshop. Almost all of these axes remain to be analysed. The Irish axes of this particular decorated variety are well-known (Megaw and Hardy 1938; Butler 1963, 30).

None of these axes appear to be related to any Scottish moulds, and all except one are single finds. The distribution of these axes is sparse, but it might be remarked that almost all of the decorated types are from north-eastern Scotland, from the Tay to the Moray Firth (fig. 13).

The most common form of Type B axe (Type Ba) in Scotland is characterised by a rather square butt, sides that extend approximately parallel from the butt to midway along the length of

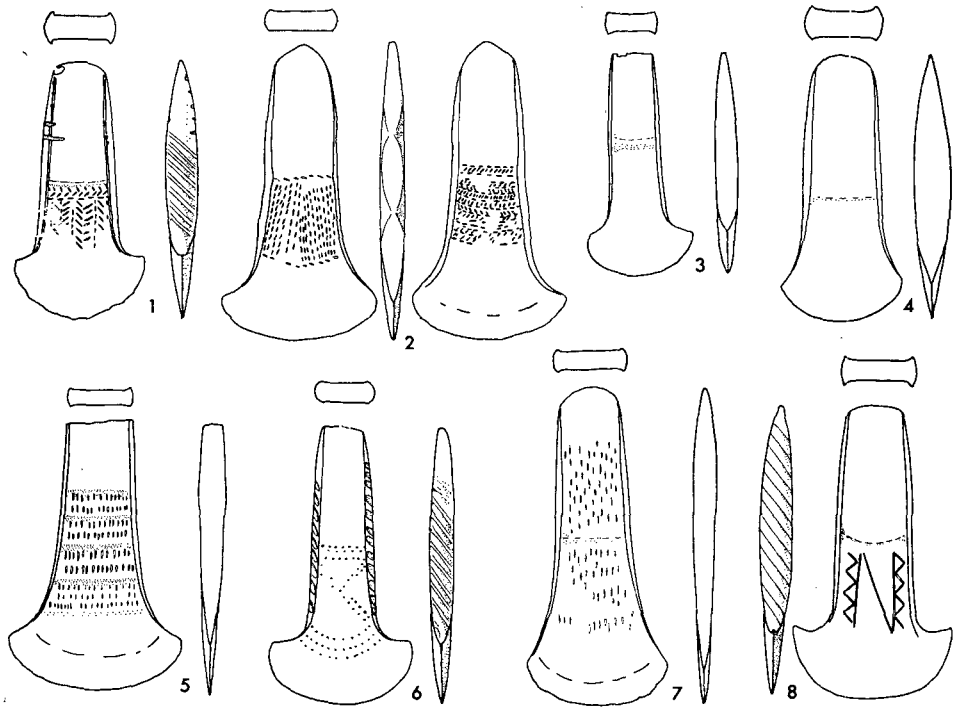

FIG. 12. Axes of Type Bc: 1 ?Oyne (Ab 31); 2 Kevans (Wg 9); 3 (Ab 40); 4 Old Meldrum (Ab 29); 5 Bentick (Pr 2); 6 near Perth (Pr 20); 7 Stracathro (An 18); 8 Rosskeen (Ro 8). ½

the axe where they begin to diverge to form a wide blade which rarely has recurved points (fig. 14). This general form is seen not only on a majority of Scottish flat axes, but also on almost all of the mould matrices for axes. In some cases the moulds may be related to specific axes, and in a larger number of cases groups of axes can be distinguished that were apparently cast in the same moulds (see below). The metal-analyses of some of these axes serve as an interesting comparison with this typological grouping (see below). In contrast to the abundant Irish axes of Types Bb and Bc, Type Ba axes appear to be exceedingly rare in Ireland, and few appear in Harbison's *corpus* (1969).

The axes range in length from 9 cm to 19 cm. Most are flat, but a small proportion have hammered sides forming flanges. Very few are decorated, and patterns are simple. Some axes have bevelled sides, others are waisted and a number have an arched butt. The waisted axes are of particular interest because the slight narrowing of the axe-face about one-third of the way down, from the butt-end, is a feature of many Early Bronze Age axes in north and central Germany. The waisted axes of the Únětician group are common in the metal industries of Saxo-Thuringia (von Brunn 1959, pl. 27, 5–7); the occurrence of a few Irish waisted axes in Ulster has already pointed to Scotland as an intermediate link (Case 1966).

In Scotland, the small group of flat axes of Type Ba having distinct waists are concentrated in the north-east (fig. 15), with a few outliers to the west and south. The several examples in Inverness-shire and Argyll may point to a route by which contact was made between north-eastern Scotland and north-eastern Ireland. No axes of Types Bb or Bc are waisted, but there are 22 waisted axes of Type Ba. A list appears on p. 101. Within the Scottish waisted axes, several

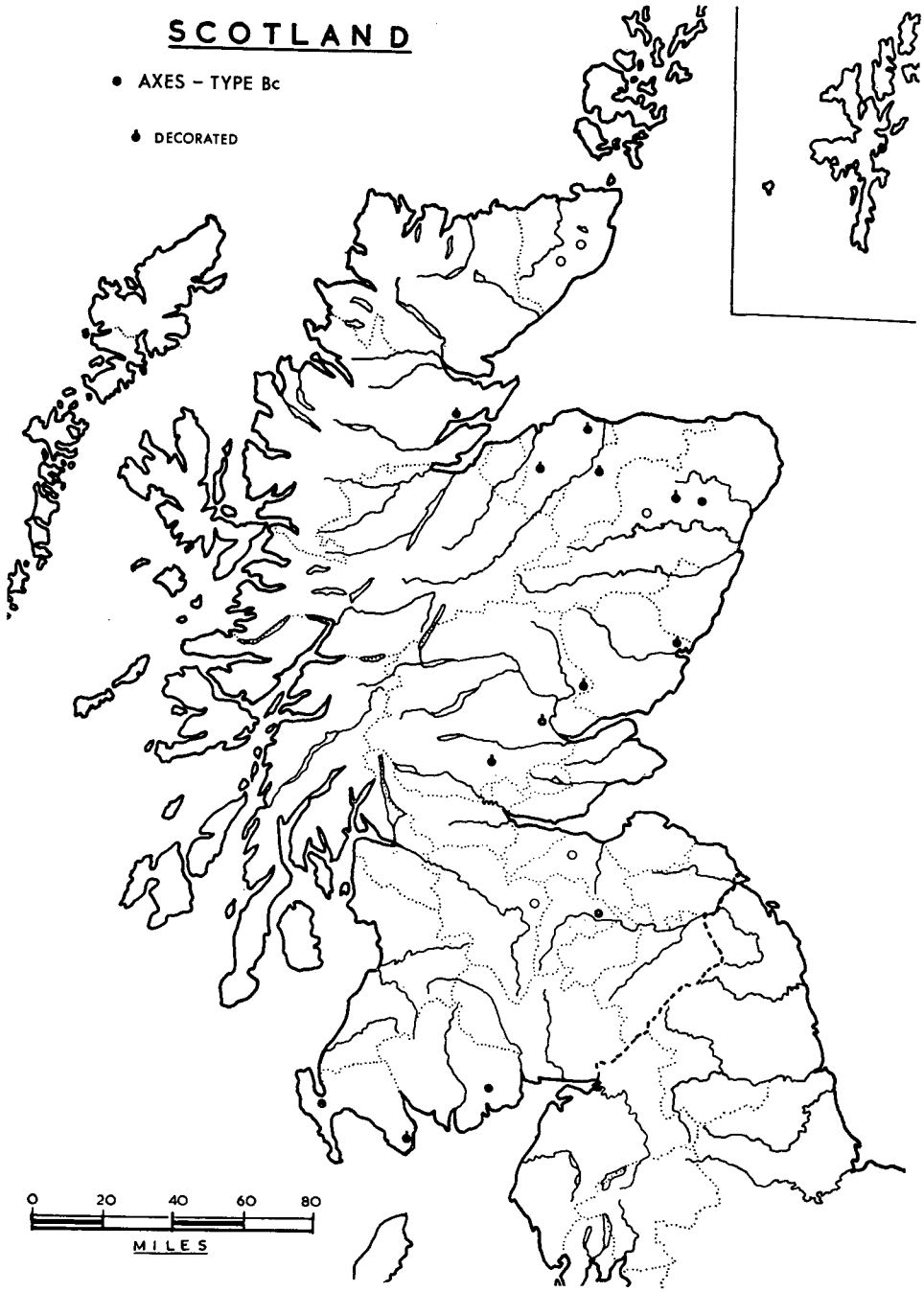

FIG. 13. Distribution of Type Bc axes.

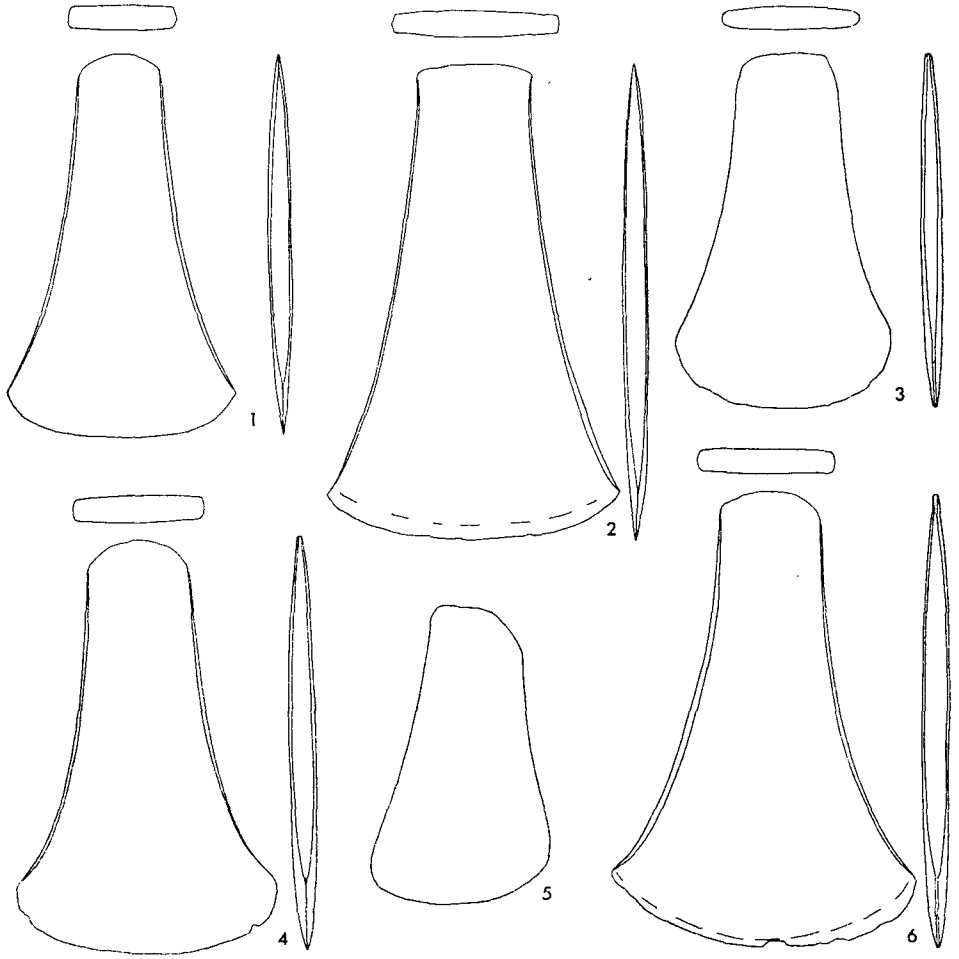

FIG. 14. Axes of Type Ba: 1 Mountskip (Ml 3); 2 near Drumlanrig (Df 3); 3 near Fetternear (Ab 5); 4 Glencarse (Pr 8); 5 Tonderghie (Wg 13); 6 Durris (Kc 4). ¼

groups appear to have been produced from the same moulds, a small rather squat variety (fig. 16:1–3), a slightly larger but still thick variety (fig. 16:4) and a longer form (figs. 16:10, 50:5; lists on p. 101), and including one axe in the Finglenny (Aberdeen) hoard. Of these three waisted groups, analyses have been carried out upon four of the longer axes, and all belong to metal-cluster A (p. 58). Other Scottish waisted axes are much more narrow at the butt and consequently at the waist (fig. 16:5–9); two of these are also of metal-cluster A. It is possible that two of the axes (Ml 2, Mr 2) were cast in the same mould. Of all of these waisted axes, half have arched butts (e.g. fig. 16:4, 9) which, although not as pronounced as on some of the Saxo-Thuringian axes, are nevertheless distinctly reminiscent of these. None have the peaked outline of certain Únětician axes, and none have the cast flanges that are characteristic of the continental axes. In cross-section, most of these axes have rounded sides, but a few have flattened sides and there are several waisted axes with bevelled sides (fig. 16:4, 9; see list on p. 102).

Most of these Type Ba axes, however, are not waisted, nor do they possess distinctive arched butts. Their blades are generally splayed, but not recurved. In shape these axes match precisely

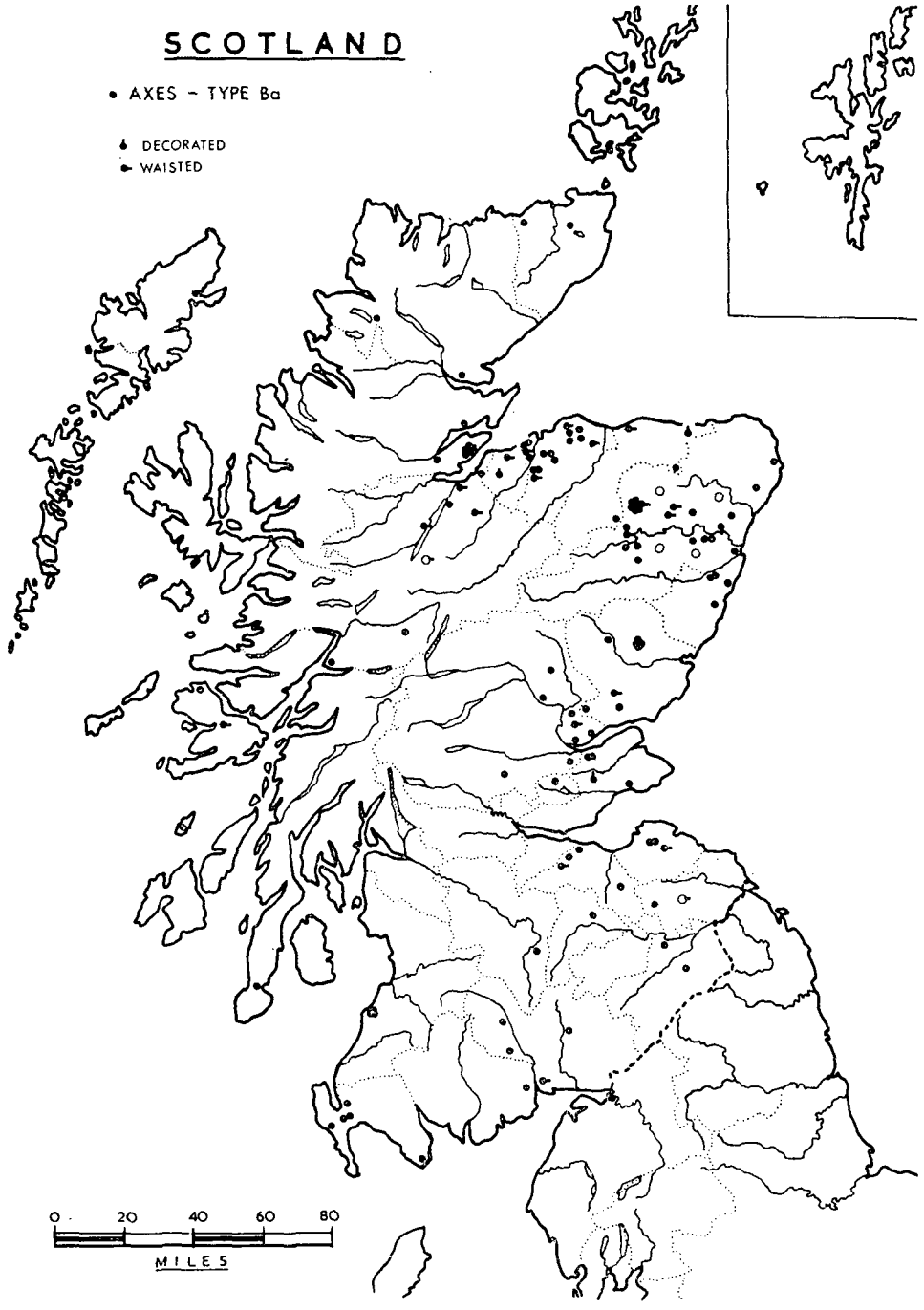

FIG. 15. Distribution of Type Ba axes: open circles, county provenance only.

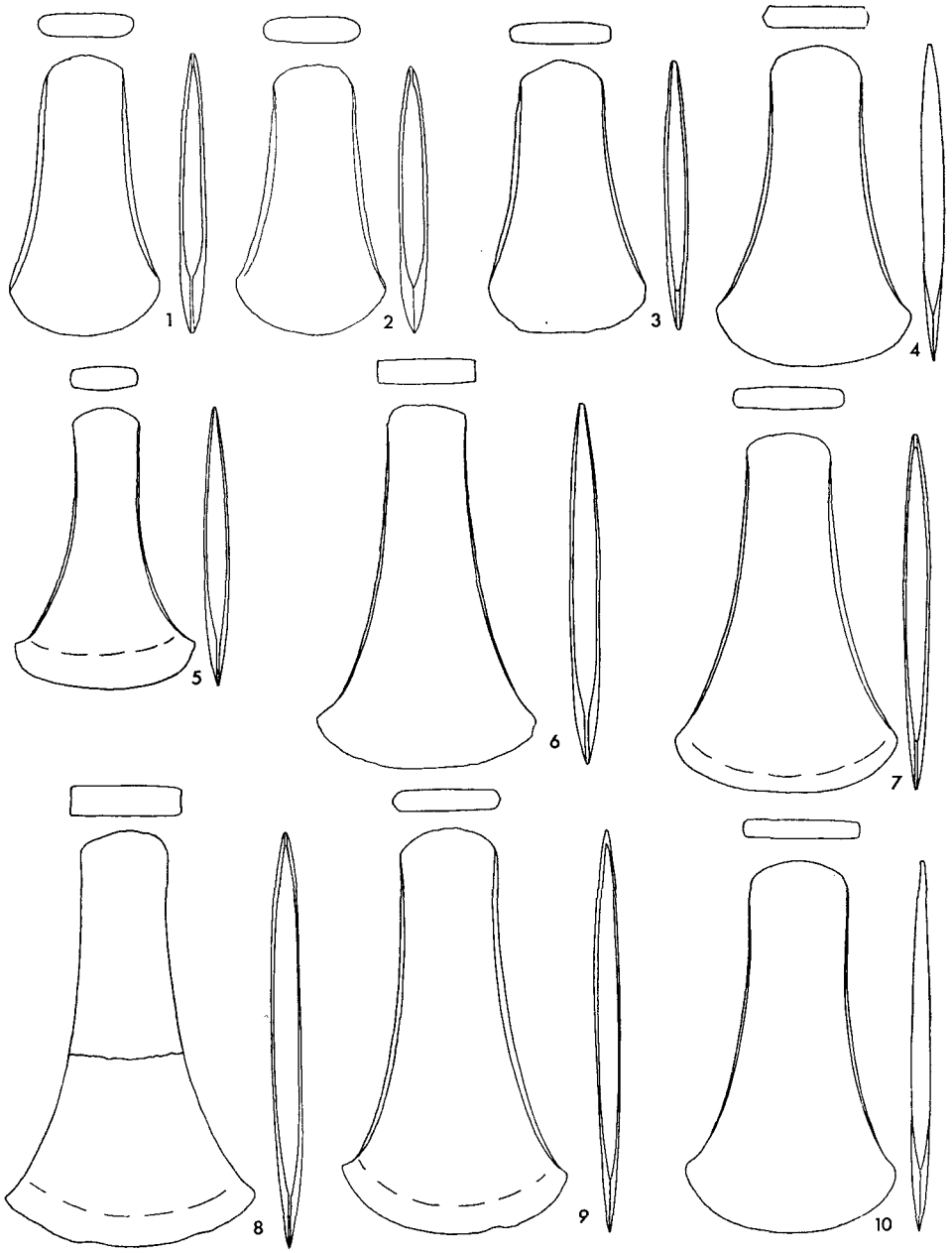

FIG. 16. Waisted axes of Type Ba: 1 near Urquhart (In 12); 2 ?Roseisle (Mr 23); 3 Hill Park (Bf 11); 4 near Nairn (Nr 5); 5 Dyke (Mr 13); 6 near Lhanbryd (Mr 18); 7 Ardhuncark (Ab 2); 8 Waughton (El 5); 9 (Br 7); 10 Premnay (Ab 34). ½

the matrices of almost all of the Scottish flat axe moulds, and it has been possible to make some suggestions about direct correlations between moulds and axes. The dangers in drawing firm conclusions from these suggestions have already been indicated, but it might be emphasised that the degree of hammering of the casting could extend the blade by a centimetre or so, and similarly

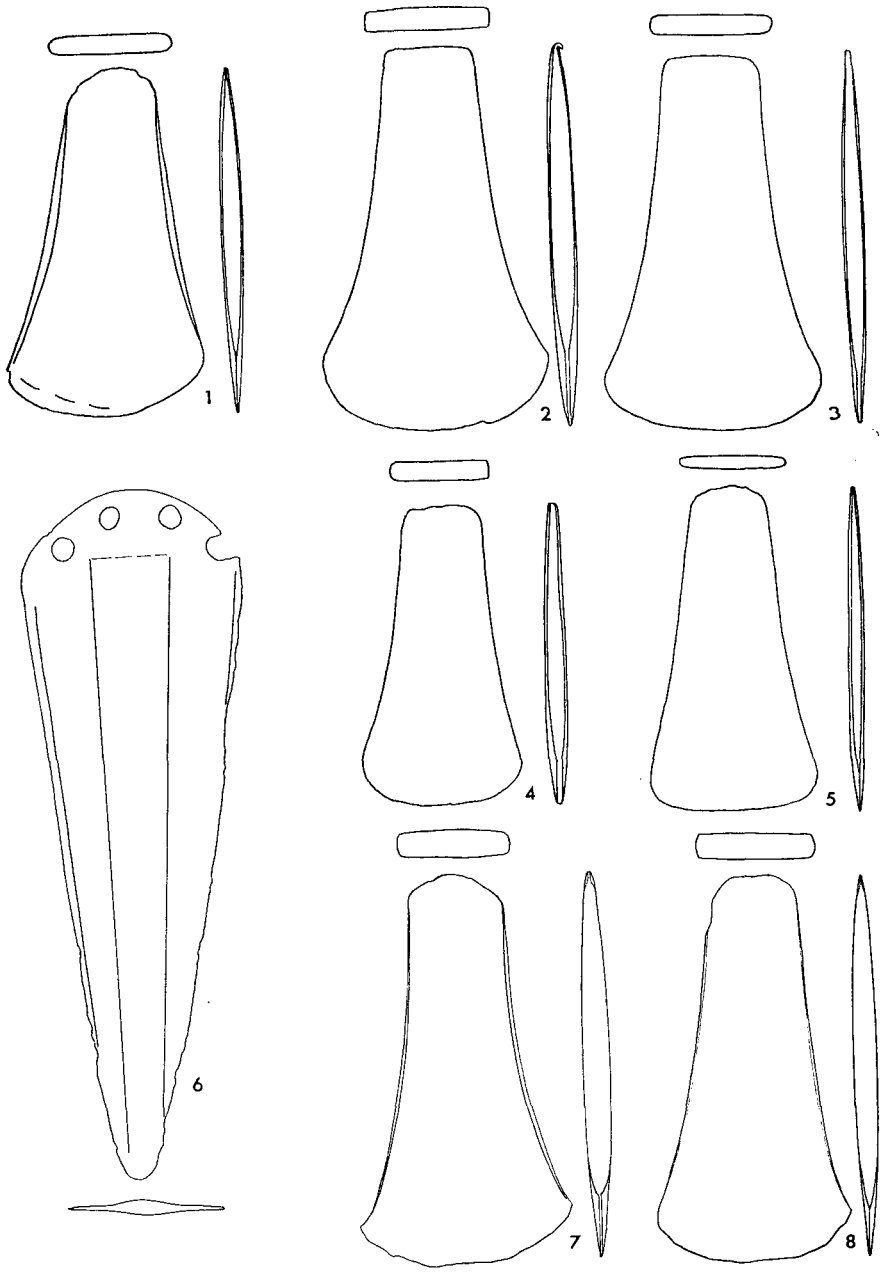

FIG. 17. Axes of Type Ba, with associated halberd: 1 Muchalls (Kc 5); 2–3 Culbin Sands (Mr 5, 6); 4 Briach Moss (Mr 3); 5 Pitcow (Ab 32); 6–8 Sluie (axes: 7 (Mr 26), 8 (Mr 27)). ½

the butt. The blade-width, too, could be extended considerably. The guiding principle in the comparison made between 12 well-preserved matrices and 110 axes, i.e. 1,320 observations, has been to try to relate mould and axe by their overall relative proportions, excluding tips of the blade, and to ignore excesses in axe-lengths of up to 15 mm or so. The result is to a considerable

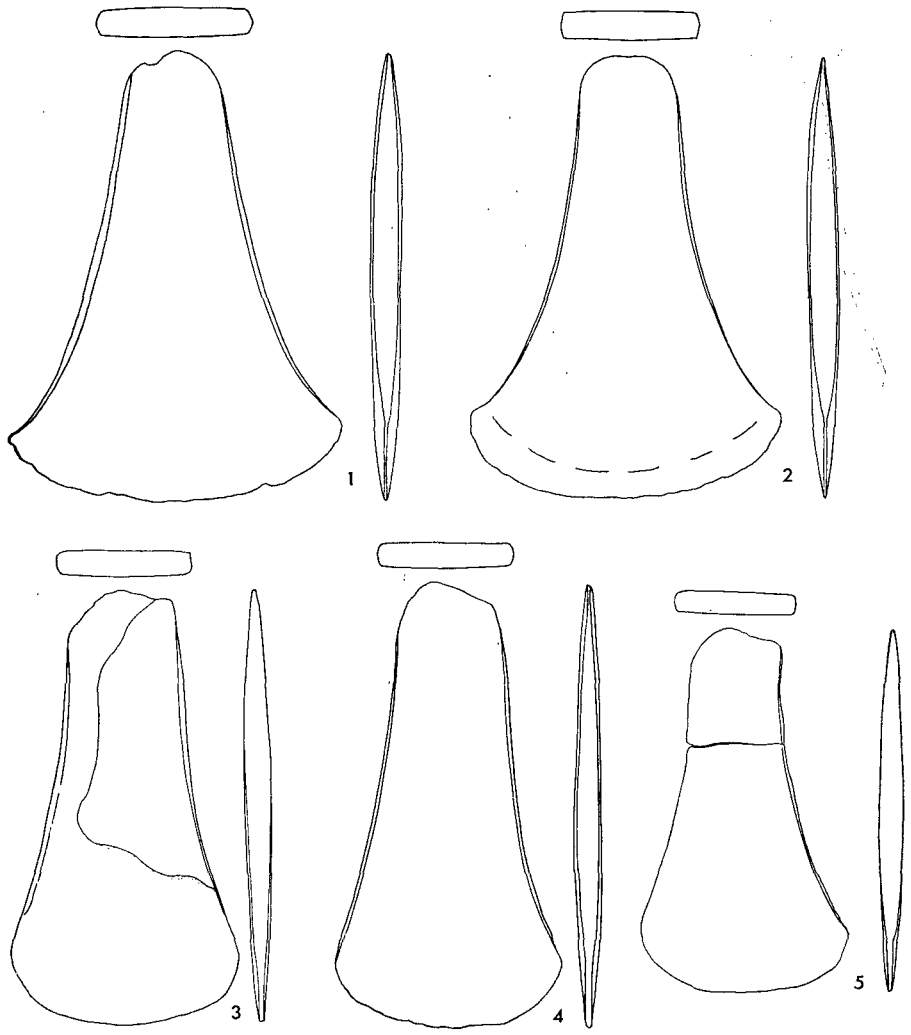

FIG. 18. Axes of Type Ba: 1–2 Boreland (Wg 2, 3); 3 Ravelston (Ml 6); 4 Kirkmichael (Pr 16); 5 Fortrie of Balnoon (Bf 10). ⅓

extent subjective, but is believed nevertheless to be of some value in assessing the range of metalwork from Early Bronze Age Scotland.

A number of axes have relatively narrow blades, and various matched sets exist. These may consist of only two axes (two sets – fig. 17:5 and fig. 17:1) or more than two axes (two sets – figs. 17:4; 49:4; and fig. 17:2–3; see list of axes, p. 101). An axe from the Port Murray hoard (fig. 49:13) may well have come from one of the Foudland (Aberdeen) matrices. Another axe, from Sluie (fig. 17:8), may relate to a Culbin mould matrix. Only one axe (fig. 11:3) of this narrow-bladed group has decoration, and none has a bevelled cross-section.

Most of the axes, however, have wider blades, and these are the most common form of flat axe in Scotland. Most are relatively large, from 13 cm to 19 cm long, and many closely comparable axes exist. Two axes, one from the Sluie hoard (fig. 17:7), and one from the Finglenny hoard (fig. 18:5) may have been cast in one of the New Deer mould-matrices. The two axes in the pre-

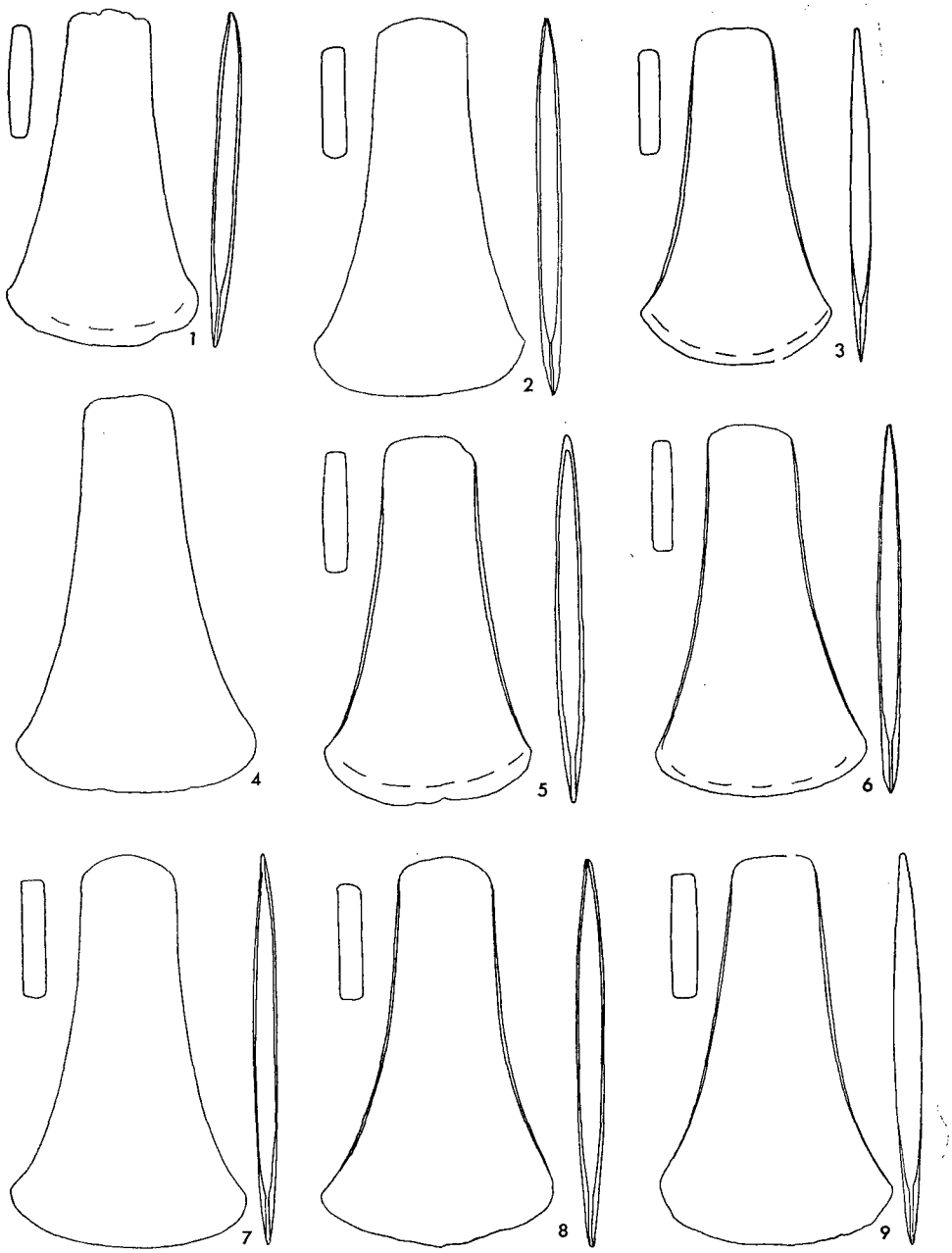

FIG. 19. Axes of Type Ba: 1 Tarland (Ab 37); 2 Baldownie (An 8); 3 Stair Estate (Wg 14); 4 Kingsmeadows (Pb 5); 5 Kildrummy (Ab 20); 6 Inchnadamph (Su 2); 7 Newtyle (Pr 18); 8 Kintore (Ab 24); 9 Newseat of Ardo (Ab 28). $\frac{1}{3}$

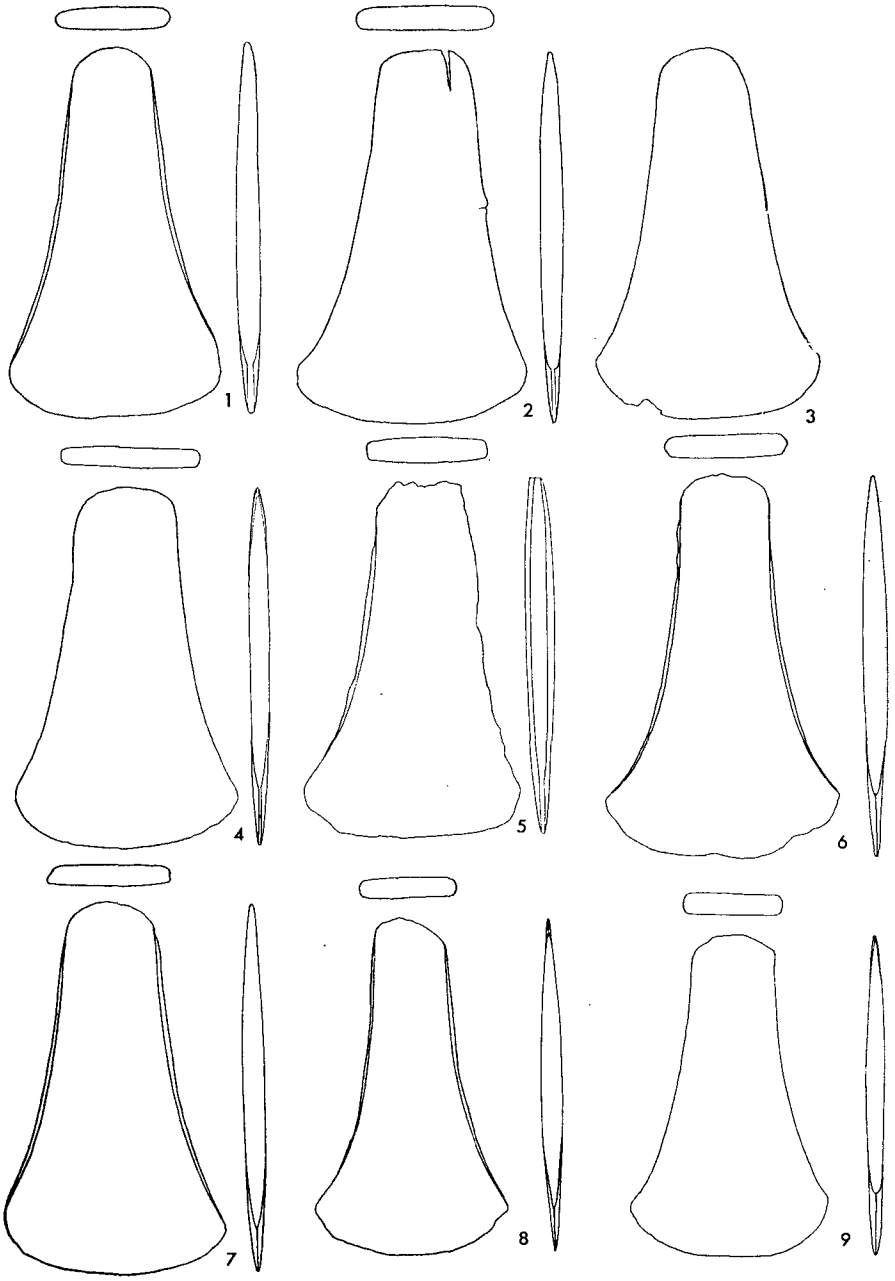

FIG. 20. Axes of Type Ba: 1 (Ab 41); 2 Airds (Kk 1); 3 The Glebe, Clova (An 12); 4 Du Bhar (Ar 2); 5 Kincorth (Ab 21); 6 Brockhillstone (Df 2); 7 Loan Farm (Pr 17); 8 Glen Drynoch (In 7); 9 Glack (Ab 19). $\frac{1}{3}$

sumed Boreland hoard (fig. 18:1–2) are probably from the same model, if not mould. Other matched sets with possible associated moulds are as follows, with full list on p. 101: 3 axes (figs. 18:3, 4; 50:4), one of cluster A and one of cluster C metal, including an axe from the Ravelston hoard and one from Finglenny, with Kintore mould; 6 axes (fig. 19:1, 3) with Foudland

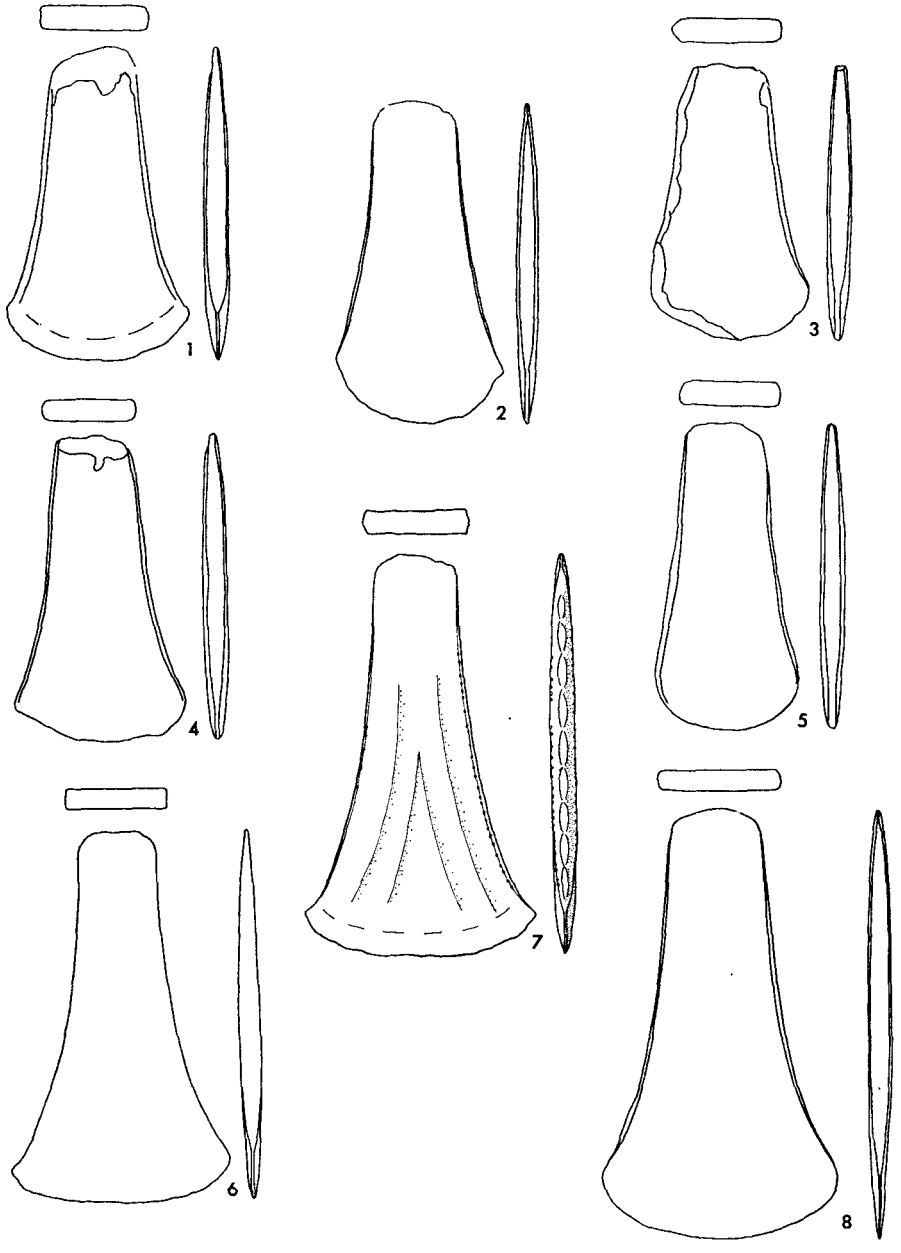

FIG. 21. Axes of Type Ba, other than no. 6: 1–5 Ladyhill (Ro 3, 4, 5, 6, 7); 6–7 Barevan (Nr 2, 1); 8 Burrelton (Pr 5). ½

mould; 5 axes (figs. 20:6; 21:7; 50:8) two of cluster A and one of cluster D metal and including one axe from each of the Finglenny and Barevan hoards, with Culbin mould; 6 axes (fig. 19:4, 7–9), two of cluster A metal, with Strathconan mould; 12 or 13 axes (figs. 20:1–5, 7; 49:1, 3), seven of cluster A and one of cluster C metal including axes from the Balnoon and Auchnacree hoards, with moulds from Culbin or Strathconan; 5 axes (figs. 19:2, 5, 6; 28:5; 39:1), three of

cluster A metal, including axes from the Migdale and Abdie hoards, with moulds from either Culbin, Marnoch, Foudland, New Deer or Burreldales. This last example illustrates both the difficulty of correlating finished products with matrices, and the basic shape-similarity of a majority of axe-matrices from Scotland. The distribution of moulds is distinctly north-eastern, and there can be little doubt about the industrial centre for the common axe shape. The known moulds and their possible products are plotted on the map (fig. 25). Additionally two other axes (fig. 20:8, 9) may have been produced in the Foudland mould, although subsequent hammering has resulted in axes of slightly different dimensions. Other matched sets exist, but without any accompanying mould (e.g., three axes, figs. 21:8; 28:6, two of cluster A metal).

Of the 110 or so axes of this common Scottish form, only 4 are decorated (fig. 21:7). In view of the large number of decorated axes of the triangular and narrow-sided forms, Types Bb and Bc, with a corresponding lack of Scottish moulds for these shapes, it is tempting to assign all or almost all of the Scottish decorated axes to an Irish source.

Nevertheless, the decoration on Type B axes is important for chronological purposes. Apart from internal hoard-compositions, the chronology of the Scottish Early Bronze Age depends upon outside contacts, and the decorated axes are particularly important in this connection (see p. 72).

FLANGED AXES

Distinct for the most part from the Type B axes, which may be entirely flat or with hammered flanges, is a group of Early Bronze Age axes with cast flanges. These are the flanged axes of Arreton type (Britton 1963, 286), Irish Derryniggin axes (Harbison 1968), and Megaw and Hardy's Type III axes (Megaw and Hardy 1938).

The Scottish examples of this axe-form, the earliest in the true (cast) flanged series and therefore called Class I flanged axes (Coles 1964, 87), are not numerous; about 20 axes are known. The Class I flanged axe has generally parallel sides which extend from a squared or slightly rounded butt well down the axe to a point near the blade where the sides splay rapidly to form a wide blade (fig. 22:1–9). On half of the Scottish axes the blade is recurved, the tips pointing towards the butt. The flanges extend along the entire length of the axe-body, from butt to the blade expansion. The flanges range in height from about 2 mm to over 6 mm, and in side-view they appear as an even curve from butt to blade. In these respects the Class I axe differs from the Class II and III axes of, nominally, the Middle Bronze Age (Coles 1964). Class I axes do not possess a stop on their faces, but there is generally a slight bump or ridge near the middle of the axe-face. A generic relationship to Type Bc axes is likely (fig. 12).

Both flanges and faces of Class I axes may be decorated. The ornamentation of the flange may consist of grooves or ridges in herringbone or cable patterns (fig. 22), but the facial decoration is more varied, consisting of grooves and dots arranged in patterns on the upper blade. Rather comparable decoration occurs on some of the groups of Class II axes in Scotland. In particular, the Caverton group of axes has decoration on both flanges and faces which closely recalls that on Class I axes (e.g. fig. 22:10), and it is likely that these forms of flanged axe are closely related (Coles 1964, 89). Only two analyses of Class I flanged axes have been made (fig. 51:1, 2) and these are of clusters B and D metal.

Note should perhaps be taken of the actual number of decorated axes with cast flanges in Scotland. In their classic paper of 1938, Megaw and Hardy listed 13 of these axes; of these, 2 are Type B axes and do not have cast flanges, 6 are Class II and III Middle Bronze Age flanged axes, and 5 are of our Class I. To these totals we can now add 5 more decorated Class I axes as well as

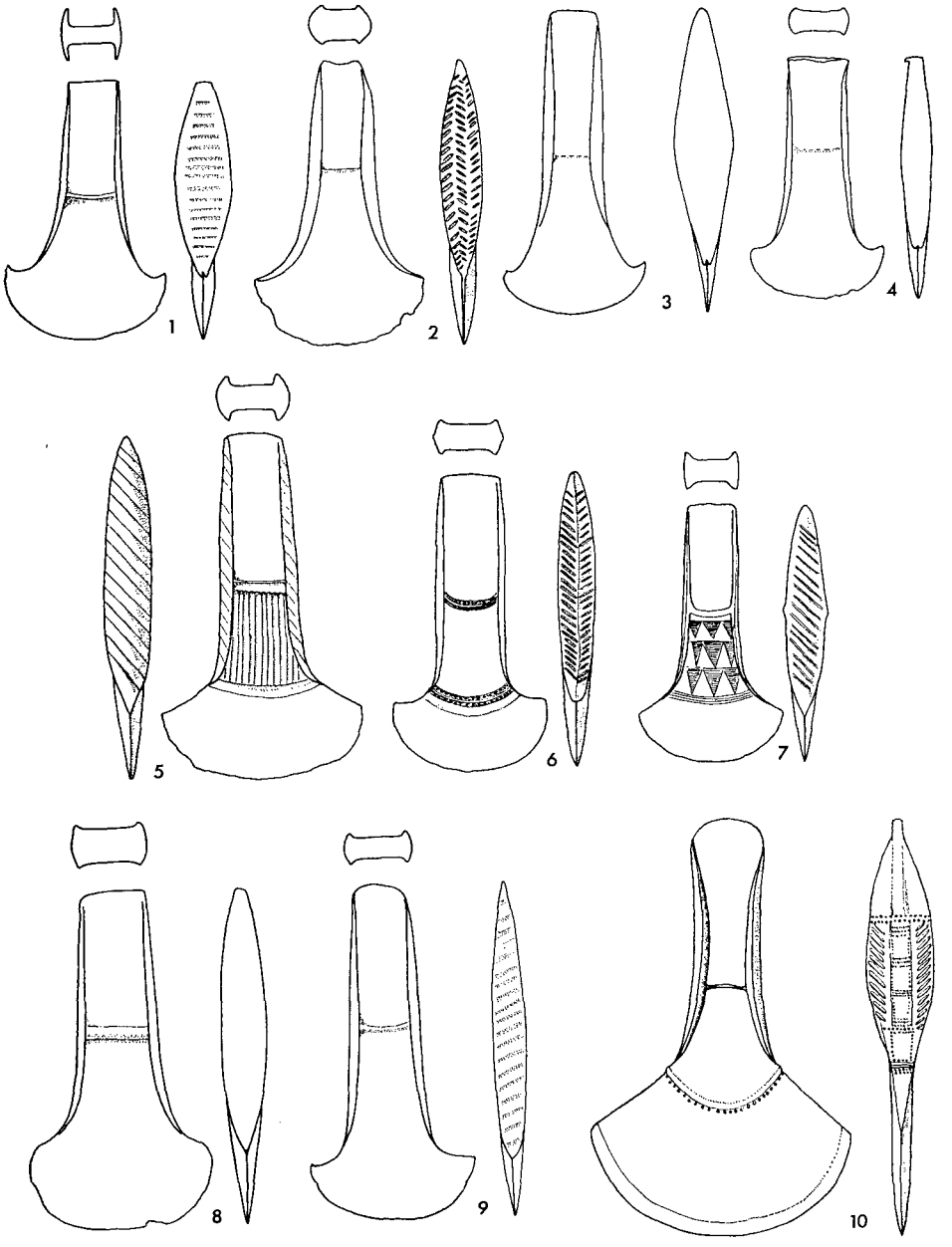

FIG. 22. Flanged axes of Class I, other than no. 10: 1 Achinroer (Ar 1); Western Golcantray (Nr 6); 3 Barwhillantry (Kk 4); 4 near Spynie (Mr 29); 5 Applegarth (Df 1); 6 Dams (Fi 3); 7 near Perth (Pr 21); 8 Ladyland (Ay 3); 9 (Pb 4); 10 Bannockburn, Class II flanged axe. $\frac{1}{3}$

5 more decorated Class II axes. The distribution of Class I axes (fig. 23) tends to be southern, but in view of the small numbers this cannot be considered to be significant without supporting evidence (see p. 73).

It is generally believed that axes of the Arreton tradition, Scottish Class I flanged axes, did

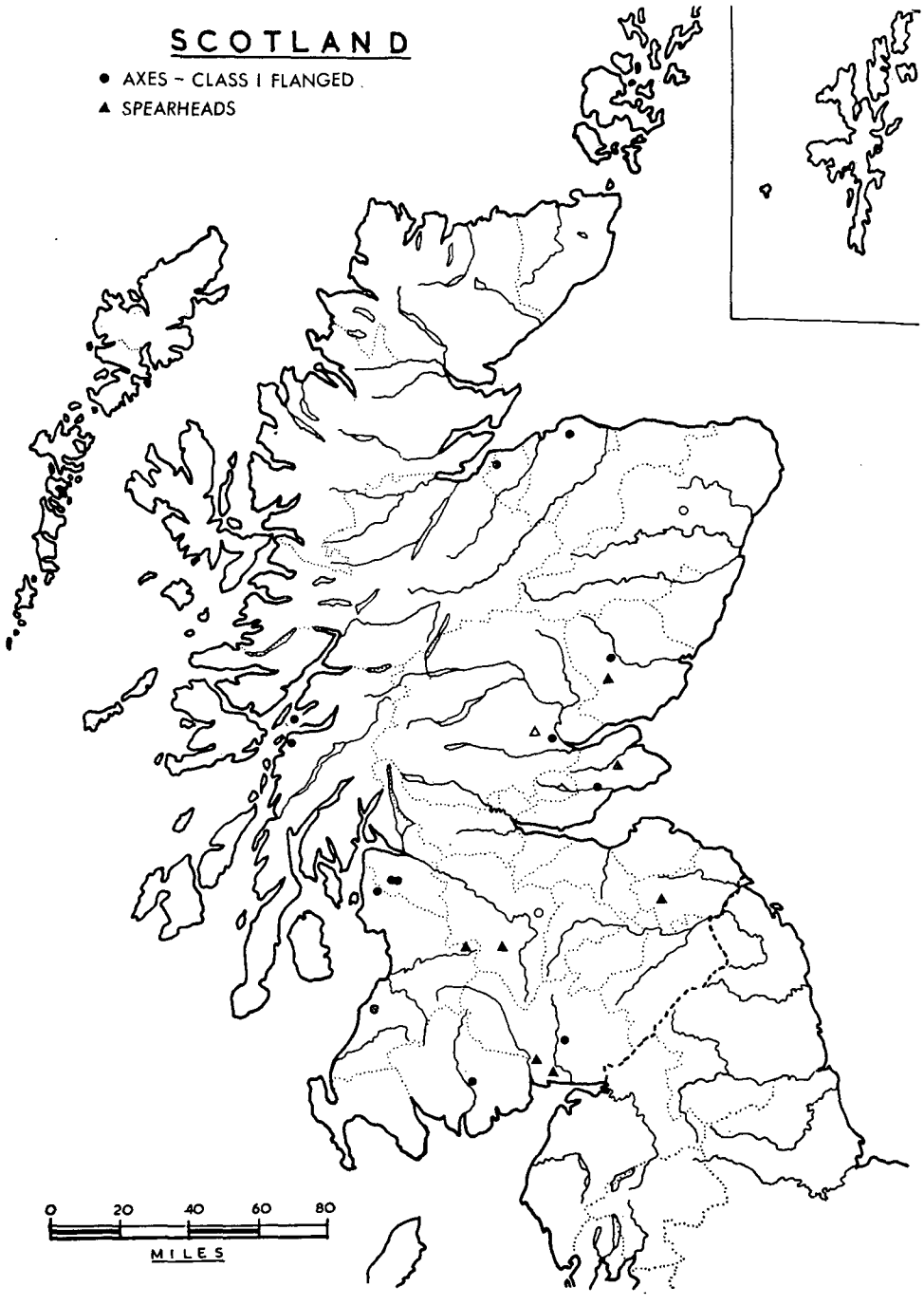

FIG. 23. Distribution of Class I flanged axes and spearheads: open circles, county provenance only.

not develop independently in the British Isles (Butler 1963, 44). The distribution of these axes tends to be eastern and southern in the British Isles (Fox 1947, pl. VII; Britton 1963, fig. 20), and it has been suggested that the Early Bronze Age flanged axes of Saxo-Thuringia played a role in stimulating the development of these British-Irish axes. It is, however, immediately obvious that Class I axes are very closely related to the hammer-flanged axes of Type B, in particular those narrow-sided forms, our Type Bc; these axes have parallel sides, splayed blades, and their decoration is similar to that of the cast-flanged axes. The only difference lies in the nature of the flanges, the one apparently hammered, the other cast. In addition, if the central European cast-flanged axes are believed to lie behind the British-Irish production of both Type B (flat) axes and Class I flanged axes, the chronological separation in this country of these products into two distinct periods, E.B.A. 1 and 2, Migdale-Marnoch and Arreton traditions, Wessex 1 and 2, seems a little difficult to maintain in the absence of other evidence (see p. 73). It is more likely that the source for the Class I flanged axes lies in the indigenous hammer-flanged axes of Type B.

MOULDS

Eleven stone moulds for the production of Early Bronze Age objects are known from Scotland. In addition, there are several other moulds that may have been in use during this period, but which lack identifiable matrices or other corroborative evidence. The moulds are all one-piece, sometimes called 'open moulds', but it is likely that a cover of stone or wood was used during the actual casting operation. The eleven moulds from Scotland make up over half of the total known from all of Britain; there are a number of Irish moulds as well, and the total for these islands is likely to be near forty. This may represent only a small fraction of the original total of stone moulds, how small cannot be known for certain, but an estimate may be made. In the discussion of Type B axes, it was noted that a number of axes appeared to have been the product of certain specific moulds. Nearly 50 Type B axes may be tentatively identified with the 11 moulds from Scotland. The total number of Type B axes from Scotland is about 270, and therefore we may have recognised the moulds for 20%; some 40 or 50 moulds remain to be found on this reckoning, but this total must then be multiplied by an unknown factor to allow for axes not yet discovered. Probably the range of axes now known accounts for most of the specific forms, so that this factor may be small.

The matrices on the moulds are generally for flat axes (Pl. 4b, fig. 24), but other shapes also occur, including bars, blades and rings. Most moulds have matrices for more than one object; details are given in Appendix A. Generally the moulds are blocks of stone, described as sandstone, which have two main parallel faces bearing the matrices. Sometimes the ends and sides of the mould also have matrices.

The distribution of the moulds is essentially north-eastern (fig. 25), and this must be contrasted with the known distribution of copper which is south-western (fig. 26). The manner by which this or other metal reached the north-east is uncertain, and cannot be considered here. It may be seen, however, that the products of the moulds are distributed precisely in areas outside the copper-bearing regions. Naturally, there is a cluster of products adjacent to the areas in which moulds have been found, but the steady stream of products down the east coast to the Tay, hardly beyond, is noteworthy. There are few objects south of the Tay that demonstrate any close relationship to the workshops of the north. The very few finds in the far west, in Skye, western Sutherland and Mull, do not seem to point to any appreciable interest on the part of the north-eastern workshops to trade or take their products in this direction. In fact, the extraordinary rarity of metal objects of the Early Bronze Age in the north-west (fig. 4), and the similar absence

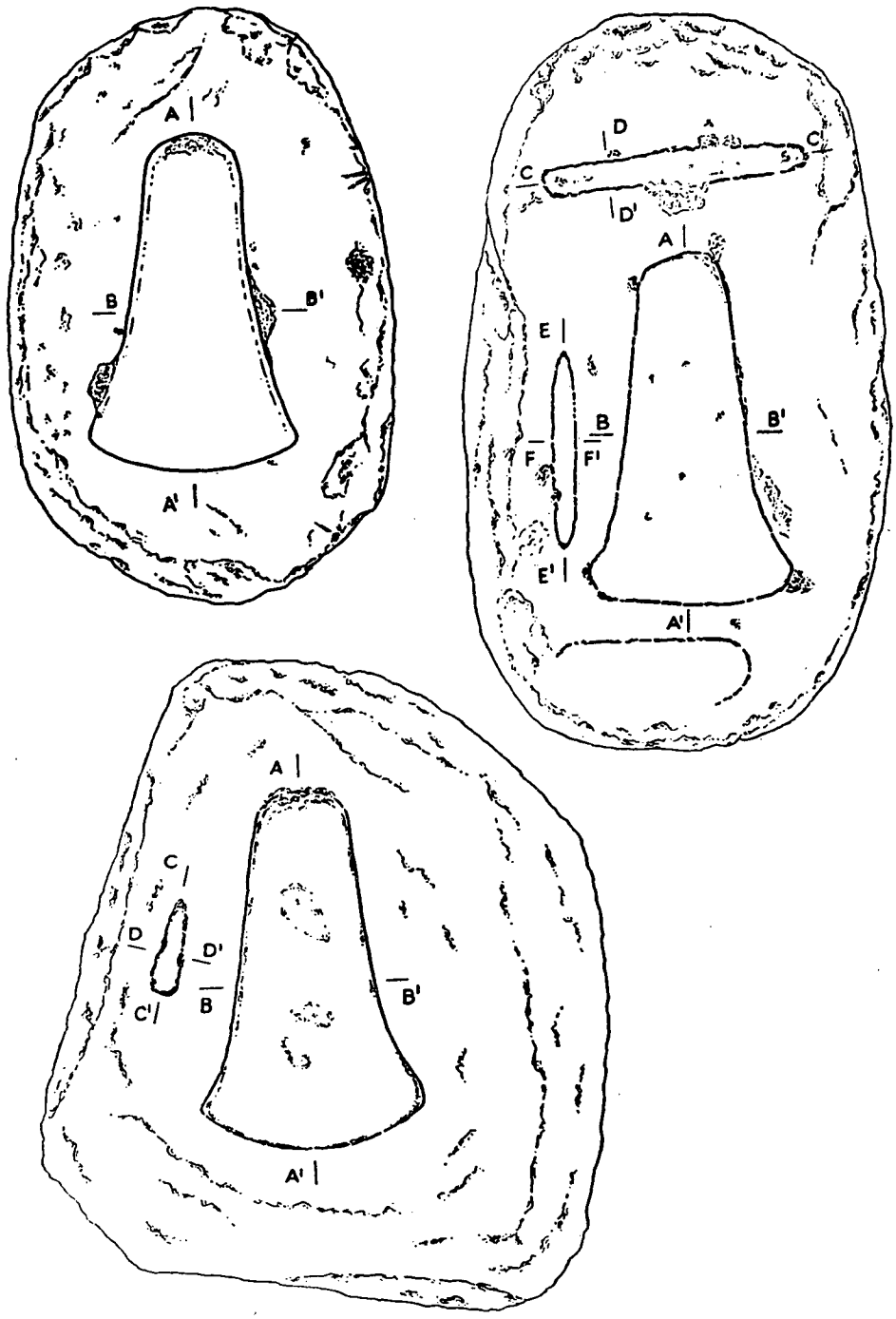

FIG. 24. Stone moulds for flat axes of Type B: 1 Marnoch (Banff); 2 Burreldales (Aberdeen); 3 Strathconan (Ross). $\frac{1}{3}$ (from Britton 1963)

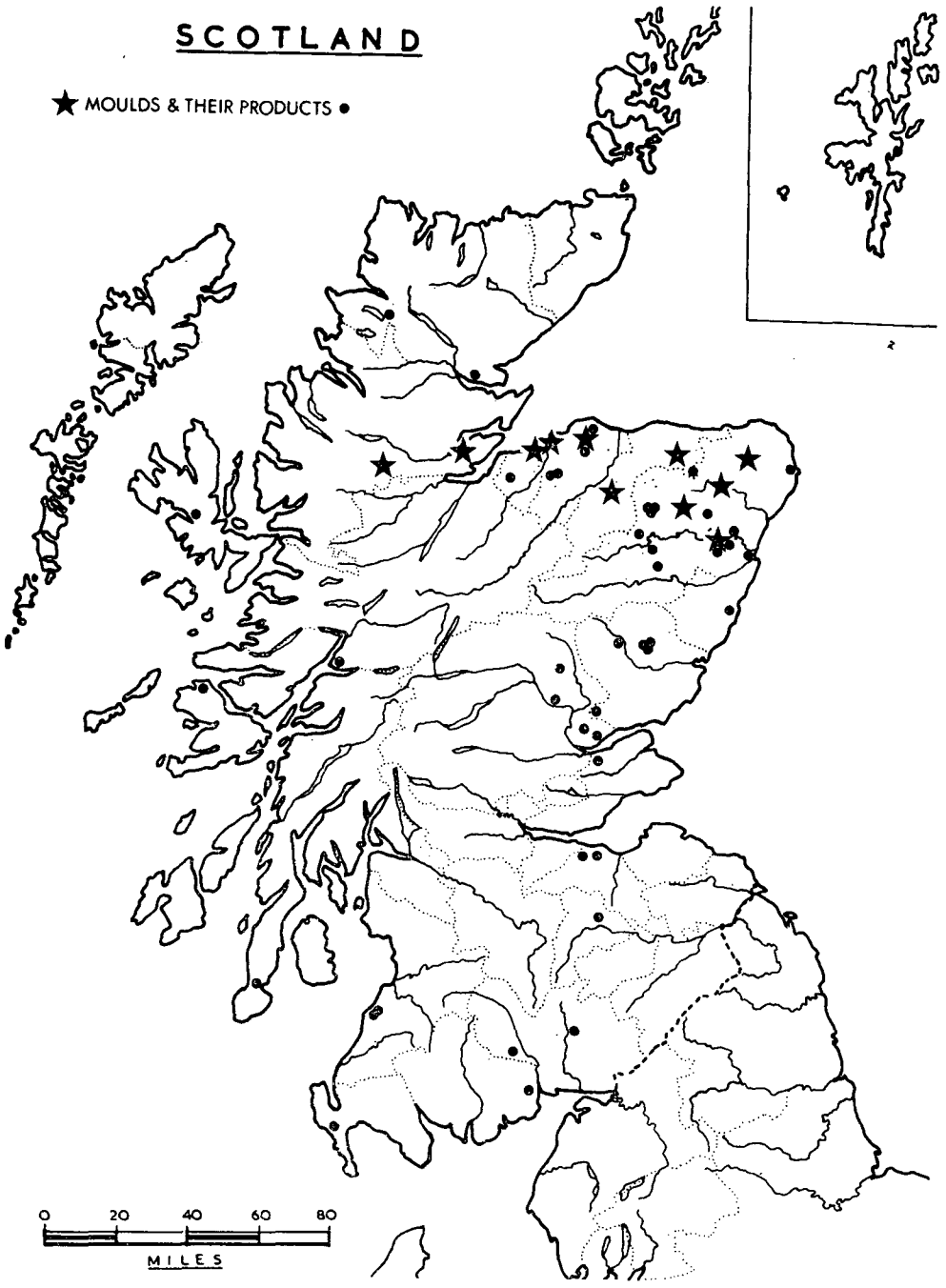

FIG. 25. Distribution of moulds for flat axes and their products.

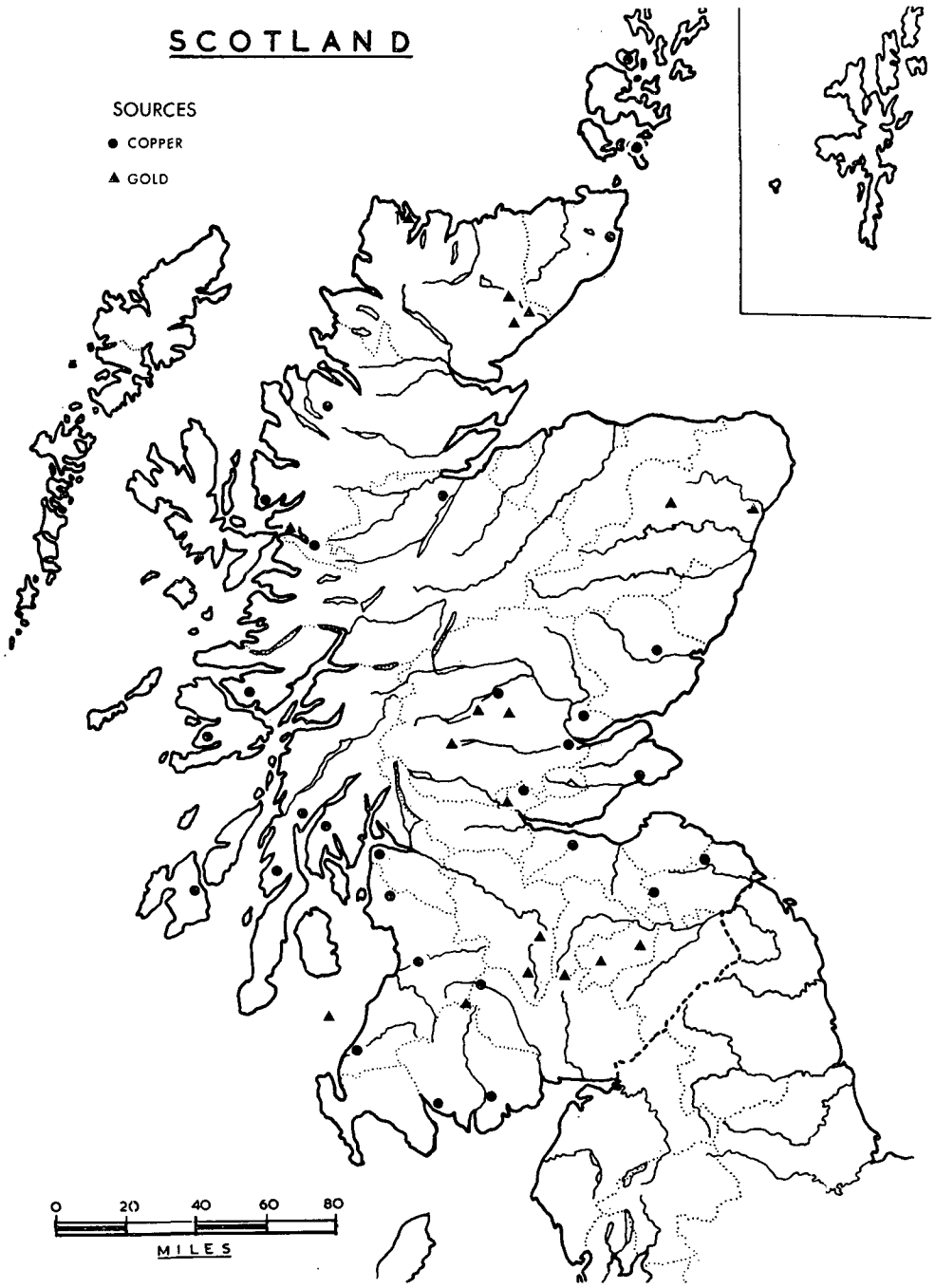

FIG. 26. Distribution of recorded sources of copper and gold.

during the Middle Bronze Age (Coles 1964), must indicate an almost complete absence of metal during the second millennium B.C. in both the Inner and Outer Hebrides.

In Scotland carvings of flat axes, and perhaps also of halberds, occur on some of the major megalithic monuments in Argyll, at Nether Largie north cairn and at Ri Cruin. The interpretation of these carvings is often directed towards some form of sympathetic magic in terms of copper supplies; proof absolute is not likely to be forthcoming. In general the axe carvings here and elsewhere are shallow and imperfect, and are not likely to have been used as moulds themselves.

DEPOSITION OF AXES

A curious aspect of the three largest axe-hoards in Scotland is that some of the axes in each hoard are snapped in two, across the middle. The Finglenny hoard (fig. 50) has two axes treated in this way, as well as an axe-butt and an axe-blade, probably not part of the same axe. The hoard from Colleonard (fig. 11) has an axe-blade and the middle part of another axe, and the only surviving axe from the Fortrie of Balnoon hoard (fig. 18) is snapped across the middle. The single axe in the Mill of Laithers find was also snapped in two (fig. 39:21). From the Auchnacree hoard there is a snapped axe (fig. 49:1), and the Abdie (fig. 28:5) and the Dunino (fig. 8:6) hoards each possesses one axe bent across the middle which renders them useless as utilitarian objects. There are axe-blade pieces from eight single finds, some of impressively large axes (fig. 27). One axe-butt and both pieces of a large snapped axe complete the Scottish total (list, Appendix D). The

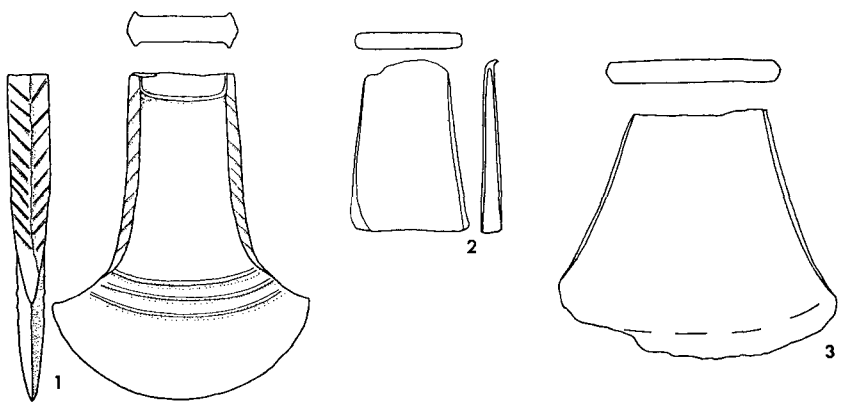

FIG. 27. Broken axes: 1 Bulleid (Pr 4); 2 Roseisle (Mr 22); 3 Auchnagarrow (Ro 1). ½

number of axes treated in this way is 21, of which 11 are in hoards, and, of the others, 5 are particularly large specimens. It is tempting to think either of ritual killing of these objects before their deposition, or the ostentatious deliberate destruction of valuable objects, akin perhaps to *potlatch*.

The number of axes in Scottish hoards is also of some interest. From Appendix D it may be seen that the hoards may contain as many as 7 or 8 axes (4 hoards), 6 axes (2 hoards), 5 axes (2 hoards), 4 axes (1 hoard), and 2 axes (9 hoards) (fig. 28). Details of the deposition of these hoards are very poorly documented (see Appendix E), but several seem to have been placed in crevices in rock faces, a couple were in pottery vessels, and one in a cist; some of the others were found close together in earth where they may have been deposited in a sack or box. The documented Irish Early Bronze Age hoards appear to show that a large majority of finds contain only 2 or 3 axes, and only 1 or 2 hoards have more than 6 axes. The figures, so far as they can be

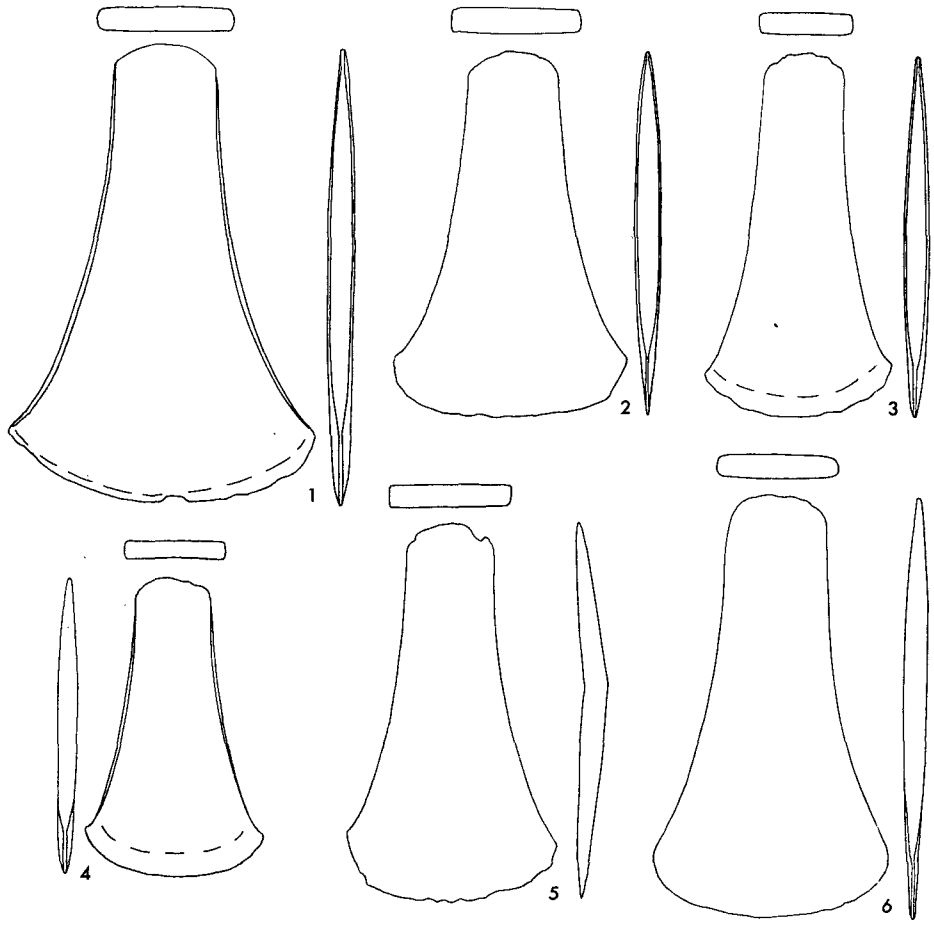

FIG. 28. Hoards with two axes: 1–2 Durris (Kc 4, 3); 3–4 Camptown (El 1, 2); 5–6 Abdie (Fi 2, 1). ⅓

ascertained, are 25 axes (1 hoard), 11 axes (1 hoard), 6 axes (2 or 3 hoards), 5 axes (2 or 3 hoards), 4 axes (3 hoards, possibly 4 others), 3 axes (4 hoards, possibly 4 others), 3 axes (4 hoards, possibly 5 others), 2 axes (9 hoards) (Harbison 1968).

A number of axes from Scotland have a tin-rich surface, and until recently it was assumed that these axes had been deliberately covered with tin to improve their appearance (Smith and MacAdam 1870–2). This could have been carried out by rubbing lumps of tin onto the heated surface of the bronze axe which had been coated with some resinous substance to prevent oxidation. However, it has been argued that it is more likely that a high tin content was formed on the surface of these axes through preferential dissolution of the copper by the surrounding soil, after loss or deposition of the axes. In addition, a high-tin alloy could be formed during the casting operation, when exudation of tin might cause this surface coating (Tylecote 1962, 156; Britton 1963, 279). Fourteen Scottish axes appear to have this tin-rich surface, as well as the sheet bronze strip in the Migdale hoard (list, Appendix D). Granted that the natural agencies noted above could have caused the formation of a tin-rich surface on bronze objects, it is surely surprising to find that of the 15 objects given this appearance, no less than 13 are from hoards. On this basis, it is likely that the original idea of deliberate coating is the correct one.

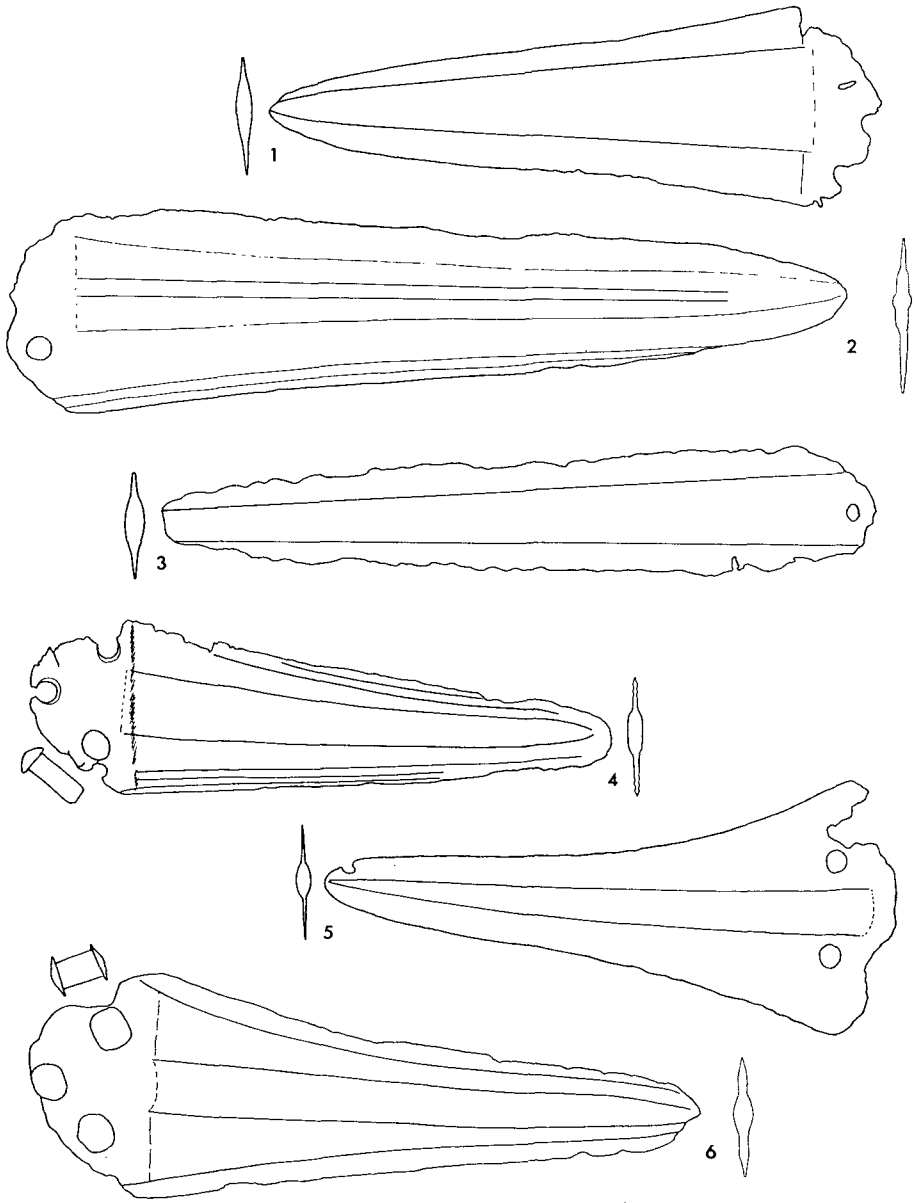

FIG. 29. Halberds: 1–3 Kingarth (Bute) (NMA DJ11, 9, 10); 4 Tom-na-Brataich (Inverness); 5 Galloway; 6 No provenance (NMA DJ24). $\frac{1}{3}$

HALBERDS

The halberds of the Early Bronze Age were studied in detail by Ó Ríordáin (1936), and his work remains the prime source for this material. Halberds occur over wide areas in Europe, and various geographical concentrations have been noted in the British Isles (particularly Ireland), Iberia (the Argaric group), and central Europe (the Únětician territory and beyond). The origin

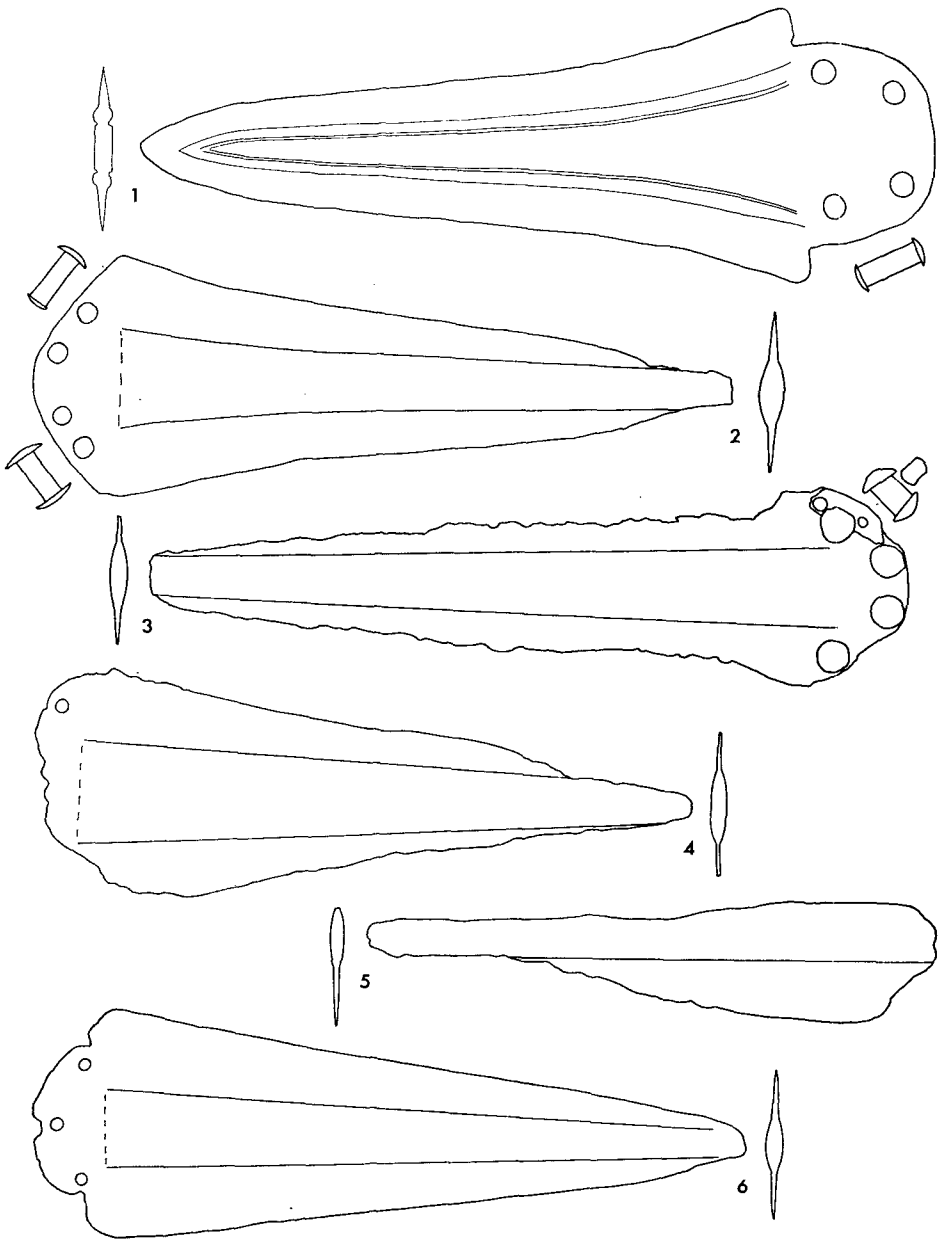

FIG. 30. Halberds: 1 Whiteleys (Wigtown); 2 No provenance (Banff Museum); 3 No provenance (NMA DJ34); 4–6 New Machar (Aberdeen) (Marischal 250, 249, 251). ⅓

of the halberd, sought in Ireland, in Iberia, in Italy and in Saxo-Thuringia, is still a little obscure, but opinion seems to have hardened towards a Central European source in an area where stone battle-axes were traditional weapons. The halberd, mounted in similar fashion on a haft, would represent the same type of weapon but in metal rather than in stone. Ó Ríordáin's theory of an Irish source was based on distributions and typology, in that Ireland possessed the largest number

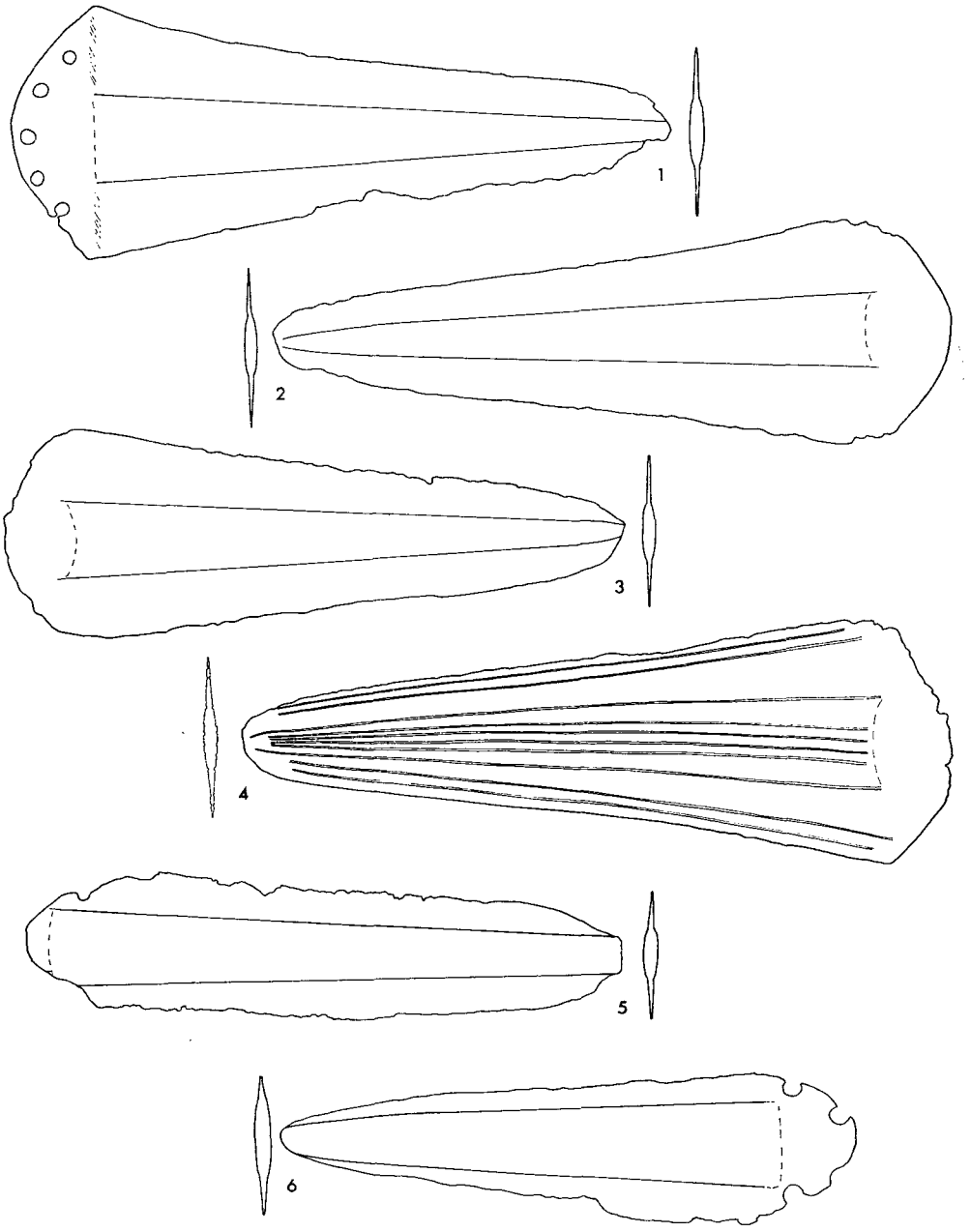

FIG. 31. Halberds: 1–4 Auchingoul (Banffs.) (NMA DJ38, 39, 37, 40); 5–6 Aldie (Kinross). ¼

of halberds of any territory, and the most primitive-looking forms, unmatched elsewhere (his Types 1–3).

In Scotland about 40 halberds are now known (list Appendix A, p. 87), and of these 30 are provenanced. For such a small quantity, the variety in shape is considerable, although in Ó Ríordáin's classification almost all would belong to his Types 4–6.

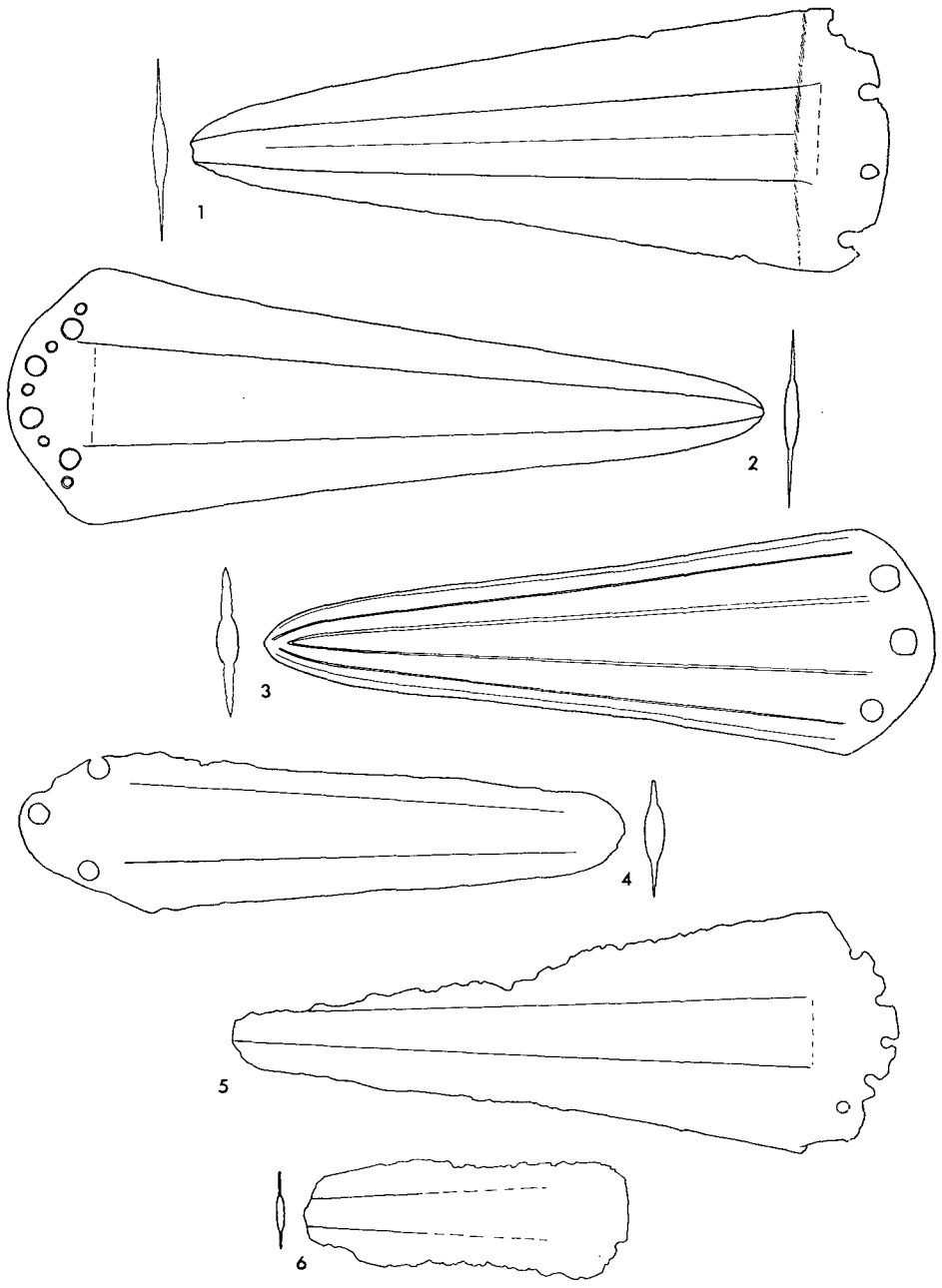

FIG. 32. Halberds: 1 Assich (Inverness); 2 Culloden (Inverness); 3 Dunadd (Argyll); 4 ?Baile-nan-Coille (Sutherland); 5–6 Baile-nan-Coille (Sutherland). $\frac{1}{3}$

The blades of most of the Scottish halberds are symmetrical and straight, although some are ogival in outline (fig. 30:1); a few halberds have slightly curved blades (fig. 29:4–6). The blades are generally plain, with a simple midrib, but occasionally the blade itself may be grooved, in dagger-fashion (fig. 32:3; cf. figs. 37 and 51), or the midrib may have a rib along its top (fig.

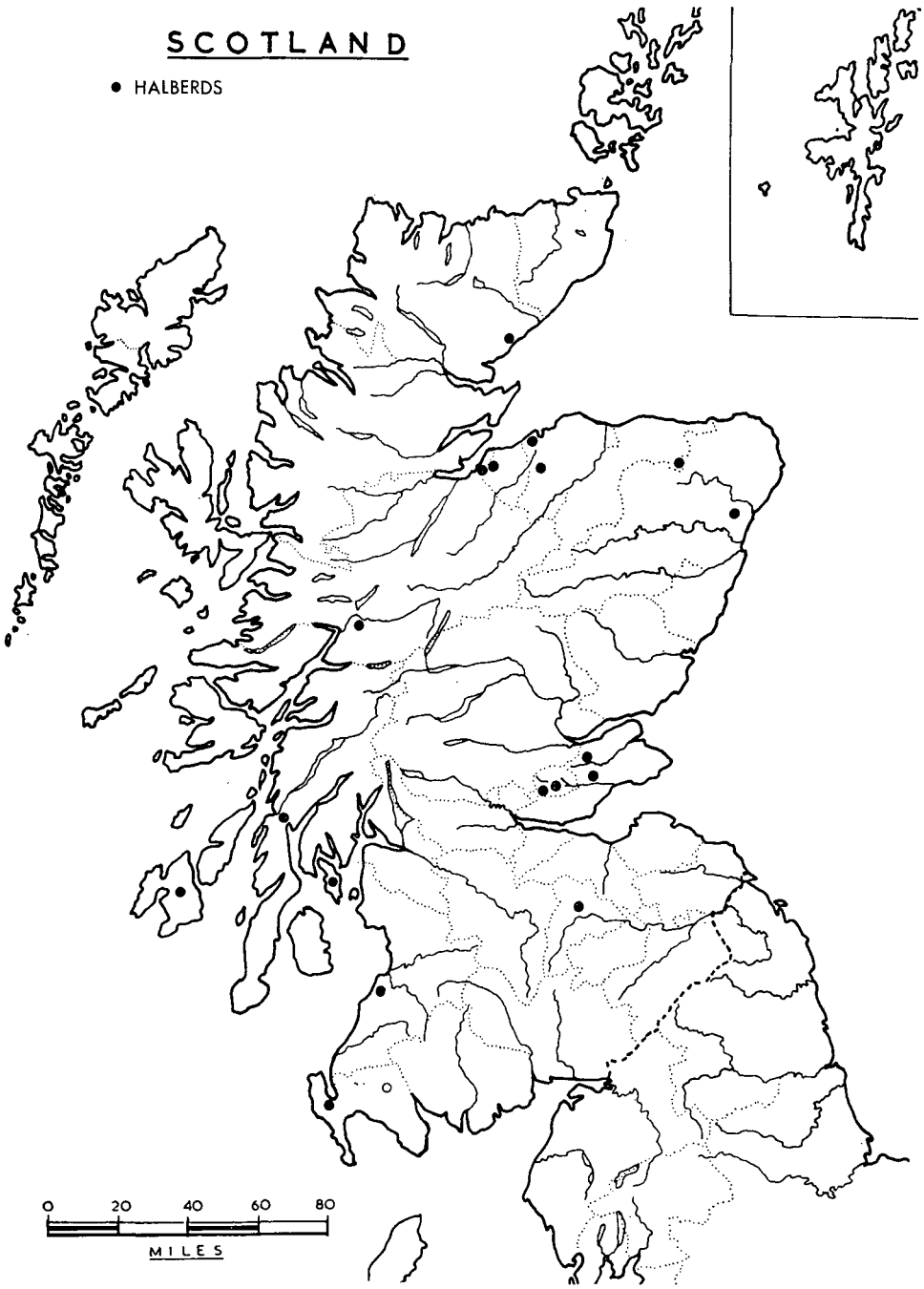

FIG. 33. Distribution of halberds: open circles, area provenance only.

29:2), or ribs bordering its sides (fig. 30:1), The blade widens from its tip to shoulders which may curve relatively smoothly into the heel or butt of the weapon (fig. 32:3), or which may turn abruptly into the butt (fig. 29:5). The shoulders may rarely be set apart from the butt (30:1). The butt may be shallow (fig. 32:1), or arched (fig. 31:6). In length the halberds range from about 37 cm to 22 cm, but most fall within the 25–28 cm range.

The halberds were attached to the haft by means of rivets. Occasionally a haft-mark can be seen as differential staining on the butt. The number of rivets employed to hold the haft varied from 2 to 5 or more, and the different numbers were used by Ó Ríordáin in his typological scheme. A number of the Scottish halberds have no rivet-holes (fig. 31:2, 3), and generally this is interpreted as demonstrating the local production of halberds and their deposition in hoards before being drilled for hafting (Britton 1963, 284). The butts of many halberds have been damaged through decay and this makes difficult any definitions on the basis of butt shape and rivet-holes. Most of the halberds, however, seem to have had either three rivets or four; a few had five and one halberd may have had nine (fig. 32:2). The rivets themselves occasionally survive, but the holes show that the rivets may have been either fat (fig. 17:6) or thin (fig. 30:4, 6). The normal rivet-head is domed (fig. 30:3), and occasionally in the Scottish finds there are rivets that have been extensively beaten out to form a cap-like head (fig. 30:2), resembling, although not identical to, the continental capped rivets.

Most of these features may be matched on weapons from Ireland, although the halberd from Whiteleys appears to be unique (fig. 30:1). The distribution of halberds in Scotland is sparse, but the finds at the head of the Great Glen, and those around the Forth and Tay, may represent particular areas of interest (fig. 33).

Halberds are generally known as single finds, but for Scotland there are six Early Bronze Age associated finds containing these weapons. Unfortunately four of these hoards possess only halberds (see Appendices D and E). The other associations include the very unsatisfactory Aldie (Kinross) find (see Appendix E), but there is little uncertainty about the Sluie (Morayshire) find where two axes and one halberd were associated in a cist. The axes are of Type B. The Irish associations include the find from Frankford (Co. Offaly) where a halberd was found with a flat dagger and three axes of Type A or derivative Type A (Harbison 1966; Case 1966, 152); this association has been taken to indicate that the halberd belongs to the same period of contact between central Europe and the British Isles as brought other continental ideas to these islands (see p. 70).

Metal-analyses of the Scottish halberds are listed in Appendix B. They belong to clusters A and C metal as well as cluster D, and are without tin (see p. 58).

SPEARHEADS

Early Bronze Age spearheads are not common in Scotland. Only eight provenanced examples are known, and in the absence of associated finds it is not certain that any or all of these were chronologically distinct from other typological forms, nominally of the Middle Bronze Age and discussed previously (Coles 1964). In continuation of the nomenclature adopted then, the Scottish Early Bronze Age spearheads may be grouped as Classes A and B, with the Middle Bronze Age forms already grouped as Classes C–F. These class names are used for convenience only, and apply to the Scottish material.

The major sources of identification of Early Bronze Age spearheads are the Ebnal (Shropshire) and Arreton Down (Isle of Wight) hoards (Britton 1963, 286). Two different types are known from Scotland. One of these (Class A) is tanged, and has a kite-shaped blade decorated

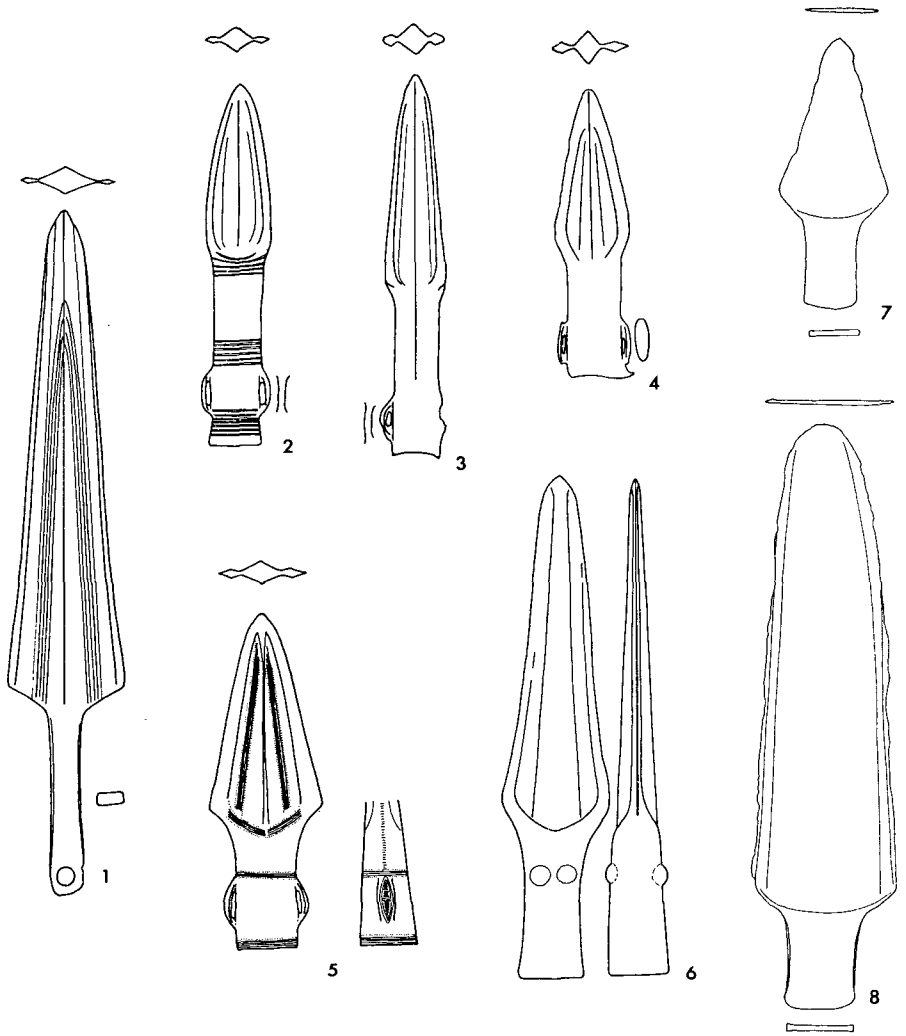

FIG. 34. Spearheads and Tanged Daggers: 1 Whitehaugh (Ayrshire); 2 Douglas (Lanarks.); 3 Birkeyden (Berwicks.); 4 (Perths.); 5 Dean Water (Angus); 6 ?Greyfriars (Dumfries.); 7 north-east Scotland; 8 East Pitdoulsie (Aberdeens.). ½

with grooves (fig. 34:1); the flat tang has a basal perforation for a rivet. This form is matched by spearheads from southern English hoards in Devon, Dorset, the Isle of Wight, and Kent, where associated material consists of Class I flanged axes, grooved ogival daggers and Ebnal spearheads, the content of the 'Arreton tradition' (Britton 1963, 284).

The second type of Early Bronze Age spearhead in Scotland (Class B) is represented by seven examples; the essential feature is that the weapon has a socket rather than a tang. The blade may be triangular in shape (fig. 34:5), or may be kite-shaped with a longer base (fig. 34:3), or it may have curved edges (fig. 34:2). The blade edges are generally strongly bevelled, and the midrib is ridged. The socket extends only to the base of the blade; near the socket opening are two loops which may be thin or flattened. The socket may be decorated with grooves (fig. 34:2),

with or without dots (fig. 34:5). These spearheads are rather small, 11–15 cm long, and are similar to a spearhead in the Ebnal, Shropshire hoard.

Another socketed form, and also of our Class B, is represented by the cast of a spearhead which may have been a part of a Greyfriars (Dumfries) hoard (Coles 1964, 151). This has an ogival blade attached to a hollow socket which carries two domes presumably representing false rivets (fig. 34:6). One of these spearheads, which are not at all common, has been identified in Jutland where it was associated, in a grave, with a Period II sword and chape (Butler 1963).

Although there are only eight provenanced examples of these spearhead types in Scotland, their distribution is decidedly southern, with none known north of Angus (fig. 23). This distribution compares fairly well with that of Class I flanged axes, which too has a southern and central bias when contrasted with the more northerly spread of Type B axes.

DAGGERS AND KNIVES

The daggers and knives of the Scottish Early Bronze Age may be divided into three groups, and these are discussed separately here in terms of their typology. A division between daggers and knives is generally based on length, knives less than 12 cm long, daggers from 13 to 33 cm long; the terms are used more loosely in this paper. The groups are *tanged* daggers, comparing with the Knocknague type from Ireland (Harbison 1968) and riveted daggers, which may be either *flat* (the Irish Corkey type) or with a *midrib* (the Irish Topped Mountain type).

Early Bronze Age daggers and knives have been extensively studied in recent years; for Britain and Ireland, Piggott (1963) and Case (1966) have brought together much of the evidence, and Harbison (1968) has treated the associated evidence from Ireland. The Scottish 'dagger-graves' have been examined by Henshall (1968). In the present paper, all daggers and knives have been listed and mapped both as individual specimens (Appendix A), and as associations in graves (Appendix C) and hoards (Appendix E). A few analyses appear in Appendix B.

The Scottish daggers with tangs are a mixed lot. On the one hand there is the East Pitdoulsie, Aberdeenshire, dagger which is a characteristic 'Beaker' weapon possessing a hollow-ground edge (fig. 34:8). The blade is otherwise flat, with straight sides converging to a rounded tip. The tang has no rivets and is short and wide. The hilt mark is a shallow arc just encompassing the shoulders. The Aberdeenshire weapon is 23 cm long, which approaches the large Winterslow (Wiltshire) knife, 25·5 cm long (Britton 1963, 262); a smaller version of the same, from north-east Scotland, is 10 cm long (fig. 34:7), and one from Glenluce was probably little more than 8 cm in length.

The other tanged knives are more slender than these Beaker daggers, and generally possess one or two rivet-holes in the tang. One from Callachally (Mull) was associated with Beaker pottery and a bracer; otherwise their dating remains uncertain. Of those few knives analysed, the two from north-eastern Scotland are without tin (all others having a high proportion of this metal), and both also contain high arsenic. In this respect they correlate with a small group of metal objects in the Low Countries and in Brittany.

In the Low Countries, Bell Beakers of type 2^{1b} of van der Waals and Glasbergen (1955) are common and among their associations are copper tanged knives. A larger group of Beakers in the Netherlands is the Veluwe group, type 2^{1f}, which also has associations with copper knives. As long ago as 1934, Margaret Mitchell asserted that 'Aberdeenshire has undoubtedly been colonised from Holland and the Rhineland' (Mitchell 1934), using the evidence of Scottish Beaker pottery and its resemblance to continental forms, and Piggott (1963) has pointed out that the Scottish north-eastern Beakers appear to be derivatives from the Dutch series at the $2^{1b/c}$–2^{11b}

phase of their classification, in other words just at that point where metal-working appears in the Dutch record according to recent views (Butler and van der Waals 1966). The total amount of Bell Beaker metalwork in the Netherlands is rather small, consisting of ten tanged knives and six other objects, including three of gold. Most of the knives have hollow ground edges, a feature matched both in the British Isles and in South Germany. The metal used for these knives is characterised by high arsenic and moderate nickel, with other elements low or absent. One Type B axe from Limburg is of the same metal, and so this alloy is considered to be typical of Dutch Bell Beaker metallurgy (Butler and van der Waals 1966, 59).

For German Bell Beaker objects the metal has higher lead and silver contents, and is considered to be totally different from the Dutch. Recently a group of Breton Aneolithic flat axes has been shown to have a metal composition with high arsenic and moderate nickel, and this may point to connections between Brittany and the Netherlands. The fact that no known source of this metal exists in Brittany needs little comment here, but it should be noted that it appears unlikely that Ireland or Central Europe are concerned with this group. Britain and Iberia remain possible sources, and certain evidence suggests the latter area.

The Scottish daggers, from East Pitdoulsie and from the north-east, appear to belong to this limited group, according to the graph of elements (fig. 48). Few of the English and Irish daggers correlate with this group, although a few objects, such as the Roundway and Faversham knives, may be a part (cf. Butler and van der Waals 1966, fig. 33). It is notable that the metal content differs from that employed for Type A axes and halberds.

In Ireland, rather similar tanged knives are common, and associations with Beaker material are well attested including awls, Type A and hybrid AB axes, and knives with midribs and groove decoration, in the Kilbannon, Co. Galway, and Whitespots, Co. Down, finds (Case 1966, 162).

The second group of Scottish weapons consists of rather small flat knives of generally triangular shape, a type that is characteristic of many Early Bronze Age groups in central Europe. Piggott has suggested that it is in this province that we should look for a source of the British flat riveted knives (Piggott 1963). The continental examples are small, with small rivets, and the lower part of the hilt is cut in the shape of an 'omega'; the blade edges are straight, converging to a sharp point. Piggott's Group I, of earliest imports or copies, consists of knives similar to the continental form, such as the Dorchester (Oxon) knife. This knife was associated with a small tanged knife, a bracer and a Bell Beaker. Case has pointed out that, while the tanged knife is of copper with various trace elements, one of the rivets of the other flat knife is of 6% tin-bronze (Case 1965). The tin-bronze of this rivet may be compared with occasional tin-bronze in Bell Beaker contexts in Saxo-Thuringia, beyond the Middle Rhine. This is the first recorded association of a tin-bronze with a Bell Beaker in the British Isles and continental examples are equally rare. The metal used in both the tanged knife and the rivet belongs to Coghlan and Case's Group III, with strong nickel content. Case considers that these objects, and the tanged knife from Roundway, Wiltshire, all associated with Beakers emanating ultimately from the Middle Rhine area, are of central European copper and must stem from a central European source. Yet it appears that this metal is not clearly of German character. The German Bell Beaker metals have stronger content of both lead and silver (Butler and van der Waals 1966, 93).

The point is, however, made by Case that a tanged knife from Winterslow, Wiltshire, associated with the same type of Bell Beaker, is of Irish copper, Group I of Coghlan and Case, and therefore it must at least be assumed that Irish copper was available in England at a time when metal objects from another source were being introduced.

There are no Scottish riveted knives that belong to Piggott's Group I. Piggott's Group II knives are larger yet still triangular in shape, often with large rivet-holes, and with the omega

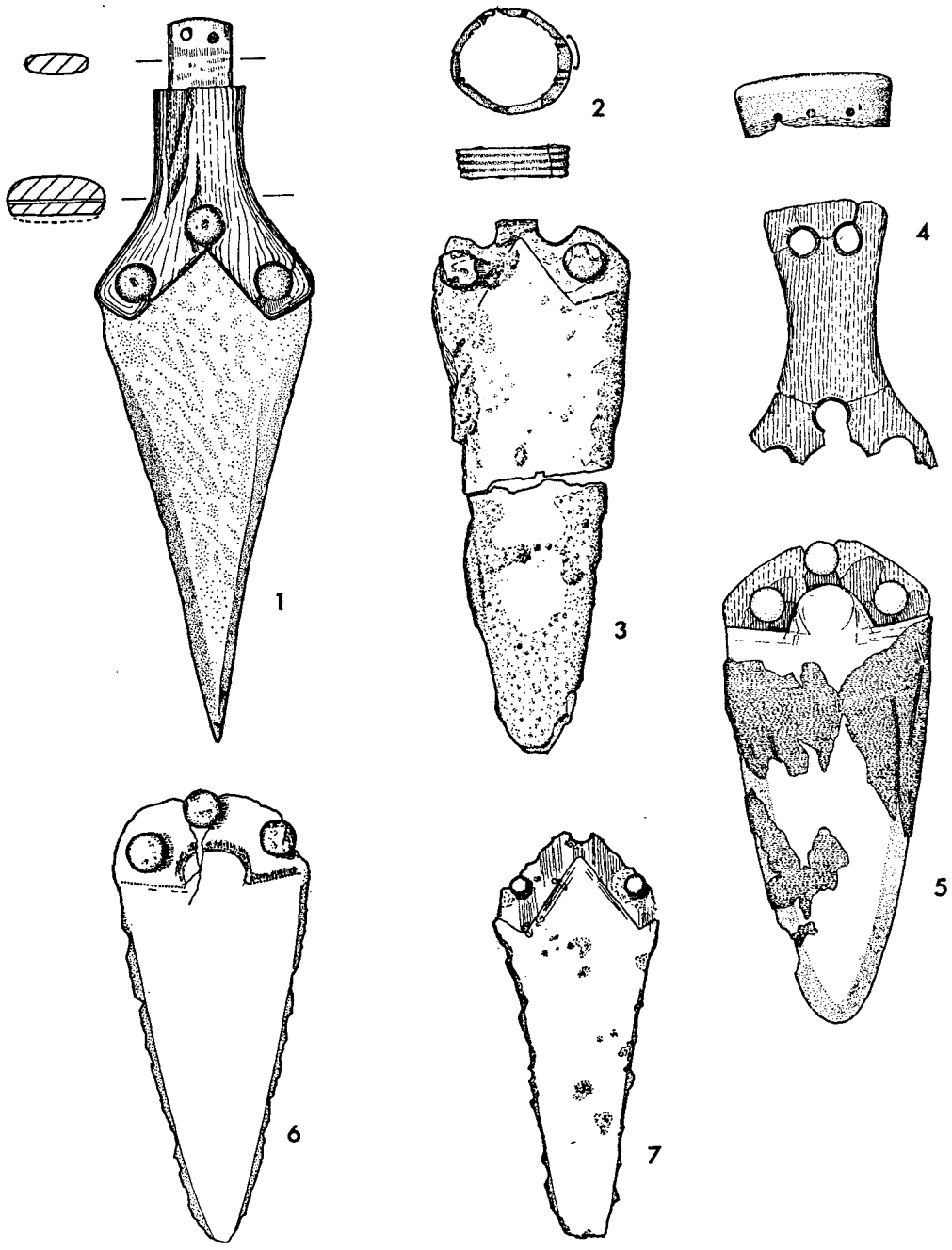

FIG. 35. Material from dagger-graves: 1 Wasbister (Orkney); 2–3 Skateraw (East Lothian) (line on 2 shows undistorted part); 4–5 Ashgrove (Fife); 6 Cleigh (Inverness); 7 Drumlanrig (Perths.). ½ (from Henshall 1968)

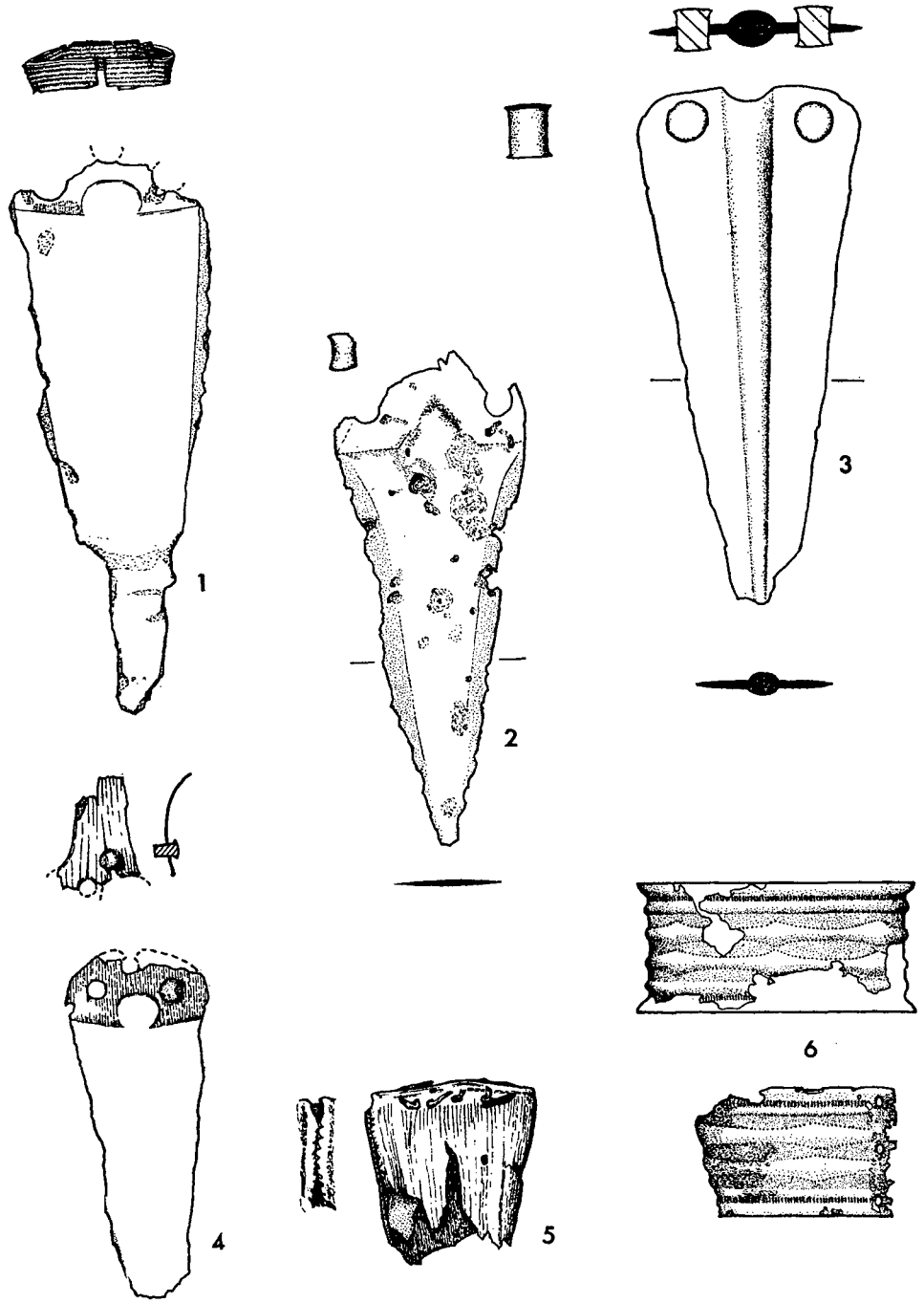

FIG. 36. Material from dagger-graves: 1 Collessie (Fife); 2, 6 Masterton (Fife); 3 Mauldslie (Lanarks.); 4–5 Kirkcaldy (Fife). ½ (from Henshall 1968)

hilt-mark. Local variants, however, have hilt-marks in the shape of a broad U or a W (fig. 35:1). Group III knives are large, with large rivets, and the blade assumes a different shape, much broader near the tip, tongue-like (fig. 35:3, 5). Another of Piggott's group consists of knives with multiple rivet decoration on their hafts which may be attached to the blade by a string of rivets; one of the Auchnacree knives is comparable (fig. 49:6), although lacking the decorated haft.

The Scottish flat riveted knives fall into two types on the basis of the hilt-mark, either an omega or a W (Atkinson 1956). There is no evidence that this is a chronological division according to a recent discussion of these artifacts by Henshall (1968). Four of these flat knives have omega hilt-marks, eight have W hilt-marks, sometimes better described as a V (figs. 35:6; 36:1 and 35:7; 36:2). In distribution it appears that the omega hilt-mark is almost exclusively east-central Scottish, the V or W mark more widely scattered. The knives were attached by three rivets, two set in perforations and the third in a notch at the top of the butt. The blades are slightly convex in cross-section, and have bevelled edges. Many of the blades from graves have a very high 'polish' and clearly were prepared for burial.

Remains of hilts are of horn, but these differ in their details (Henshall 1968). The Ashgrove knife has an ivory pommel of 'trough' type with basal socket and transverse peg-holes (fig. 35:4), similar to some English examples. The pommel would fit into a hilt tang such as can be seen on the Wasbister knife (fig. 35:1). This latter knife has a single-piece hilt of horn, but the Ashgrove hilt is in three parts, a central wooden plate held by outside horn plates; two rivets set within the grip held the plates together.

Three of these knives have surviving sheaths, of animal skin. The Kirkcaldy sheath is made of two layers of skin, the lining of a lighter colour (fig. 36:5). The outer layer is one-piece with a side seam held by fine gut. The lining has a central seam on one face. Near the top of the sheath, which is fragmentary, are four holes threaded with two thongs and at the top are two strips of horn forming a mount. The Ashgrove sheath appears to have had slender ribs down one of the faces, formed by threads sewn at about 18 stitches per centimetre (fig. 35:5). At Collessie, the sheath apparently was of wood, covered with ox-skin.

There are a number of other flat riveted knives, generally smaller, and lacking any evidence for hilt, sheath or hilt-mark. One of the Auchnacree knives has already been noted as showing affinities with the South English tongue-shaped weapons with multiple rivets holding the hilt in place.

The third Scottish group of daggers and knives consists of weapons with midribs, and often with grooved decoration on the blade. Many are fragmentary, but both the omega hilt-mark (4 examples) and the W hilt-mark (1 example) occur. They are generally longer than the flat knives, and tend to retain the rather slender triangular shape without the broad tongue-like appearance of some of the flat knives. The number of rivets used to attach the hilt tends to vary, from two to nine. Many blade butts are damaged and the precise number of rivets employed is not known in these cases.

Plain, undecorated daggers are known (fig. 36:3), but most have grooves or ribs on the blade between the midrib and the blade edge. The Craigscorry dagger (fig. 37:5) has a single rounded rib running down the blade close to the bevelled edges, an Orkney knife has double ribs, and the Campbeltown dagger has three slender ribs merging into the blade and set close to the midrib. The Bishopsmill knife has pendant arcs from the hilt-mark and the blade, and is decorated by four thin grooves set near the edge (fig. 37:4), in similar fashion to an unprovenanced knife fragment (NMA DJ 15), and one of the Gilchorn blades has a double groove arrangement creating a ribbed effect. More unusual is the dagger from Auchterhouse, with a triple-ribbed midrib (fig. 37:3); this feature is matched on blades from England and Ireland. The Auchterhouse dagger

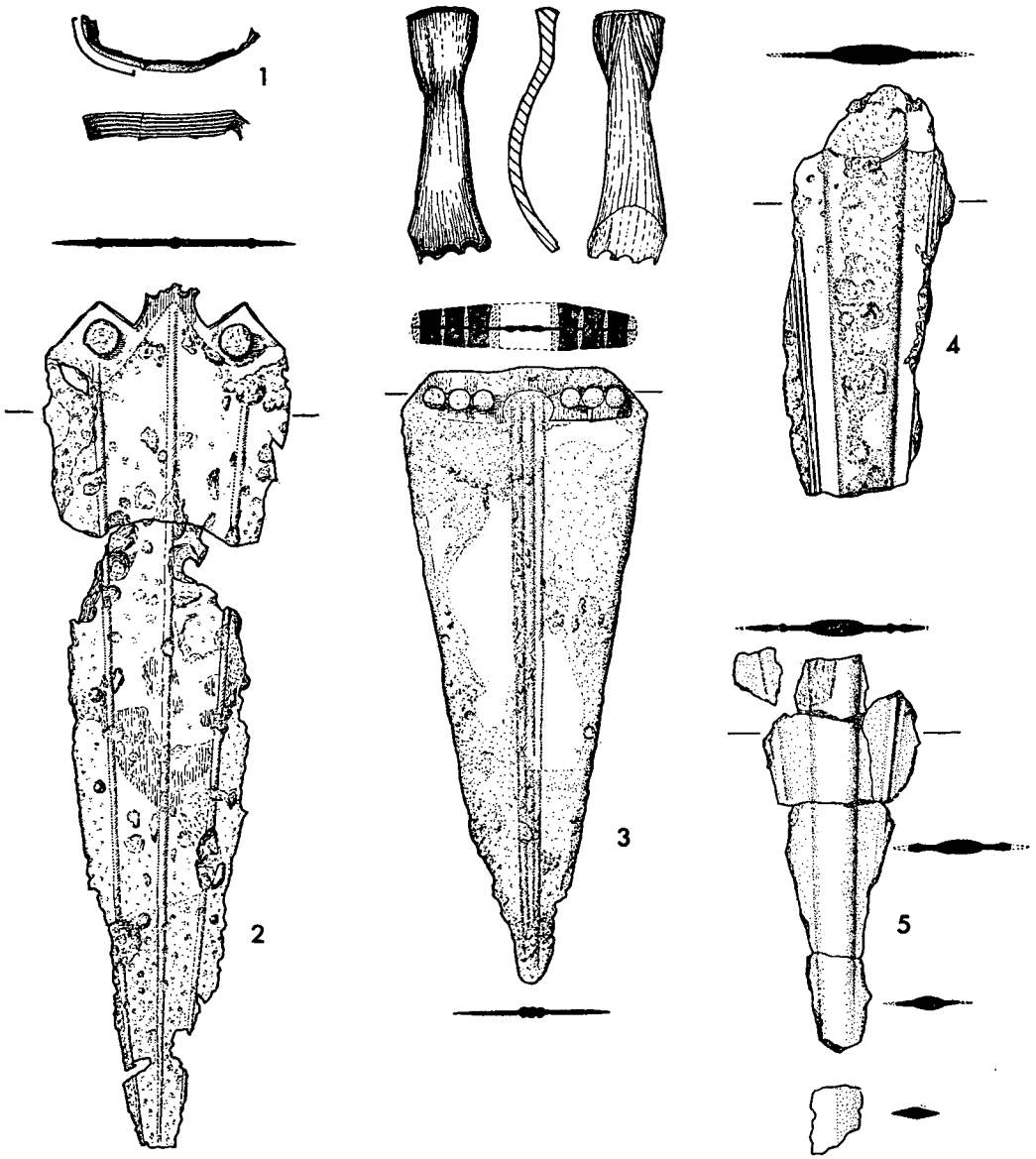

FIG. 37. Material from dagger-graves: 1–2 Blackwaterfoot (Bute) (line on 1 shows undistorted part); 3 Auchterhouse (Angus); 4 Bishopmill (Moray); 5 Craigscorry (Inverness). ½ (from Henshall 1968)

also has nine rivets, set in groups of three, and this has been taken to indicate some relationship with knives from Wessex. The Blackwaterfoot dagger is particularly long and has three ribs on the blade, set widely apart (fig. 37:2); this too has a counterpart in southern England. Both the Auchterhouse and the Blackwaterfoot daggers are also decorated by lines of punched dots, which run alongside the various ribs. One of the flat knives, from Cleigh, has similar decoration along the hilt-mark (fig. 35:6). Another dagger with ribs occurs in the Gavel Moss hoard (fig. 51); three

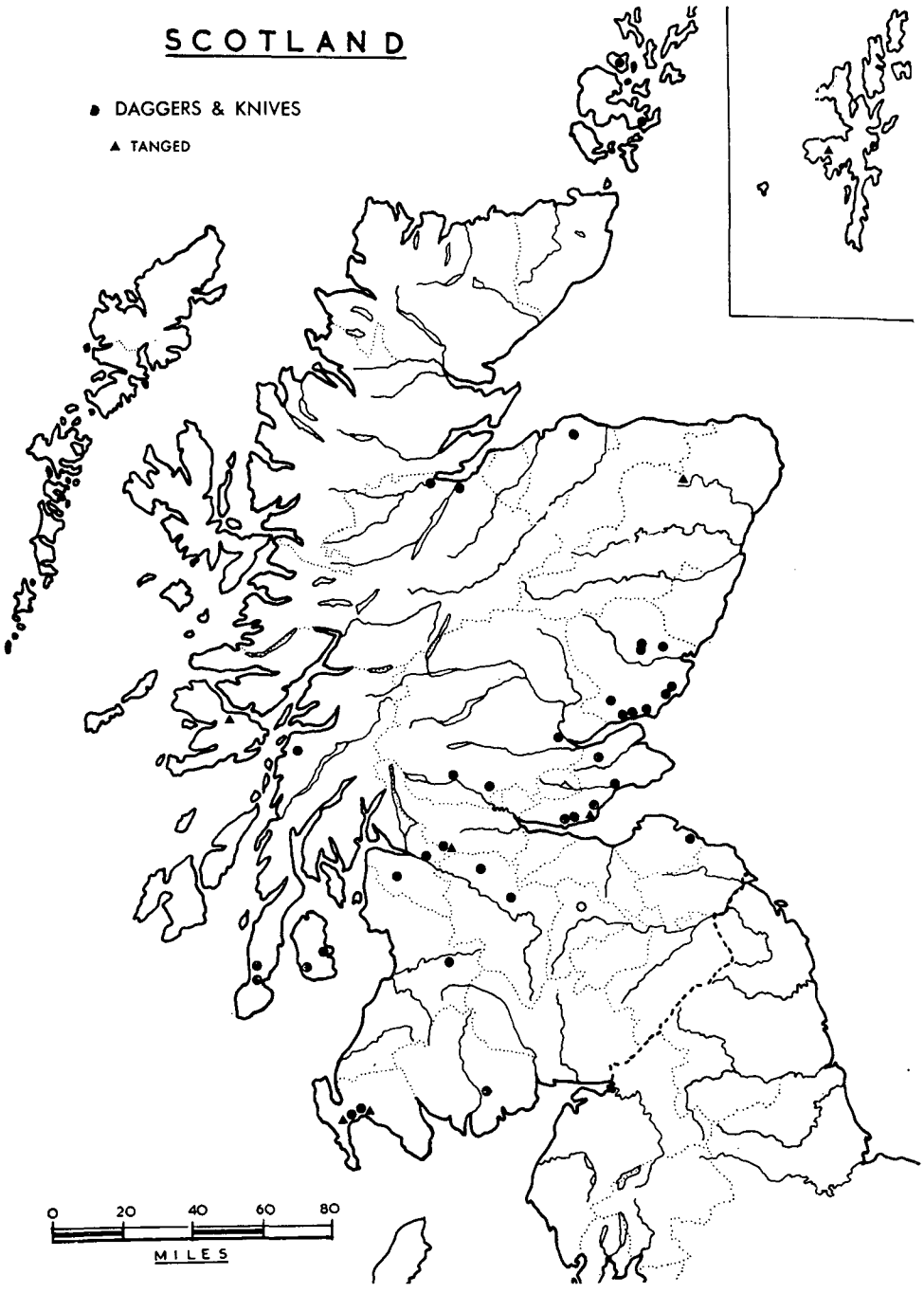

FIG. 38. Distribution of daggers and knives: open circle, county provenance only.

ribs, spaced over the central area of the blade, recall the Blackwaterfoot weapon. Both are long daggers, measuring about 26 and 23 cm.

Traces of a hilt of ox-horn survive with the Auchterhouse knife (fig. 37:3). The hilt was in one piece, the upper part being solid, the lower part split to receive the metal butt of the knife. Several pieces of horn from a sheath-mount also survive. The sheath from Gilchorn had both wood and skin components, with an upper edge fitted to receive the lower edge of the hilt when the knife was inserted.

The distribution of these daggers, when allied to the flat riveted blades, tends to concentrate in central, particularly east-central, Scotland (fig. 38). The absence of such weapons from areas of flat axe concentration, in the north-east, is worthy of some consideration in terms of the difference between a working object, presumably lost in the course of action, and an object prepared for deposition in a selected location.

The flat riveted and the midrib knives and daggers are characteristic objects in Early Bronze Age graves. Their associations are recorded in Appendix C, and these provide some dating evidence examined below. Typologically comparable weapons occur in English and Irish contexts, and these too may provide some evidence for chronology. But neither line of evidence is capable of yielding a precise chronology.

The Scottish daggers may be compared both individually and collectively with weapons from the Wessex graves and from other graves in the south. The Craigscorry grooved blade, for instance, compares well with the Cressingham, Norfolk, and Wilsford, Wiltshire, daggers (Annable and Simpson 1964, no. 165). From Winterbourne Stoke, Wiltshire, comes a blade comparable to the Gilchorn knife (ibid., no. 220). Daggers considered to be characteristic of the early part of the Wessex cemeteries, such as those from the Bush Barrow and from Wilsford (ibid., nos. 170, 164) may be related to Scottish daggers such as that from Bishopsmill, and the setting of the rivets on the Auchterhouse blade recalls the earlier Wessex weapons. The Blackwaterfoot dagger, with three widely-spaced ribs, and punch decoration, bears some resemblance to a blade from Cambridge (Evans 1881, fig. 304), and to the Gavel Moss dagger as already noted. The dot decoration on the Scottish weapons, from Blackwaterfoot, Auchterhouse, and Cleigh, is duplicated on other Scottish objects of the Early Bronze Age, such as the Masterton armlets, and it has been suggested that the decoration on some Wessex blades and south English spearheads is related.

Another component in this approach is the gold pommel-mounts which appear to be a feature of limited occurrence. Four of these pommel-mounts are known from Scotland, and one occurs in Ireland at Topped Mountain, Co. Fermanagh, in association with an E-type Food Vessel. The mounts (figs. 35:2; 36:1; 37:1) are of sheet gold, decorated by ribbing and with flanged edges; the Blackwaterfoot and Collessie mounts have 6 ribs, Skateraw has 4, and a probable mount from Monikie had 5 ribs. The gold pommel-cover from Ridgeway, Dorset, is often quoted as a relation of these essentially Scottish objects. It is worth noting, however, that few of these objects, whether knives or pommel-mounts, are exactly duplicated in the Wessex cemeteries (p. 71).

The internal associations of the Scottish knives and daggers are of considerable importance, both for the recognition of metal industries in the country and for chronology. Appendix C lists the basic data concerning metalwork in graves, and from this we can see that blades have been found in association with Beakers on 5 occasions, with Food Vessels on 1 only, never with Urns, once with a 'crock'. The burial site tends to be inhumation (18 occurrences), with 7 cremations recorded. Twenty-three burials with knives or daggers were probably in a cist, and only 4 times has a cist definitely not been employed. Henshall has pointed out that in general the cists used to

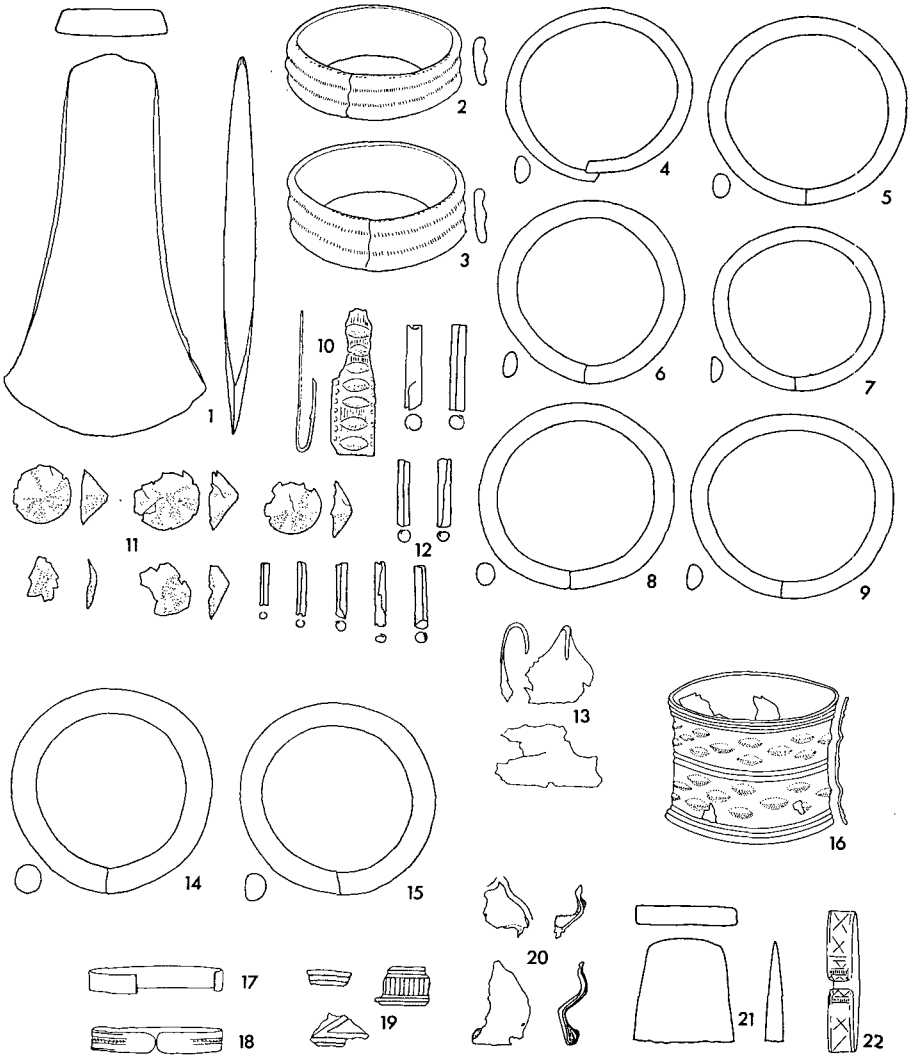

FIG. 39. Ornaments and hoards: 1–13 Migdale (Sutherland); 14–15 Kinneff (Kincardines.); 16 Melfort (Argyll); 17 Carnoustie (Angus); 18 Cairntable (Ayrs.); 19–20 Balnabraid (Argylls.) (line marks probable original edge); 21–2 Laithers (Aberdeens.). $\frac{1}{3}$

hold burials with fine weapons were larger than the norm, and sometimes clay was used for jointing. At Craigscorry and Bishopsmill, the cists were long. The cists were within cairns on 8 or 9 occasions, within earthen tumuli once or twice.

ARMLETS

The Early Bronze Age armlets in Scotland are of three types, and these are described separately here. The first type is the bar armlet, and 18 of these are known from 9 finds. Of the latter, 4 comprise pairs of armlets. Bar armlets are circular in plan, and range from about 7 cm to 8 cm in external diameter. They are made from a solid bar of bronze, of round, oval or D-

shaped section, bent into a butt-joint so that the ends fit tightly against each other. The associations for bar armlets include hoards of Auchnacree (fig. 49), Port Murray (fig. 49) and Migdale (fig. 39), and graves at Kinneff (fig. 39), Crawford, Ratho and Stobo (see Appendices C and E). The type appears to be basically Scottish, and few comparable objects are known elsewhere. It has been suggested that the massive C-shaped rings and armlets of the central European Bronze Age, occurring in South Germany in Reinecke A2, for instance, are related; to these may be added the butt-jointed armlets of massive form that are found in Saxo-Thuringian hoards of the Early Bronze Age, in Dieskau 2 with halberds and Irish decorated axe (von Brunn 1959, taf. 14), and in many other comparable finds. Also in these finds, and in South Germany in Reinecke A1 and A2 contexts, are heavy spiral armlets (Torbrügge 1959), unmatched in Britain, but it might be pointed out that the wearing of the 6 Migdale armlets would create an almost identical impression to that of one spiral armlet.

Another type of armlet found in Britain is the band armlet. Three of these are known from Scotland, and one other from Staffordshire (Henshall 1964). The armlets are formed from a simple flat ribbon of metal about 1 cm wide, bent so that the slightly rounded ends touch or nearly touch. Two of the Scottish armlets, and the English one, are decorated with incised lines, forming a herringbone pattern on the Cairntable example (fig. 39:18) and lozenge patterns on both the Staffordshire and the Mill of Laithers armlets (fig. 39:22). No certain Irish examples are known, although four plain gold band armlets from Vesnoy, Co. Roscommon, may be related. Armlets of precisely this type, however, are also found in Scandinavian Period II contexts (Broholm 1952, no. 192).

These Scottish band armlets appear to be local versions of the more elaborate sheet metal armlets from Knipton (Leicestershire), Bridlington (Yorkshire) and Normanton (Wiltshire) (Henshall 1964 with refs.). These provide only a date within the Early Bronze Age of the south; the Knipton armlet was found with a Long-necked Beaker. The Mill of Laithers armlet was associated with a broken axe of Type B (fig. 39:21–22).

The third type of armlet that occurs in Scotland is the rib armlet. Eight armlets of this type are known. Two from Migdale are butt-jointed and are cast and rather thick, with three curved ribs forming the external face, separated from each other by a line of vertical strokes; oblique nicks occur on the edges (fig. 39:2–3). A comparable armlet was found in a cist at St Martins (Perthshire), but this, while cast, is appreciably thinner. An armlet from Cappuck (Roxburghshire) is also related in form, if perhaps not in chronology. These armlets merge into a true sheet metal type of rib armlet, such as has been found in pairs at Melfort and Masterton. The latter were made as strips of bronze, with longer edges turned over to form and strengthen the edge (fig. 36:6). The ends are imperfect, and the presence of several rivet-holes suggests that the metal was attached to another substance (Henshall and Wallace 1963). The edges of the armlets are everted, and there are four wide ribs beaten up from inside; two of these are lozenge-like. These are lined by punched dots, and a row of vertical strokes appear between the everted edge and the first rib. The surviving Melfort armlet is comparable, but here the panel decoration is in the form of lenticular bosses and groups of lines (fig. 39:16); the armlet is a complete cylinder and the edges are thickened rather than turned in. These rib armlets also appear to be an insular feature not however restricted to Scotland, for an armlet closely related to the Masterton pair is known from Co. Waterford, Ireland, in gold rather than bronze, associated with a Food Vessel, and another is reported from Cuxwold in Lincolnshire (Henshall 1968 with refs.). North European objects of comparable form are known, but ribbed armlets as a type are widespread in central Europe, and it may be that the Únětician *manchette* armlets are ultimately responsible for the western finds, as for the northern. The Scottish associations for rib armlets include the Migdale hoard with

Type B axes, bar armlets and other objects, the Melfort grave with a jet necklace, and the Masterton grave with a knife and jet beads. On three occasions these armlets have been found with inhumations. Generally they occur in pairs, at Masterton, Melfort, Migdale and Tillychetly (Aberdeenshire), where the report indicates a pair of armlets comparable to the St Martins (Perthshire) armlet.

OTHER ORNAMENTS

Among the quantity of Early Bronze Age decorative objects are bronze and gold earrings. Only one pair of gold earrings is known, from Orbliston (Morayshire). These are true basket earrings, with a long basket-like pendant and a short tongue attachment (Pl. 1a). Only one of the pair survives, and is decorated by dots and lines around the edges of the basket. Other gold earrings of this type are known, from Ireland and from England, and associations include Bell Beakers at Radley (Berkshire) and Kirkhaugh (Northumberland). The Orbliston pair came from the same area as a gold lunula (Pl. 1b), but no association can be proved. Bronze earrings are no more common. The Cowlam (Yorkshire) pair are believed to be contemporary with an inhumation, and the pair in the Migdale hoard are associated with Type B axes, bar and rib armlets. The Migdale earrings are fragmentary, but one at least survives sufficiently to be described (fig. 39: 13); this has a narrow tongue for attachment to the ear, and the metal bends away towards the basket shape although most of this is gone. A fragment of bronze from Traprain Law, East Lothian, may represent another earring of this type; there is nothing basically surprising about the presence of Early Bronze Age material on such a site, although the earliest bulk of material is of the late Bronze Age. Another pair, previously unrecognised, is probably represented in the 149 fragments of sheet bronze recorded from cist 5 at the Balnabraid cairn, Kintyre (Ritchie 1967, 88). The fragments from this cist, found with a cremation, an urn, a flint flake and a bone toggle, consist of strips of sheet bronze with rib decoration and two heavier pieces (fig. 39:20) which seem plausibly to have been earrings of basket type.

The strips of sheet bronze bear low ribs along the edges with vertical ribs between (fig. 39:19); this has been linked to the Migdale sheet strip (fig. 39:10), which has decoration of low bosses along the edges with a hatched central background supporting lenticular bosses, of a style comparable with that of the Melfort armlet (fig. 39:16). Other fragments of sheet from Balnabraid bear repoussé decoration forming triangles (fig. 39:19); it is likely that these formed a second bronze strip, but whether both made up a pair of band armlets cannot now be decided. It has been suggested that the Migdale strip was the covering for a spacer-plate (Stevenson 1956), but it could as well have been designed to cover a bracer.

The Migdale hoard also contains 5 sheet bronze cones, bearing traces of perforations at their lower edges (fig. 39:11), and 43 tubular beads of sheet bronze, some of which have remains of perforated wooden cores (fig. 39:12). A few beads of this type are known from England and Ireland, but they are essentially a continental Early Bronze Age form, occurring in the Danube valley from Bavaria eastwards. Possibly of greater significance for the Scottish finds is the presence of such beads and sheet cones with edge perforations in the Únětician hoard of Gröbers-Bennewitz, Saalkreis (von Brunn 1959, taf. 33).

Perhaps to be related to the sheet bronze cones are the sheet gold domed discs from Barnhill, Angus (Pl. 3b). These have a false rib around the rolled edge, with dot decoration in the defining grooves and on the edge of the central low domed surface; the rolled edge is lightly grooved. It is likely that they represent a local version of the gold-bound amber discs from Wilsford G8 and Preshute G1a (Annable and Simpson 1964, nos. 195, 188–9), although there is no record that the

Barnhill discs were attached to any other substance. Another type of gold disc is that from barrow 1 of the Knowes of Trotty, Orkney. Four discs of sheet gold were found (Pl. 2a), and it has been argued that their radial splitting shows that these originally were shallow cones, covering large buttons in the same way as the Migdale bronze cones did; the radial splitting, however, is not particularly apparent. The decoration consists of concentric ribs with 1 band of zigzag lines and 1 of straight or oblique lines between the ribs. In this, the discs recall several of the Irish gold discs, without the characteristic cruciform decoration, such as those from Cloyne and Macroom, Co. Cork (Armstrong 1933, pl. XIX 436–7, 431). On the other hand, gold coverings for cones are a feature of certain Wessex graves, such as the high shale cone at Wilsford G8 (Annable and Simpson 1964, no. 181).

The pair of copper neckrings or diadems from Lumphanan, Aberdeenshire, represent another type of ornament (Pl. 2b). These neckrings each consist of a round-sectioned rod, the two ends of which have been beaten into spade-like terminals. The rod is 9·5 mm in diameter, and the ends are approximately 50 mm in length and width. The Yarnton (Oxfordshire) neckring, also of copper, is the only comparable British specimen (Glasbergen and Butler 1956); the Yarnton terminals carry 'stepped' decoration which may be compared with that on a gold lunula from Ireland (Taylor 1968), and there can be little doubt that these neckrings are of the Early Bronze Age rather than a later period. The relationship of these neckrings in copper to gold lunulae has been clarified by Taylor's work, who has shown that such neckrings in gold may represent unfinished lunulae; the copper specimens must have been worn as bar neckrings or diadems.

Six or seven gold lunulae have been found in Scotland. There are a few known from England and Wales, and over 60 in Ireland. Almost all of these are single finds, unassociated with other objects, but the Harlyn Bay pair of lunulae were probably found with a flat axe. The lunulae exhibit considerable differences in their style of decoration, and this aspect has been examined by Taylor (1968). She points to the evidence of contact between Ireland and Iberia in the Early Bronze Age, but suggests that the geometric decoration on lunulae may have been derived from similar motifs on British Beakers. The styles of decoration on the lunulae from Ireland and Britain appear to fall into three groups according to this recent work. The 'classical' lunulae have a formalised decoration, and are thinner and wider than the provincial styles which have less formal decoration. One Scottish lunula is of Taylor's classical group. Provincial styles occur in Scotland, Wales, England and Brittany. One of these local styles utilises a dot-line motif, the other has heavily incised lines. Taylor's dot-line motif occurs on the Auchentaggart (Pl. 5) and the two Coulter lunulae (Pl. 4a) from Scotland, as well as on one Welsh and one Breton example. Examination of the punch-marks on the two Coulter lunulae has shown that they were executed by the same tool; the lunulae were found at different times but are clearly the product of one workshop. It is suggested that the provincial lunulae were made outside Ireland, perhaps from 'blanks' of Irish gold, to local tastes.

The problem of lunula chronology remains unresolved. The traditional theory regards lunulae and jet spacer-plate necklaces as reflections in the north and west of the amber spacer-plate necklaces of southern England, and as such are contemporary or later than these amber necklaces (Piggott 1962, 100 with refs.). Recently, however, it has been argued that the sheet-work technique and style of lunulae falls intermediate between that of Beakers and that of the Early Bronze Age graves of Wessex (Taylor 1968). This would mean that the lunula was developed in Ireland at least as early as, and probably earlier than, the amber spacer-plate necklaces of the south. The position of the jet spacer-plate necklaces, of which there are many in northern Britain, generally associated with Food Vessels, remains uncertain (but see p. 72).

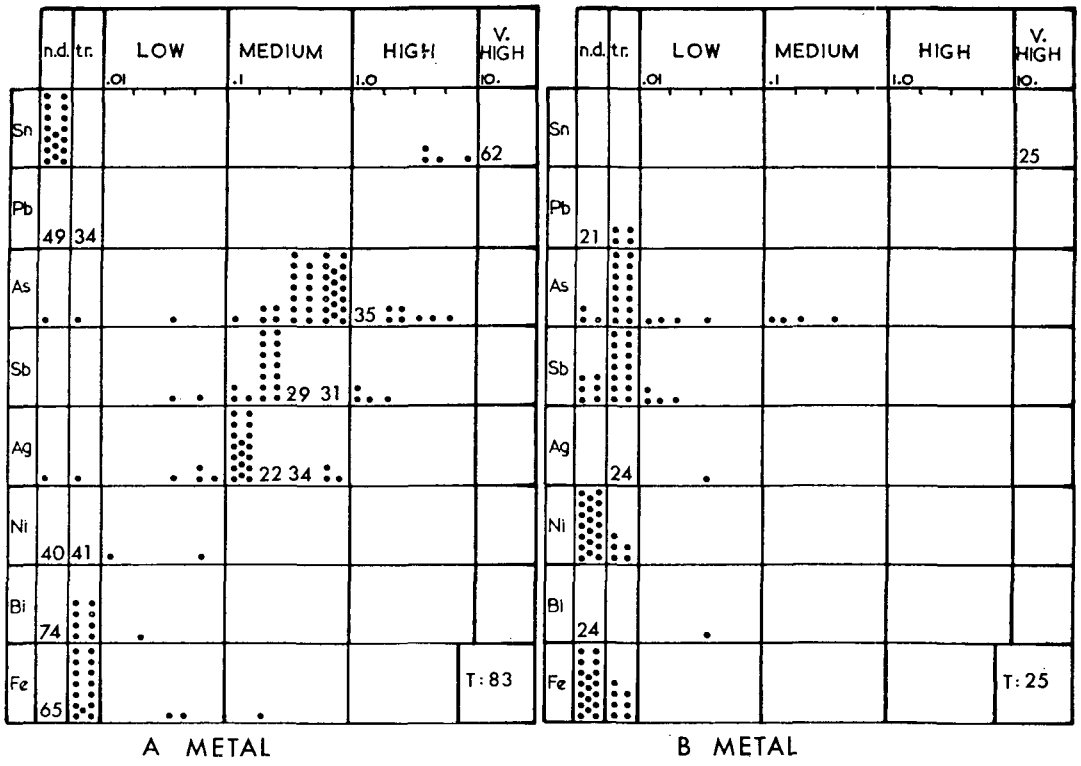

FIG. 40. Cluster A and B metal in Scottish Early Bronze Age material.

METAL-ANALYSES

The analyses of Early Bronze Age objects throughout Europe has been a concern of the Arbeitsgemeinschaft für Metallurgie at Stuttgart for a number of years. In 1960 the first major results of this ambitious programme were presented in a volume generally referred to as SAM 1, or Studien zu den Anfängen der Metallurgie (Junghans, Sangmeister and Schröder 1960). Using the trace elements arsenic (As), antimony (Sb), silver (Ag), nickel (Ni) and bismuth (Bi), SAM 1 described the content and distribution of 12 European metal-groups, each devised on the basis of the variable concentrations of trace elements in Bronze Age metal. For comparison purposes, Europe was divided into 15 zones, and SAM 1 presented a series of maps showing how the metal objects of the groups tended to concentrate in different zones, so that, *inter alia*, some idea of the trade patterns might be visible. The method of combining the elements into groups was criticised on archaeological grounds by Butler and van der Waals (1964), and a new approach was adopted by Waterbolk and Butler (1965), in which the Stuttgart method of attempting to find clusters from a gigantic range of analyses, each one treated exactly as another, was abandoned, and replaced by a more archaeological approach in which association and typology were used to group material in the first instance; the results of this work are only now being assessed. The Stuttgart method of statistical analysis, based on a 'univariate' method (see SAM 1, table 1), has recently been criticised mildly by Hodson who has shown that a multivariate method of analysis may produce apparently significant archaeological groups (Hodson 1969).

A programme of analysis of the Scottish data is at present being carried out by the writer

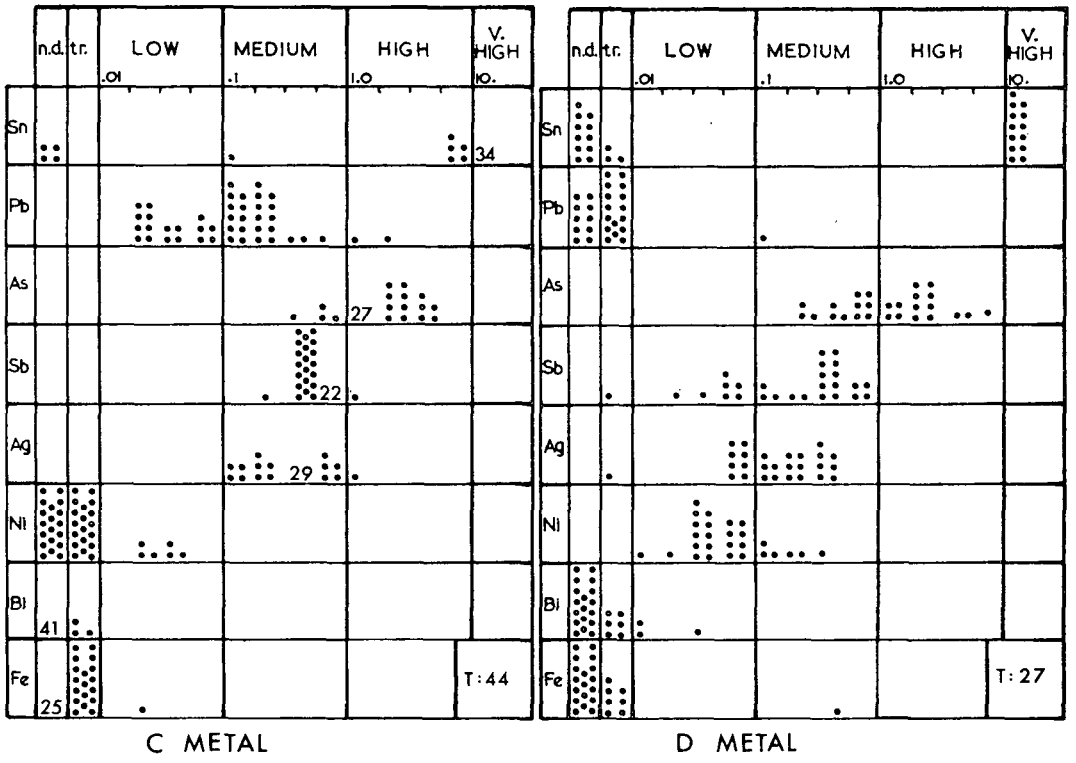

FIG. 41. Cluster C and D metal in Scottish Early Bronze Age material.

and Mr A. Balfour, Director of the Computer Unit, Heriot-Watt University, Edinburgh, but the results are not yet available. The purpose of this programme is to obtain a third method of examining the analyses of Scottish Early Bronze Age metalwork. The two methods available at the moment are the Stuttgart approach, presented in SAM 2 (Junghans, Sangmeister and Schröder 1968), in which about 160 Scottish analyses are presented (along with 9,000 other analyses), and a version, carried out by the writer, of the non-statistical approach devised by Waterbolk (Waterbolk and Butler 1965; see also Butler and van der Waals 1966). The latter method involves the setting up of a table of percentages (Appendix B, p. 98), which provides a relative positioning for each element on a geometrically scaled graph. As almost all of the Scottish analyses have been carried out by Stuttgart, and as the limit of detection of elements rarely falls below ·01%, it has been found desirable to omit the very low area on Waterbolk's graph, just as Case has done (Case 1966).

The Scottish analyses are presented in this way on a series of graphs (figs. 40 and 41) and these may be compared visually with each other and with the graph presentations of Butler and van der Waals (1966), Case (1966), and others expected shortly. One of the difficulties of this graph-method of presentation has been that any anomalous positions of an object on the graph (e.g. fig. 40 right, Bi) can only be seen in terms of one element in that the specific identification of any one object which may fall outside the average range for one element cannot be seen on the graphs of other elements without recourse to the work-sheet on which each object is clearly identifiable by number. This is a serious procedural problem if a graph shows a considerable spread of an element, from Low to High, for example (fig. 46 right, As); in these cases the work-

sheet will point out whether the objects within the upper or lower limits of the spread are to be identified with any extreme positions seen on other elements.

This poses another problem, one of basic procedure. If the elements tend to cluster together in a compact distribution on the graph (e.g. fig. 40), then it is likely that the objects represented on the graph form a group of similar composition. Waterbolk suggests that 'if there is a chance of only 1 in 100, for example, that an analysis with one deviant value belongs to the group, then the appearance of a second equally deviant value in another element for that analysis diminishes the chance of its belonging to 100^2, or 1 in 10,000. In other words, an analysis with strongly deviant values in two elements has an extremely small chance of belonging to the group' (Waterbolk and Butler 1965, 236). There is no evidence that this 1:100 ratio is anything other than an assumed amount, and it may be that the chance of an analysis occurring with one deviant value is much less. However, this problem is not considered to be a serious hindrance to the presentation of Scottish analysis in view of the relatively compact groups that are visible. It may also be assumed, for there is no other way of accepting the analyses as significant, that one analysis for each object represents a true and accurate account of the composition of the entire object; little work of verification has been carried out at the moment (Richards and Blin-Stoyle 1961).

As is apparent, five groups have been identified. These are called Clusters A–E for convenience in discussion, and again it must be pointed out that this is a purely internal arrangement. The word Group has been avoided in view of Coghlan and Case's Groups I–III, and Stuttgart's alphabetical Groups. Cluster A has no Pb or trace only of Pb, medium to high As, medium Sb and Ag, no Ni or trace only of Ni, no Bi or Fe. Sn is generally very high, but is not a defining feature of this or any other cluster, as it would have been added deliberately in the making of bronze implements. Metal containing relatively high proportions of arsenic as a trace element is generally considered to have been produced through deliberate selection of ores rather than through the intentional addition of arsenic as a separate ingredient (Britton 1961, 42).

Cluster B is characterised by absence of detectable amounts of Pb, Ni, Bi and Fe, and traces only of As, Sb and Ag. As is slightly variable.

Cluster C has low to medium Pb, high As, medium Sb and Ag, and absent or trace only Ni, Bi and Fe.

Cluster D has absent or trace only Pb, medium to high As, medium Sb, Ag and Ni, absent Bi and Fe.

Cluster E has absent or trace only Pb, Ni, Bi and Fe, trace or low Sb, variable As and medium Ag. This is a small and rather indistinct group.

Additionally, there are a few objects classed as 'other' in Appendix B; the trace elements in these do not fall into any of these Scottish clusters, but several are identifiable with external composition-groups (see below). Not plotted on any graphs are several objects, typologically of the Early Bronze Age but which by analysis are shown to fall well outside any clusters and to possess proportions of elements unlikely to have been employed in the Bronze Age. These are three axes (Ab 15, Ab 16, Ln 12) and the Cappuck, Roxburghshire, armlet; all of these have been omitted from maps, but they appear in Appendix A and B, where details of provenance and metal content may be found. The point must be made here that these five Scottish clusters do appear to be real, in that they form discrete groups. Comparison between fig. 40 and fig. 41 clearly shows the basic differences between the clusters, and it will be apparent that the use of lead (Pb) in this approach is valuable in separating Cluster C from Cluster A; Stuttgart do not use Pb as an element in their groupings.

Before discussing how these clusters react upon the typology and distributions of the metalwork, they should be compared with the Stuttgart and other groups. The publication of SAM 2

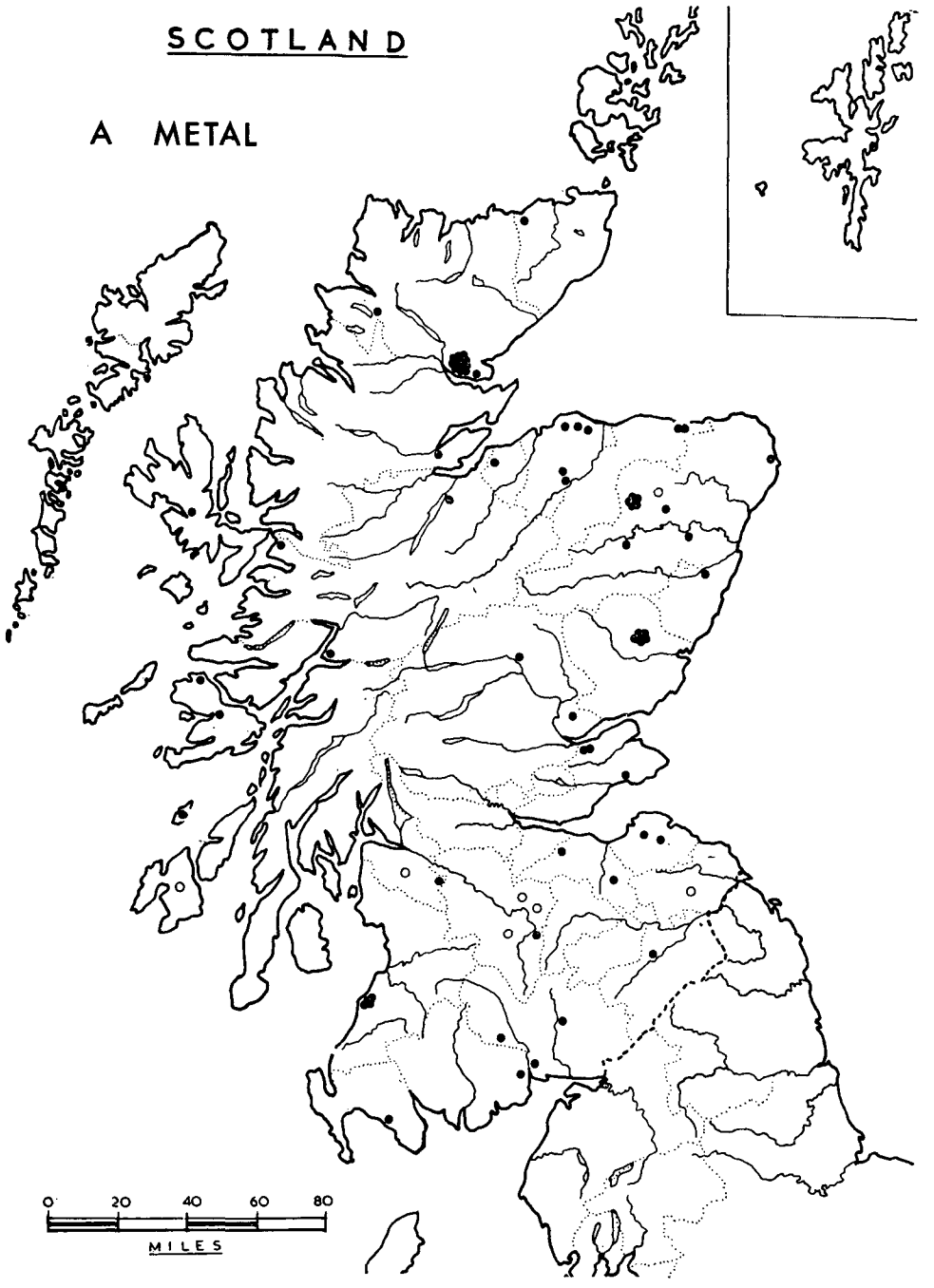

FIG. 42. Distribution of cluster A metal: open circles, county provenance only.

has enlarged the number of European groups, from 12 to 29, and areas from 15 to about 50; we are concerned only with their area 5d, Scotland. SAM 2 presents evidence showing that, according to the Stuttgart approach, no less than 16 metal groups are represented in Scotland. Unfortunately SAM 2 does not provide lists showing to which groups individual analyses belong, so that correlations with other schemes are made difficult and time-consuming. It is apparent, however, that our cluster B represents Stuttgart Group E 00, that our clusters A and C fall within Stuttgart Group E 11 A, and that our cluster D relates to Stuttgart Group F, now subdivided. Coghlan and Case's Group I metal contains our clusters A and C, and their Group II metal is analogous to our cluster D (Coghlan and Case 1957).

The way in which SAM 2 presents the evidence for relations between different areas is by a series of maps, arranged by metal groups. If, say, 100 objects belong to a specific group, and 40 of these are found in Scotland, 40 in Ireland and 20 in Jutland, then the map for that group will show these relative densities; related areas are thereby demonstrated. For Scotland, relatively dense concentrations occur for Groups E 00, E 11 A, FB 1, FB 2, and FG. The areas which also show equivalent or greater densities for these groups are Ireland (E 00, E 11 A and FG), the Low Countries (FB 1), and England, north-west Germany, the Low Countries and Brittany (FB 2). Relations with these areas are archaeologically reasonable, but other areas also participated in significant quantities in these metal groups, such as Hungary (E 00), and Italy (FG). Although linking regions may also be picked out, the widespread nature of certain metal groups tends to eliminate or reduce the value of any conjecture about trade and cultural relationships.

For immediate purposes, attention may be concentrated upon the internal clusters as produced by the graph method, and then proceed to look for immediate, not ultimate, sources or connections.

Cluster A metal in Scotland, with medium concentrations of arsenic, antimony and nickel (fig. 40), is represented by many axes of Type B, by bar and rib armlets, by a few Type A and AB axes (without tin), by several halberds and halberd rivets, and by a couple of knives and other objects. Identification of all these objects may be found in Appendix B, following the analysis-details. This metal was used for 42 out of 66 (analysed) Type Ba axes, the common Scottish type, for only 9 out of 43 (analysed) Type Bb axes and 1 out of 8 (analysed) Type Bc axes. The metal may therefore be considered as an important component of Scottish industries. In distribution this metal is fairly well spread, particularly in the north-east of the country, although there is a scatter throughout the south (fig. 42). Note has already been taken of certain axe shapes that seem to have utilised this metal exclusively (p. 25). In addition, 10 out of 11 analysed waisted Type B axes (p. 18) are of cluster A metal, but only half of the 18 analysed bevelled Type B axes (p. 15). In terms of associated finds, the Auchnacree (Angus), and Abdie (Fife) hoards are exclusively of cluster A metal, while 10 of the 11 objects in the Migdale (Sutherland) hoard, 5 of 7 axes in the Finglenny (Aberdeen) hoard, and 4 of 6 objects in the Port Murray (Ayr) hoard are also of this metal, as is the one analysed object from the Durris (Kincardine) hoard (fig. 43).

Cluster C metal is also well-represented in Type B axes. This metal has high arsenic, medium antimony and silver, and medium to low lead. Nickel, bismuth and iron are present only as traces or are undetected. Tin is very high in almost all specimens (fig. 41). The essential difference between this metal and cluster A metal is the presence of lead. This metal was used for the production of Type B axes, several bar armlets and a few halberds; only one Type A axe, and one Type AB axe, were made from cluster C metal. Type B axes, subdivided, show that the metal was used for 20 out of 68 Type Ba, 10 out of 43 Type Bb and 1 out of 8 analysed Type Bc axes; the metal, then, was employed for 31 axes compared with 52 axes of cluster A metal. The distribution of cluster C metal is distinctly north-eastern (fig. 44), with a sparse scatter in central or

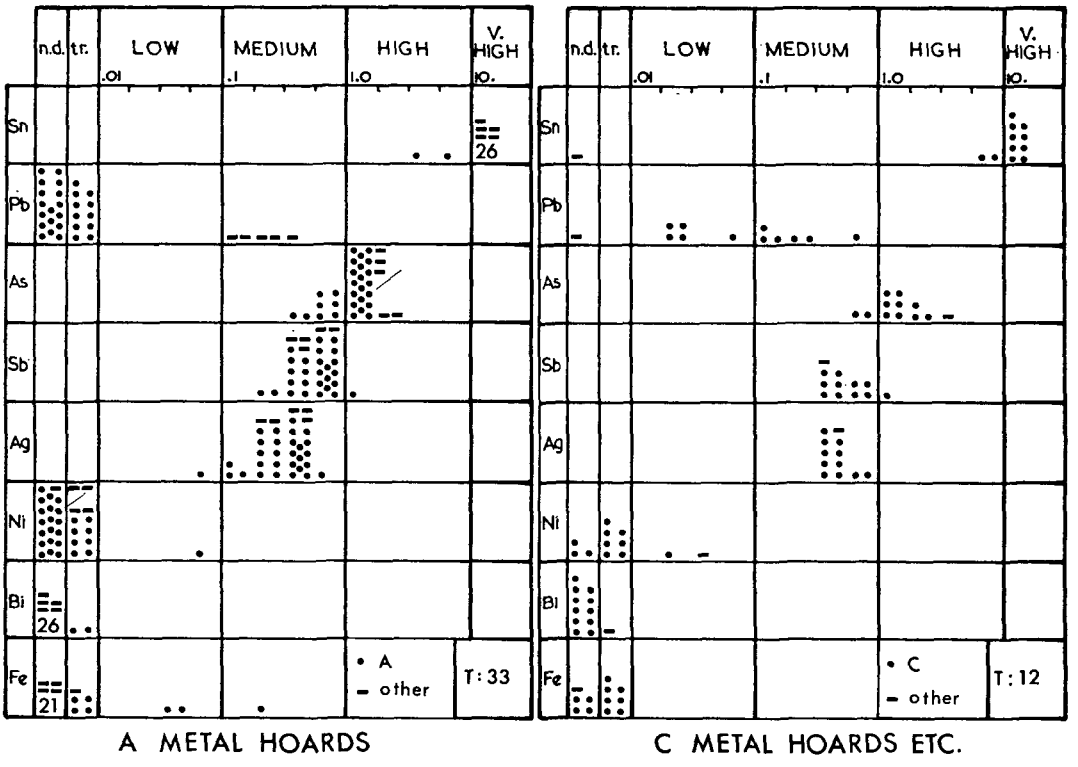

FIG. 43. Hoards and grave-groups of cluster A and C metal.

southern Scotland. Reference has been made to a specific sub-group of axes of Type Bb that employed this metal (p. 11). Associated finds using cluster C metal exclusively include the Ladyhill (Ross) hoard, and the Kinneff (Kincardine) grave group, as well as the two axes in the Sluie (Morayshire) hoard, found with a halberd of cluster D metal. The sole surviving axes from the Ravelston (Midlothian) and Balnoon (Banffs.) hoards are also of cluster C metal (fig. 43).

Cluster B metal is less well represented in Scottish finds. This metal is characterised by very low content, trace only, of arsenic, antimony and silver, with absent lead, nickel, bismuth and iron. Tin was added to all objects cast from such metal (fig. 40). Cluster B metal was used to produce Type B axes only, apart from one halberd. Of the 19 axes of this metal, 14 are of Type Bb, 3 and 2 of Types Bc and Ba respectively. This contrasts strongly with the other metal clusters used for Type B axes, as the table shows:

METAL-CLUSTERS

	A	*B*	*C*	*D*	*E*	*Totals*
Type Ba axes	43	2	20	2	1	68
Bb axes	8	14	10	8	3	43
Bc axes	1	3	1	1	2	8
Totals	52	19	31	11	6	119

From this it is apparent that, in general terms, cluster B metal was used for Type Bb axes, and cluster A and C metal was used for Type Ba axes. In distribution, cluster B metal is sparse and well scattered (fig. 45). Only one specific form of Type Bb axe seems to have been made

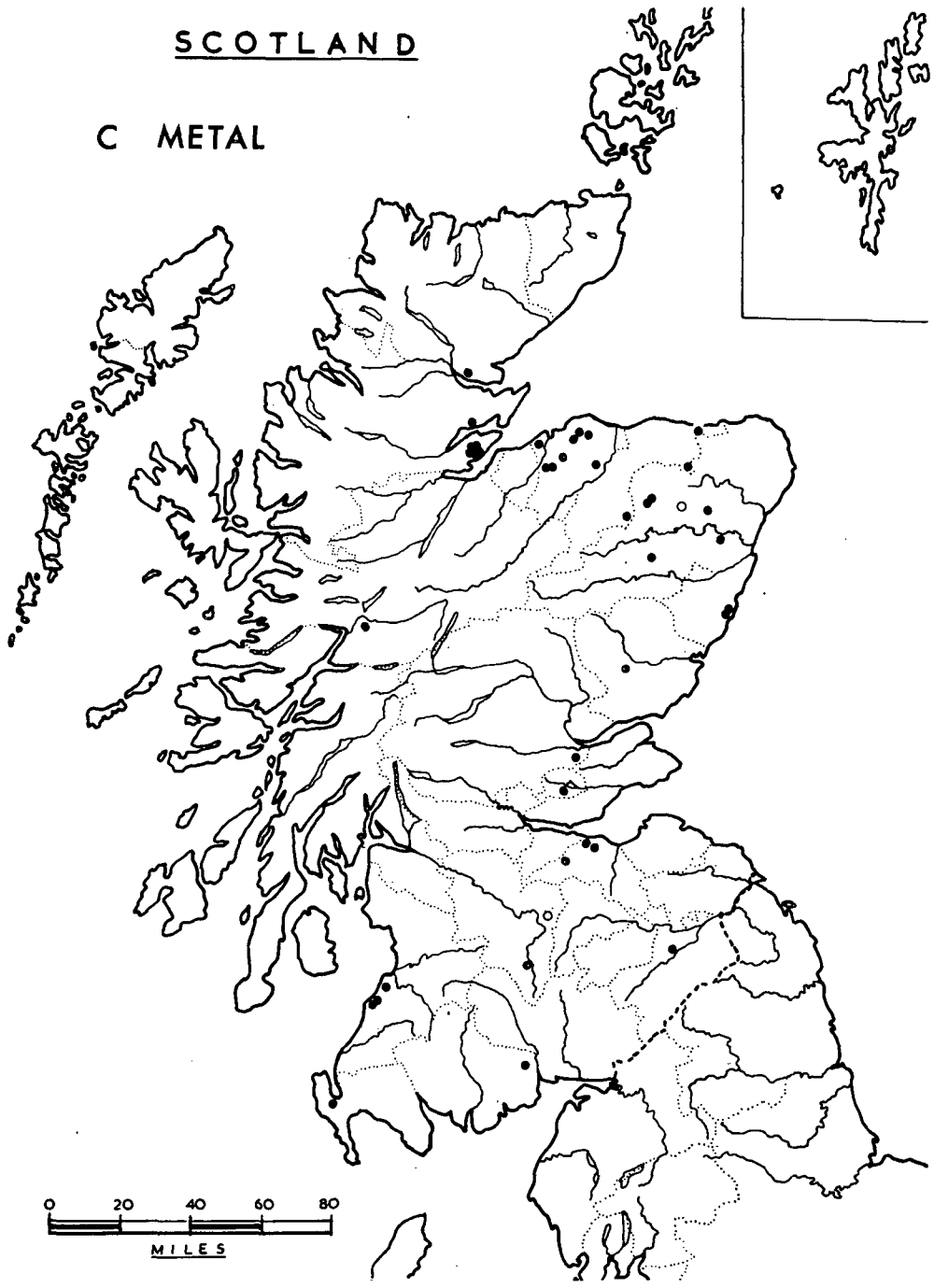

FIG. 44. Distribution of cluster C metal: open circles, county provenance only.

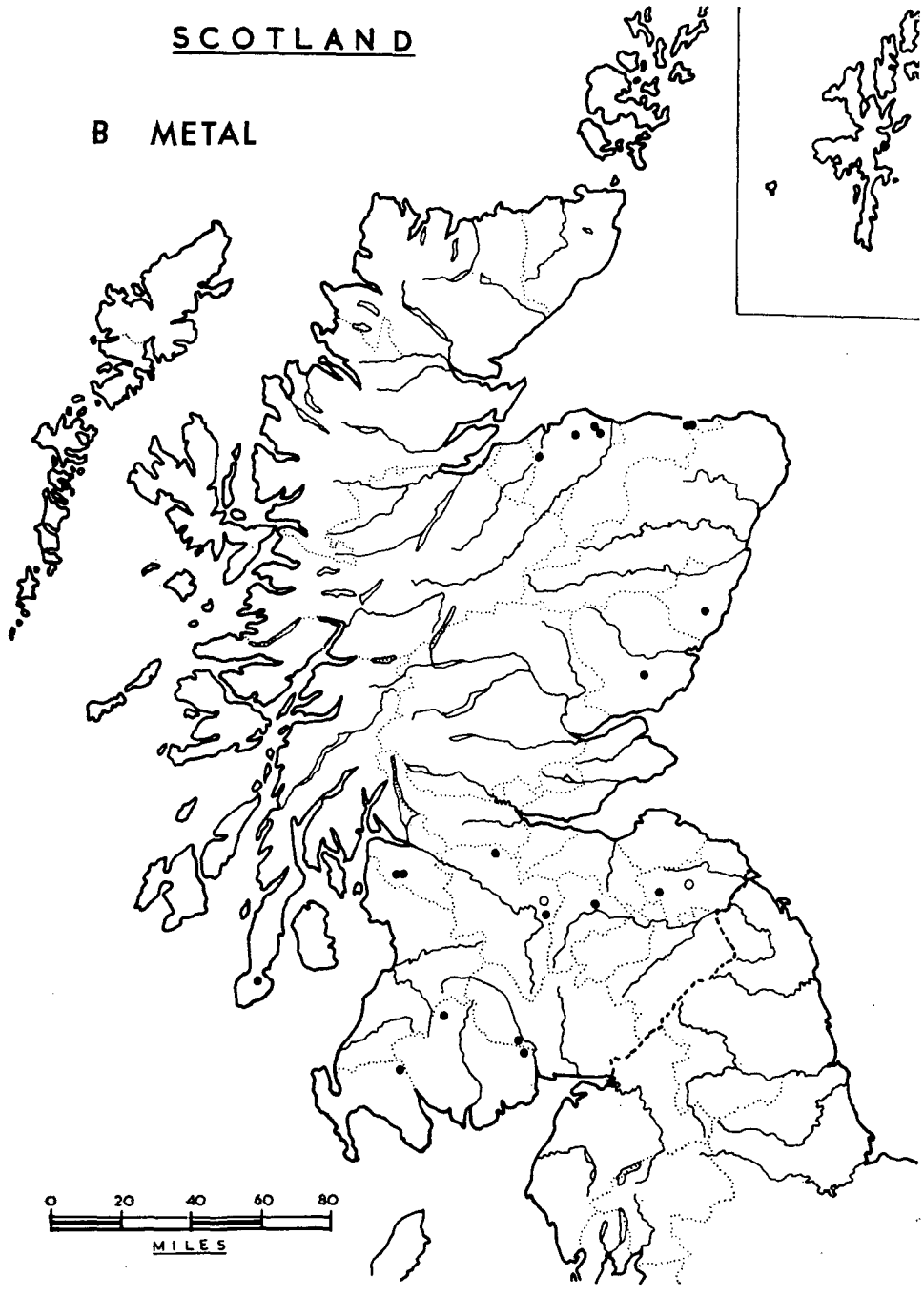

FIG. 45. Distribution of cluster B metal: *open circles, county provenance only.*

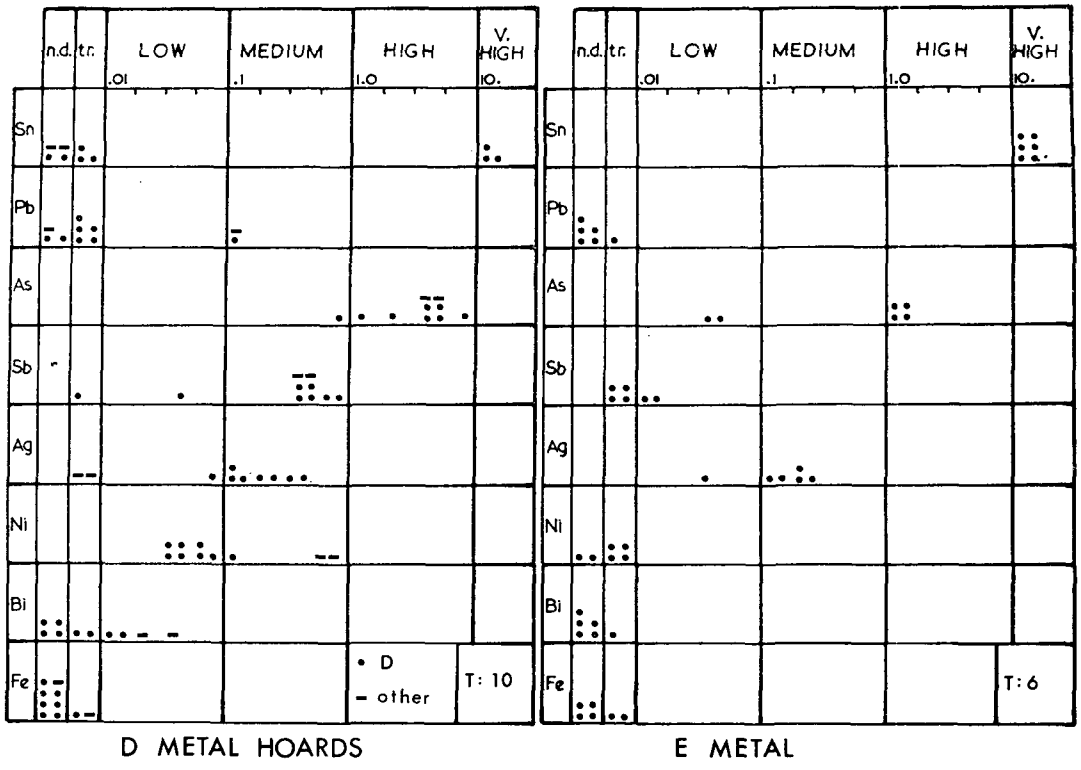

FIG. 46. Hoards of cluster D metal and material of cluster E metal.

exclusively of this metal (p. 14), and there are no associated finds the metal of which is predominantly of cluster B.

Cluster D metal is characterised by low to medium amounts of nickel, in contrast to cluster A metal which is otherwise similar. Arsenic is medium to high, antimony and silver medium, and lead, bismuth and iron are absent or represented only by a trace (fig. 41). Tin is variable, from absent (mainly halberds), to very high (axes). The objects made of this metal are Type B axes, several Type A and AB axes, and a number of halberds (list, Appendix B). Of 11 Type B axes of cluster D metal, 8 are of Type Bb, and it appears that this metal was used in the same way as cluster B metal, principally for Type Bb axes. The distribution of cluster D metal is distinctly eastern, with, however, a very few west coastal and head of the Great Glen finds (fig. 47). Associated finds with cluster D metal are rare but include the Auchingoul (Banffshire) halberds and the Barevan (Nairn) axes (fig. 46).

Cluster E metal is represented by only a few Type B axes, of all sub-types. The metal is characterised by an absence of lead, and low or trace only of antimony. Arsenic is variable, there is medium silver, and nickel, bismuth and iron are absent or trace only. Tin is very high (fig. 46). The few finds are scattered from Caithness to Dumfries, and the metal is unrepresented in any associated find.

Although cluster E metal may be considered a weak and poorly documented metal, there can be no doubt about the existence of the other metal clusters. The graphs present the evidence for the existence of these clusters, and by themselves appear conclusive, if the element lead is

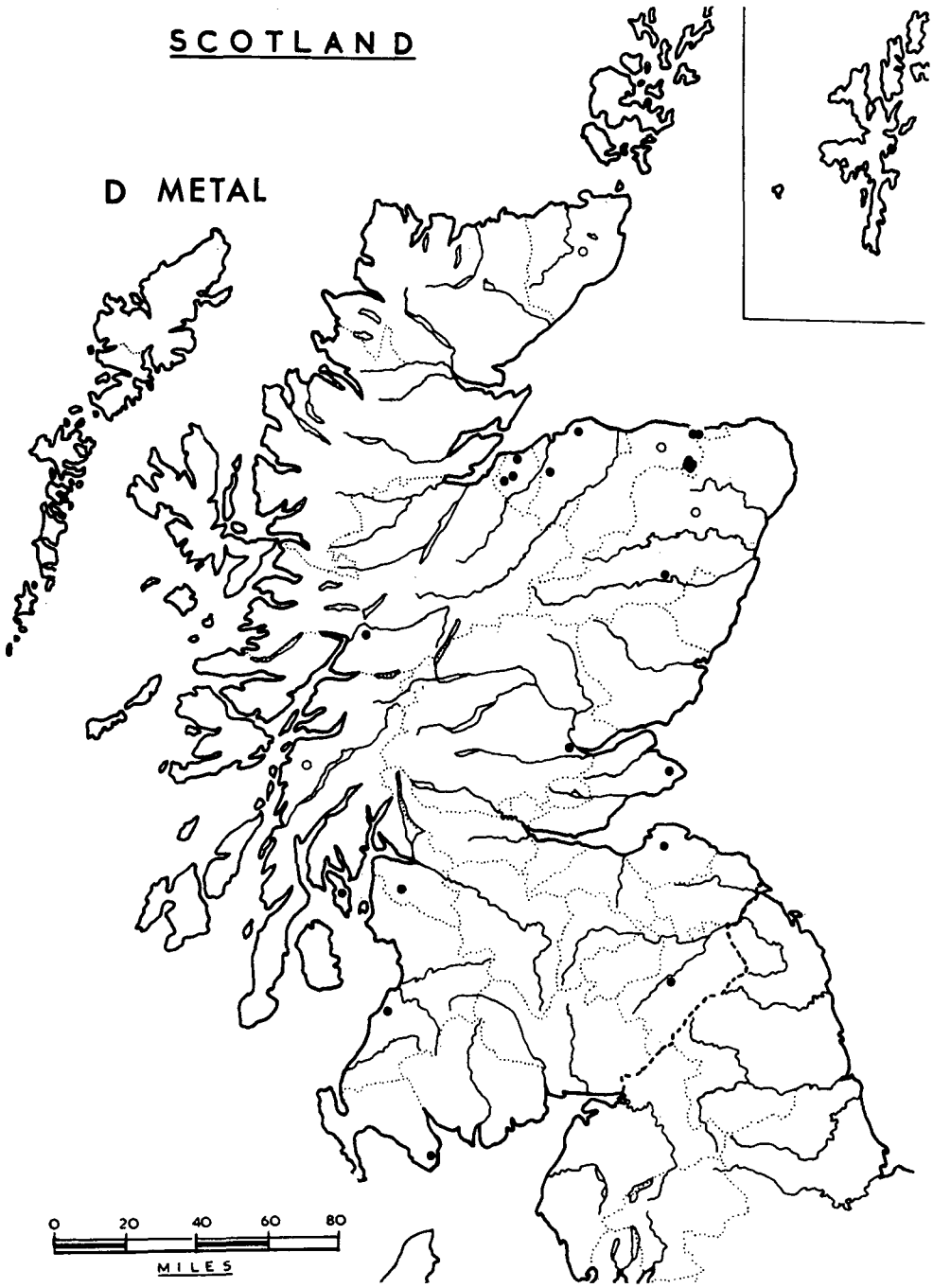

FIG. 47. Distribution of cluster D metal: open circles, county provenance only.

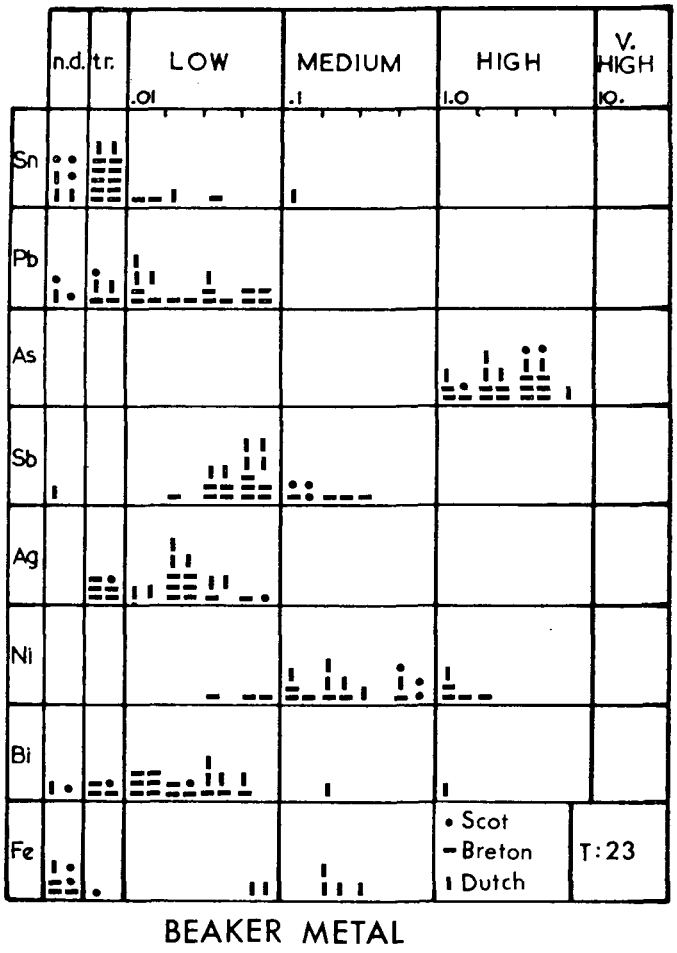

FIG. 48. Breton-Dutch Bell Beaker metal material.

accepted as worthwhile incorporating in this method, and if tin is ignored for the purposes of determining metal clusters. Tin was a deliberate addition to copper, and should not be used initially in determining metal clusters, although of course it is of some interest when considering the types of objects that seem consistently to have been made without it. These are almost entirely halberds and Type A and AB axes, as well as tanged knives and the Lumphanan (Aberdeen) neckrings. The metal of the neckrings, the tanged knives and a few other objects does not conform to any of the Scottish clusters, and some are presented separately (fig. 48). The metal of the two tanged knives seems to fall within the grouping produced for tanged knives from the Netherlands and Brittany (Butler and van der Waals 1966), although the Scottish lead content is rather low.

The other support for the real existence of the Scottish metal clusters as they are presented here, and for the non-existence of any other comes from the association of specific metal clusters with certain axe shapes noted above, and with certain hoards and grave groups, as may be seen in the table on page 67.

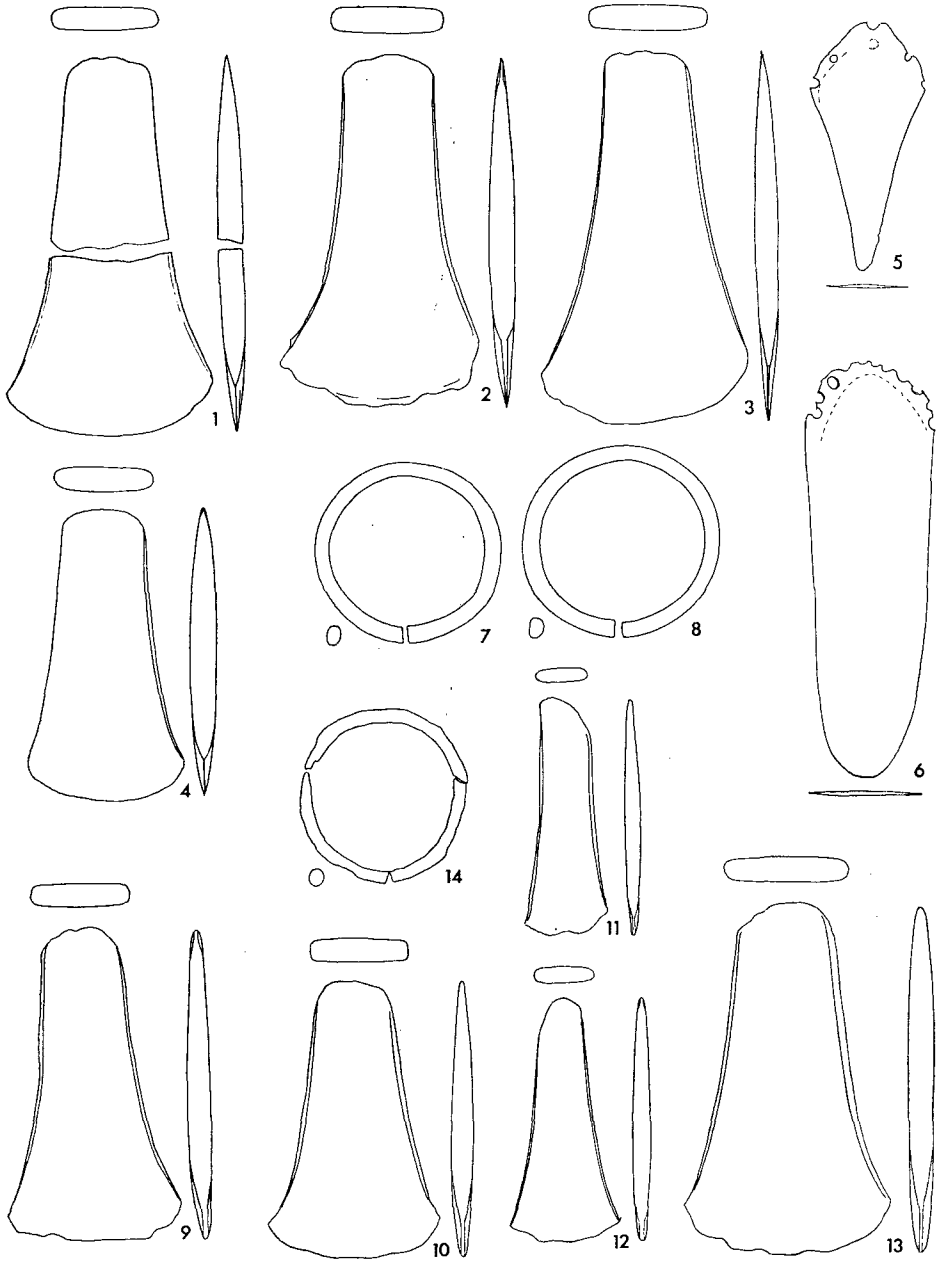

FIG. 49. Hoards: 1–8 Auchnacree (Angus), *axes* 1 (An 5), 2 (An 3), 3 (An 2), 4 (An 4); 9–14 Port Murray (Ayrs.) *axes* 9 (Ay 8), 10 (Ay 7), 11 (Ay 6), 12 (Ay 4), 13 (Ay 5). $\frac{1}{3}$

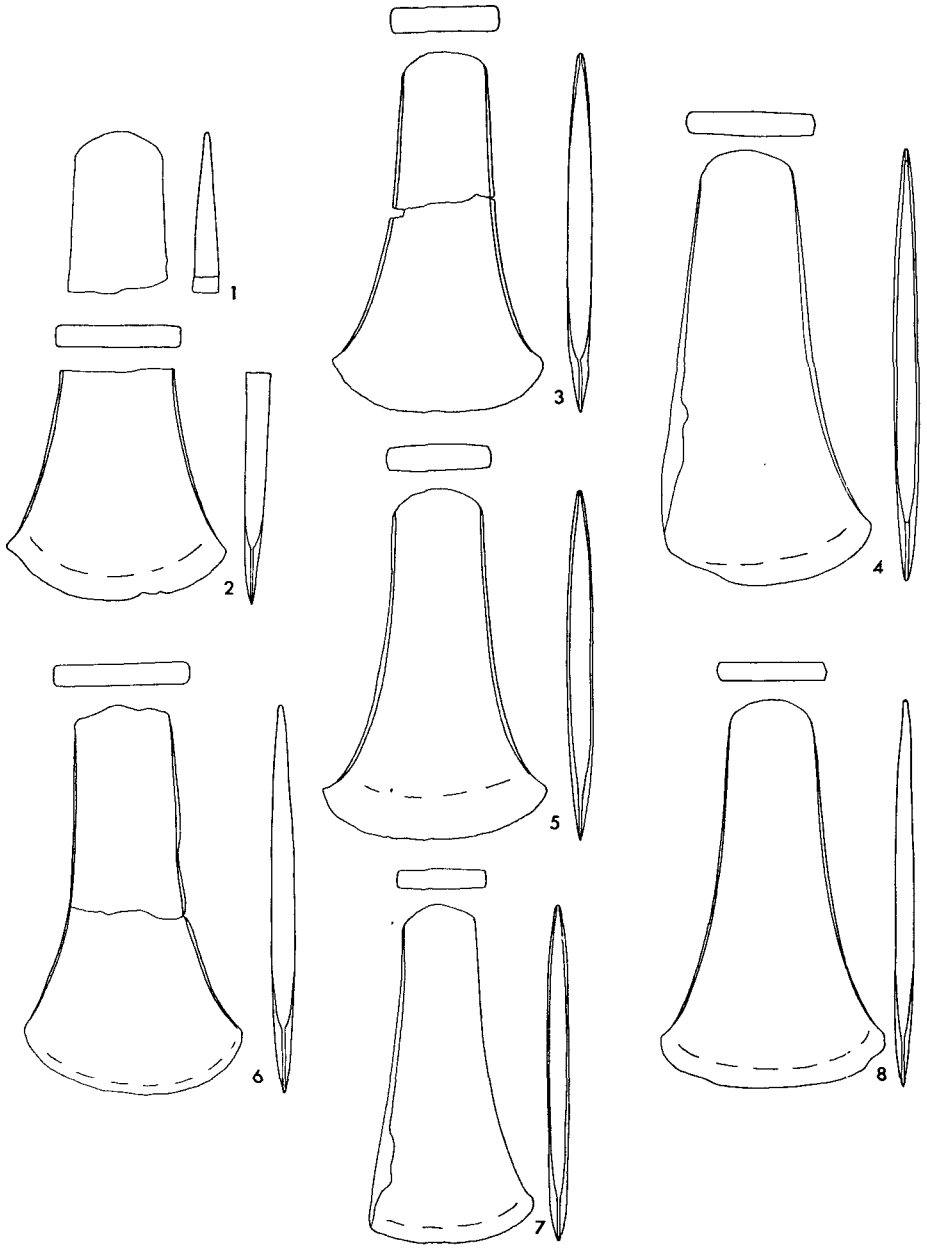

FIG. 50. Hoard from Finglenny (Aberdeens.): 1 (Ab 9), 2 (Ab 10), 3 (Ab 11), 4 (Ab 6), 5 (Ab 13), 6 (Ab 8), 7 (Ab 12), 8 (Ab 7). $\frac{1}{3}$

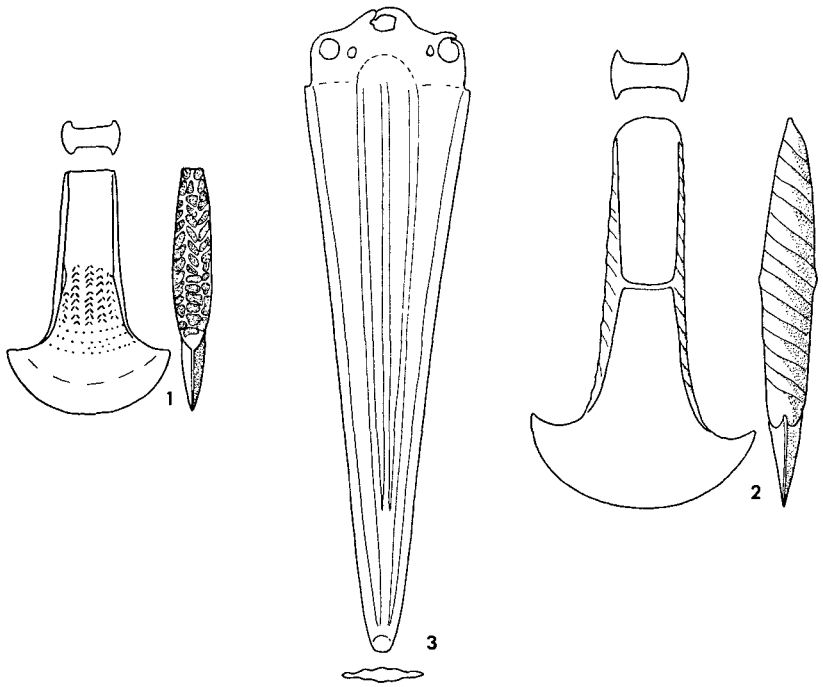

FIG. 51. Hoard from Gavel Moss (Renfrews.): *axes* 1 (Rf 2), 2 (Rf 1). ½

METAL-CLUSTERS IN SOME ASSOCIATED FINDS

Find	*Cluster A*	*B*	*C*	*D*	*E*
Auchnacree	6				
Abdie	2				
Migdale	10		1		
Finglenny	5		2		
Port Murray	4		2		
Ladyhill			5		
Kinneff			2		
Sluie			2	1	
Auchingoul				4	
Barevan				2	
Colleonard	2	2?	1	2	
Gavel Moss		2		1	

The Colleonard hoard stands out from this table as the only 'mixture', containing objects made of a variety of metal clusters. All of the other associated finds seem to point to a single or twofold source for the metal used.

This study of the Scottish analyses began with an attempt at the grouping of trace elements into significant clusters. The results of this work was the identification of five clusters, A–E, with some few objects falling outside all of these. Typological correlations, and correlations by associated finds, seem to support these clusters. An independent method of assessing the significance of the clusters is at present being carried out. The results of this preliminary work shows the existence of two major metal-clusters in Scotland, A and C, both of which were used to make

the characteristic native form of flat axe, Type Ba, a form which is represented by almost all of the existing Scottish moulds. The metal is a part of Coghlan and Case's Group I metal, which is arsenical copper, with antimony and silver in appreciable quantities. The metal is believed to be in part of Irish origin, smelted from sulphide ores, but it is likely that Scottish metal sources were also used (see fig. 26; Scott 1951 for source names). In Ireland, Munster has been recognised as one source of this metal (Coghlan and Case 1957, Case 1966). No continental regional concentrations have been proposed. For Scotland, not only Type Ba axes were produced with this metal, but also some typologically earlier axes, of Types A and AB, and some halberds and other objects. The evidence seems to point to the existence of considerable contact between Ireland and Scotland during the second millennium B.C. The relative scarcity of this metal in graves and hoards of the Early Bronze Age in southern England serves as a contrast to this northern relationship (Britton 1961).

The other metal-clusters were not used as extensively; for clusters B, D and E, the total is only 35, compared with 82 for clusters A and C. But cluster B metal was used principally for Type Bb axes, and for a majority of decorated axes of this form; of all decorated and analysed Type B axes, 9 are of cluster B metal, 6 of cluster D, only 3 of A and C metals. Typologically it has been suggested that Type Bb axes, and particularly decorated ones, are of Irish character, and perhaps even production (p. 11). Cluster D metal corresponds with Coghlan and Case's Group III, characterised by relatively high nickel, and is considered generally to be of central European origin (Coghlan and Case 1957; Case 1966; Britton 1961, 43), although it may be questioned whether or not this attribution will stand for long. Cluster B metal, which corresponds with Stuttgart's Group E 00, is comparable with some of the metal found in south English Early Bronze Age graves and hoards (Britton 1961), and again has been generally reckoned to represent a non-Irish metal; on the continent such metal is commonly seen in Portugal, south-western France, and Hungary, but the recent Stuttgart publication (SAM 2) shows densities of this metal in other areas, and now including Ireland as well as the north European plain (Junghans, Sangmeister and Schröder 1968, maps 34–6). Irish examples of similar type and metal content are known (Megaw 1969, fig. 2a). Judgment perhaps should be reserved on this metal, but its concentration in Scotland, lying between Ireland and northern Europe, may be remembered. The metal-cluster is virtually free of trace elements, and native copper might be considered.

INDUSTRIAL PHASES

The internal hoards and graves provide some measure of evidence for the contemporaneity of metal objects in Scotland. Appendix C lists metalwork associated with graves, and Appendix D provides a guide to the contents of hoards, full details being given in Appendices A and E. From these the contemporaneity of the major forms of Type B flat axes may be seen, Types Ba and Bb occurring in association with each other on four occasions, Types Bb and Bc occurring together once. Type B axes as a whole appear to be contemporary with band, bar and rib armlets, on the basis of the Laithers, Port Murray, Migdale and Auchnacree hoards. The only knives associated with axes in Scotland are the pair in the Auchnacree hoard. Halberds, too, remain in isolation from the remainder of the metalwork except for the Sluie find. Finally, Appendix D shows the Gavel Moss find to be unique in Scotland, linking a midrib knife and two Class I flanged axes.

Appendix C lists graves with metalwork, and provides the basic data on the association of various metal knives with gold discs at Barnhill, Beakers at five sites, gold pommel-mounts at Blackwaterfoot, Skateraw and Collessie, rib armlets at Masterton, and Food Vessels at Glenboig

and Kilmaho. The gold discs at the Knowes of Trotty were found with fragments of amber spacer plates. Other associations include bar armlets with a Yorkshire Vase at Ratho, with an Irish Bowl at Kinneff, and with a Beaker at Crawford. The probable bronze earrings from Balnabraid were contemporary with a Cordoned Urn. Ribbed armlets occurred with a jet spacer-plate necklace at Melfort, and a gold pommel-mount from Monikie was found with a form of Food Vessel.

These are internal associations, and many may be duplicated outside Scotland, in England and Ireland. Thus, bar armlets from Lug na Curran, Co. Leix, were associated with an Irish Bowl and faicene beads, bronze earrings at Garton Slack and Goodmanham occurred with Yorkshire Vases (Simpson 1968 with refs.), band armlets were found with a local Beaker at Knipton, variants of Type B axes occurred with knives of Bush Barrow type at the Bush Barrow itself and at Barrow 7 on the Ridgeway in Dorset (Britton 1963, 279, 281 with refs.), and Type B axes were associated with riveted knives at Aylesford, Shuttlestone and Butterwick (Piggott 1963 with refs.). The chronology of these finds depends more upon the metal objects than on the sometimes associated pottery. Locally-developed Beakers of Long-necked form, Clarke's Southern British forms, are dated in general terms to the centuries from about 1600 B.C., and the conclusion of Simpson's examination of Yorkshire Vase and Irish Bowl associations was that both forms were contemporary with the two phases of Bronze Age graves in Wessex, and that there was no evidence to support their existence either before or after the period of these Wessex cemeteries, which on traditional chronology are *c.* 1600–1400 B.C. The Irish evidence for the association of Food Vessels and metal objects is also sparse (Harbison 1968), and in the absence of much evidence for metal objects typical of the Wessex graves (Flanagan 1961) the chronology of metal industries must depend upon internal developments.

In work on the Scottish Late Bronze Age and Middle Bronze Age metalwork, it proved possible to suggest that the development of metal industries could be divided into a number of geographical and chronological phases (Coles 1960, 54; 1964, 128–30). The basis of this was typology and hoard-content, and for the Early Bronze Age here under discussion there is no lack of material for comparable treatment. From this it appears that at least three phases of industrial activity may be discerned in the Scottish Early Bronze Age.

The first of these phases is bound up with the appearance in Britain, primarily southern and eastern Britain, of Bell Beakers from the Middle Rhine region (Clarke 1966). The makers of such Beakers were in contact with nineteenth and eighteenth-century developments in Saxo-Thuringia, and in the upper Danube valley, where what is referred to as the Early Bronze Age was in existence in Christlein's Phases 1 and 2 (Christlein 1964). Too precise a chronology cannot be expected at this point in time. The recognition of Bell Beakers of this character in Ireland suggests it is likely that penetration to the west was swift. Other groups had descended on eastern Britain as far north as the Moray Firth by the early seventeenth century, and it appears that metalworking was present in Ireland and in southern England within the eighteenth century, and in northern Britain at the same time or, more likely, shortly after. The two tanged knives and one Type A axe from eastern Scotland, of Dutch-Breton Beaker metal, are likely to be of the nineteenth or eighteenth century B.C., in view of the chronology for Type 2^{1b} Beakers and the Exloo (Drenthe) grave in the Netherlands (Butler and van der Waals 1966), and may be earlier than, but foreshadowing, a concentration of Beakers in north-eastern Scotland. By this time, the eighteenth century, the Irish metal industries must have been under way, to produce and exchange their tanged knives and, probably, their Type A axes, and metal, with British groups. The evidence for this is in Beaker grave groups of southern England, where tanged daggers of probable continental copper, and others of Coghlan and Case's Group I metal (Scottish clusters A and C in general

terms), are contemporary; the interpretation is that the Irish, and Scottish, metal industries were underway by this date (Case 1965; 1966).

This initial episode of metal in Scotland can hardly be called an industrial phase, and there is very little evidence to place any locally-produced objects before the eighteenth century B.C.

Important for the chronology of the Scottish industrial phases is the appearance on a wide scale of a metal group, Stuttgart's Group A (with moderate to high arsenic, antimony, silver and nickel, variable tin and little or no bismuth) which occurs in the Singen group of south-west Germany, the Adlerberg of the Middle Rhine, the Nitra group of south-west Slovakia, the Early Gemeinlebarn group of Austria, and in the Únetician group to the north. The Úněticians generally added tin in quantity to this metal, which may have a source in south-west Germany or Slovakia, but other groups added low and variable amounts of tin. In the Netherlands, this metal was used for some objects in the Wageningen hoard, and is likely to have been widely available as early as the nineteenth century (the awl in the Exloo find), but used for objects in hoards such as Dieskau II and Wageningen in the seventeenth century.

These two hoards, by their decorated axes, show the existence of British-Irish products on the continent in the seventeenth century, at a time contemporary with the Leubingen and other groups in Únětician territory, and contemporary with the first phase of the Wessex cemeteries. The preceding time, the later eighteenth and early seventeenth centuries, seems to be the crucial period when metallurgical ideas, immediately from north-western Europe, but ultimately of central European origin, were established on a wider scale in the British Isles. To this time, which for convenience may be regarded as the eighteenth century, must belong the widespread appearance of Type B axes, tanged and riveted knives, various gold finery; this is Case's impact phase in Ireland (Case 1966), but the use of this term in Scotland is a little uncertain in view of the absence of evidence for any pre-existing industry on which any impact might be felt.

In Scotland, this first phase of industrial activity, the Migdale phase, using metal of clusters A and C, saw the production of Type B axes as well as those few axes of more primitive form, Types A and AB. The waisted forms of Type B axe, which were of continental inspiration, yet which never really caught on in Britain, are likely to belong to an early episode in this industry, and all of the Scottish waisted axes that have been analysed are of cluster A(10) or cluster C(1) metal. In contrast, cluster B metal seems not to have been available at this time. No axes of Types A or AB, and only one halberd, are of cluster B metal, which is the metal used most often for decorated axes. On the other hand, metal considered to be of Alpine origin, Stuttgart's F Groups, Scottish cluster D metal, was used for several Type A and AB axes, and for a number of halberds, as well as some decorated Type B axes. The view preferred for this is that some type A and AB axes continued to be produced well after Type B axes were in vogue, rather than that cluster D metal was readily available at this time. If this view is accepted, it means that the initial stage of Scottish Bronze Age industry relied upon what must be local or Irish supplies, and continental metal was readily available only thereafter, after the establishment of trading connections with the continent. Ideas which seem to have been transmitted to Scotland and to Ireland at this time, through the activities of Beaker-using people, included thin and slender axes (but see p. 5), riveted flat knives and some tanged daggers, spiral armlets, tubular beads, perhaps halberds as well. All of these objects are documented in material of Reinecke A1 and were widely distributed in central Europe. In Scotland, exact copies of some of these types may be recognised, but in other cases local ingenuity prevailed and a different form resulted.

The Migdale tubular beads and button-covers are good examples of exact copies of continental material. They are made of cluster A metal. Similar forms occur in the Danube valley and farther north; in the Gröbers-Bennewitz find, Saalkreis, both beads and covers occur (von

Brunn 1959, taf. 33). The bar armlets from the same Migdale hoard are commonly considered to represent local versions of the massive armlets known in the same northern area of Europe, but generally in slightly later contexts. However, from Reinecke A1 associations over a wider area is known a heavy spiral armlet (e.g. Torbrügge 1959, abb. 5, 7 and 19), and the effect of wearing the six Migdale bar armlets is identical to one spiral armlet. The Exloo spiral armlet, in an earlier hoard, could be matched in visual effect by a pair of bar armlets such as occur in the Auchnacree hoard. It is likely that the Port Murray hoard, with a single bar armlet, is contemporary. The Auchnacree, Port Murray and Migdale hoards are of cluster A metal, with 3 objects of cluster C. To these must be linked the Finglenny hoard of axes, again of cluster A and C metal.

Around 1700 B.C. it is likely that a gravitation of interest and wealth occurred towards Wessex, stimulated in part by the very strong Beaker groups that had occupied the area since the nineteenth century, in part by external influences, not excluding groups of people, that were brought to bear on this region. Almost the whole of southern England, of course, is without natural metal resources, and the significance on the area of the long-established henge monuments such as Avebury, and Stonehenge, need not be emphasised. In any case, the tremendous concentration of wealth in the hands of the dead in Wessex must have stimulated the growth of industrial activity in other areas of the British Isles. The requirements of those buried in Wessex resulted in a flow of ideas and materials to the south from not only other parts of Britain and Ireland, but also from the continent, particularly Saxo-Thuringia. The range of weapons and ornaments in the Wessex graves need not be listed here (Piggott 1938; Ashbee 1960; Annable and Simpson 1964; ApSimon 1954). Considering the fact that all of these metal goods had to be imported either as finished products or, much more likely, as raw material to be fabricated locally, it is remarkable that those areas likely to have provided such material, Ireland in particular, and Wales and Scotland too, received so little that is tangible in return (Flanagan 1961; Burgess 1962). For Scotland, the four gold pommel-mounts from Skateraw, Collessie, Blackwaterfoot and Monikie, are often considered to represent Wessex ideas, but their principal analogy is the Topped Mountain, Co. Fermanagh, pommel-mount, found with a grooved knife admittedly related to the Wessex Bush Barrow form, and a Food Vessel, The Blackwaterfoot mount is likely to belong to a late phase of the Scottish Early Bronze Age, contemporary with the final episodes in the Wessex cemeteries (p. 73). The enrichment of knife-handles in Wessex was achieved in different ways.

For Scotland, almost all of the objects that may be related to certain types in Wessex graves are of non-metallic substances. The bone or ivory belt-hook from Brackmont Mill, Fife, associated with a Collared Urn, is comparable with the Killicarney, Co. Cavan, belt-hook with an Irish Bowl, and to the gold cover for such a hook from the Bush Barrow. A few Scottish pins of bone, resembling in shape some ring-headed and crutch-headed pins from Wessex, might also be noted here. A glass bead from Gilchorn, Angus, of probable fifteenth-century date, seems exotic but not necessarily a Wessex-derived gift. Perhaps more direct, but of doubtful chronological validity, are the fragmentary amber spacer-plates from the Knowes of Trotty, Orkney, barrow; these amber pieces if intact would be similar to plates from Upton Lovell, Wiltshire, and Oakley Down, Dorset. Continental fragments have been recovered from south-west German graves of the Tumulus Bronze Age, and the Mycenaean grave-finds are also well-known. What they mean in terms of chronology for the re-used Orkney amber pieces is open to discussion. Associated with these are four sheet gold discs, possibly originally covers for shallow cone-like buttons, and which may relate to Beaker V-bored buttons of jet, to gold coverings from Wessex graves, or to the simpler Migdale metal covers.

It does not seem likely that pure one-for-one exchange systems brought wealth to Wessex;

political or religious reasons are, on this evidence, more likely than economic ones. The point of this digression is to suggest that industrial activities in Scotland, and in parts of Ireland, were not securely tied to south English developments, but in a major part were locally dependent.

To this time, the seventeenth century, in what might be called the Colleonard phase, must be ascribed the continued production of Type B axes, sometimes decorated, and which may have been traded direct to the continent. These axes, such as those in the Colleonard hoard, were produced in Ireland and perhaps in Scotland, although the suggestive absence of suitable moulds in Scotland for most of the axe-forms has been noted already. The evidence of metal-content, however, strongly suggests that Ireland did not have a monopoly of these axes. Continental decorated axes of Irish-Scottish type tend to look like local productions, made perhaps by a travelling Scot or Irishman out of locally available metal. But they were of a superior quality to the ordinary continental axes, and although there can be no case for an independent discovery of tin-bronze in the British Isles, there can also be little doubt that in Ireland and in Scotland knowledge of the ideal amount of tin to add was obtained earlier than in many continental areas. The result of such exploits on the continent was the continued reception of ideas in Scotland, and continued improvement in the metal products. The two main pottery traditions of this time, the seventeenth and early sixteenth centuries, were local Beaker forms and various types of Food Vessels (Clarke 1966; Simpson 1968). Associations of metalwork with these pottery types include riveted knives, bar armlets, awls, earrings and gold pommel-mounts (see Appendix C). The preponderance of 'dagger-graves', particularly in east-central Scotland, is likely to belong to this episode.

It is likely that goldwork, in the form of lunulae and earrings, also belongs to this phase of activity, if not the earlier one. The evidence for this begins in the Migdale hoard which contains a strip of sheet bronze carrying lenticular decoration. It has been suggested that this strip might have served as the covering for a wooden spacer-plate, to which perhaps the tubular metal and wooden beads were attached in a necklace (Stevenson 1956). Whether or not this attractive idea is correct, the lenticular decoration has been compared stylistically with that on the Melfort (Argyll) armlet. This armlet appears likely to be a native copy of a central European form, the Únětician *manchette* armlet, and the presence of lenticular bosses need not indicate a date for the armlet in the later second millennium by virtue of the Mold (Flintshire) cape (Powell 1953; Piggott and Stewart 1957). Rather should the armlet be compared with the Migdale strip and with Únětician armlets. The small bosses on the Migdale strip reflect Reinecke A1 metalwork (Torbrügge 1959, abb. 7), and together these two objects appear to belong to an early phase of industrial activity in Scotland. The interpretation of the Migdale strip as part of a spacer-head would suit the association at Melfort of a jet spacer-plate necklace.

The traditional theory that jet spacer necklaces and gold lunulae were northern versions of Wessex amber necklaces has led to the view that lunulae and jet necklaces post-date the Wessex material. On the above view, however, the jet spacer necklaces would be as early as the more complex Wessex amber necklaces. Arguing from neckrings, Taylor has indirectly suggested that lunulae are likely to be as early as Wessex amber necklaces (Taylor 1968). Simpson too has indicated that he can find no evidence from associations that point to the existence of Food Vessels, often associated with jet spacer necklaces, subsequent to the Wessex cemeteries (Simpson 1968). The suggestion then must be advanced that, for a number of reasons, it is likely that lunulae and jet spacer-necklaces belong to the phase of industrial activity in Scotland that is no later than the appearance of the earlier graves in Wessex cemeteries. To this time the Orbliston earrings should also belong; if comparisons with the Migdale bronze earrings are valid, and if stylistically the decoration on the Orbliston earrings reflects that on the Bennekom (Netherlands) gold ornament

(Glasbergen and Butler 1956), then the gold earrings must be no later than the seventeenth century, and more likely to be somewhat earlier than this. The temptation with all this goldwork is to suggest that it belongs to the first phase of industrial activity in Scotland, at a time when continental ideas were rife, and when the exploitation of local metal sources was in an early stage. A more conservative view, however, suggests that the goldwork may belong to the succeeding century, but hardly later than this.

By this time the metal employed in Scotland must have been from a variety of sources and clusters B, D and E metal joined clusters A and C in general use. The varied nature of the metal used is typified by the Colleonard (Banffshire) hoard in which cluster A, B, C and D metal occurs; this is the only large hoard from Scotland which exhibits more than two metals. Most of these axes are decorated. The Sluie hoard from Morayshire probably belongs to this phase; the metals used are clusters C (axes) and D (halberd). Halberd production in Scotland and Ireland is likely to have continued over a considerable time; the source of the weapon is now believed to be in central Europe, in areas where stone battle-axe traditions were strong. The metal halberd, however, is hardly a functional instrument in terms of its use as a battle-axe, and it is likely to have served a purpose as a prestige object, for display or ceremony. Some of the continental halberds are metal-shafted, but no British or Irish halberds possess metal covers for the shaft. The Auchingoul (Banffshire) hoard of four halberds lacking rivet-holes is of cluster D metal, as is one of the Kingarth (Bute) halberds.

By the early sixteenth century, all of the metal types that made up the bulk of equipment in Early Bronze Age Scotland were in production, using a variety of metal sources, and perhaps by now using scrap metal. Such equipment as Type B axes, riveted knives, and probably halberds, continued to be made through the next century at least, during which some few new influences reached Scotland.

New elements in the Scottish Early Bronze Age appearing in the later sixteenth and fifteenth centuries B.C. consist of bronze flanged axes and various knives and spearheads. These are reflections of the metal equipment characteristic of the later graves in the Wessex cemeteries, and may be traced back to continental forms of Reinecke A2. Recent dating of this central European phase suggests that it was in the sixteenth century that such elements became widespread.

The Scottish material is sparse, and is distributed mainly in central and southern Scotland (fig. 23). To the north, such objects are rare, and must be contrasted with the abundance of Type B axes, in particular, in north-eastern Scotland (fig. 4).

In southern Britain, material of this type is abundantly represented, and forms the Arreton tradition (Britton 1963, 284). The hoards from the south contain flanged axes of our Class I, knives comparable with the Camerton-Snowshill type (ApSimon 1954), with a midrib and often an ogival outline, knives with three converging ribs, and tanged and socketed spearheads (p. 40). The range of this material in the south is illustrated in the Arreton Down (Isle of Wight) and Ebnal (Shropshire) hoards (Britton 1963, figs. 17, 19, pl. XXVII). Graves with knives of these forms are generally assigned to the second part of the Wessex cemeteries, generally in cremation graves, and associations include bulb-headed, crutch-headed and chain-headed bronze pins, bone pins and tweezers; these, and the knife form, are considered to reflect central European developments which may now be dated to the sixteenth and perhaps the fifteenth century.

It appears likely that the central European groups that had stimulated the development of the Early Bronze Age in the south of Britain, and had earlier brought ideas to northern Britain and Ireland, were by this time becoming preoccupied elsewhere, and the impression is that Britain as a whole, and not just the north and west, was about to enter its insular phase (Hawkes 1960; Coles 1964, 126).

For Scotland, about 20 Class I flanged axes are known. These are comparable in all respects with those in the Arreton Down, Plymstock (Devon) and Westbury-on-Trym (Gloucester) hoards, and decorated examples are common, particularly in eastern England and in north-eastern Ireland (Megaw and Hardy 1938, fig. 9). The few axes in Scotland may have been introduced from either of these areas, but local sources should also remain a possibility (p. 27). Few analyses of the Scottish axes have been made. From elsewhere must stem the 8 or so spearheads, 5 of which are from the southern part of the country (fig. 23).

More difficult to asign to this specific phase are certain knives and daggers. The Gavel Moss (Renfrew) hoard, which may be used to describe this phase, contains two Class I flanged axes, both decorated, and a long dagger with three ribs near the central axis (Pl. 3a). An ogival dagger with three ribs is known from the Arreton Down hoard, but the form is rare in Britain. The Blackwaterfoot (Arran) dagger has three widely-spaced ribs and should be related; this was accompanied by a gold pommel-mount. This dagger has punch-dot decoration of the ribs, such as occur on Wessex ogival daggers, on the tanged spearheads from Arreton Down and Walton Farm (Fife), on the socketed spearheads from Dean Water (Angus) and probably Greyfriars (Dumfries). All of these objects are typologically of this Gavel Moss phase, although the punch-dot decoration is not restricted only to this phase. It also occurs on the Masterton (Fife) armlets, associated with flat knife and jet beads, which are perhaps somewhat earlier in view of the Melfort connections. The Cleigh (Argyll) flat blade has punch-dot decoration near the blade butt, but by its omega hilt-mark this may belong to an early stage in the development of such knives; this, however, is not at all certain, and most of the flat knives, with omega or W hilt-mark, cannot be assigned to specific phases of the Early Bronze Age. The dagger from Auchterhouse (Angus), however, has a midrib composed of three narrow ribs, and is decorated by punch-dots; this dagger has counterparts at Teddington (Middlesex) and Reaverhill (Northumberland) and in Ireland. It is likely to belong to this Gavel Moss phase, although it has been compared with earlier daggers from Wessex because of the linear arrangement of six of its rivets (ApSimon 1954, 56).

In a study of Scottish flanged axes, it was suggested that an early group of Class II flanged axes, the Auchendrane groups, was likely to have been locally developed from flat axes of Type B (Coles 1964, 88–9). Other flanged axes, the Caverton and Belhelvie groups, are considered to have been developed from the Early Bronze Age flanged axes, our Class I. Six of the Caverton group of flanged axes have decoration in Early Bronze Age styles, on the flanges and on the faces (Coles 1964, fig. 2:4, 6, 7). One of the Class III groups, the Auchterhouse group, contains four axes with Early Bronze Age decoration on flanges (ibid., fig. 6:6) and, in one case, punch-dot decoration on flanges and faces. Typologically this group was not considered to have been in production until 1300 B.C., but the Caverton group was dated from 1500 B.C. The Auchendrane group of flanged axes was developed from an earlier form of axe, the Type B flat axe, and this, allied to the rarity of Class I flanged axes, might be interpreted as showing that the local development of flanged axes (Class II) began at an early date to complement the flat axes of Type B, and effectively reduced the importance of the Class I flanged axe when this became available in the sixteenth century. If so, the Auchendrane group of flanged axes should be considered as a part of the final phase of Early Bronze Age metalwork, the Gavel Moss phase, providing a link with the emergence of the many varieties of flanged axes of Classes II and III which were produced from the fifteenth to the ninth centuries B.C. (Coles 1964).

In summary, it may be possible to distinguish three industrial phases in the Early Bronze Age metalwork of Scotland. These are purely internal divisions, and deal only with the metalwork; any future work on other aspects of Bronze Age society may well alter this scheme. For the moment, however, it is presented as an attempt to show how metallurgy became installed in

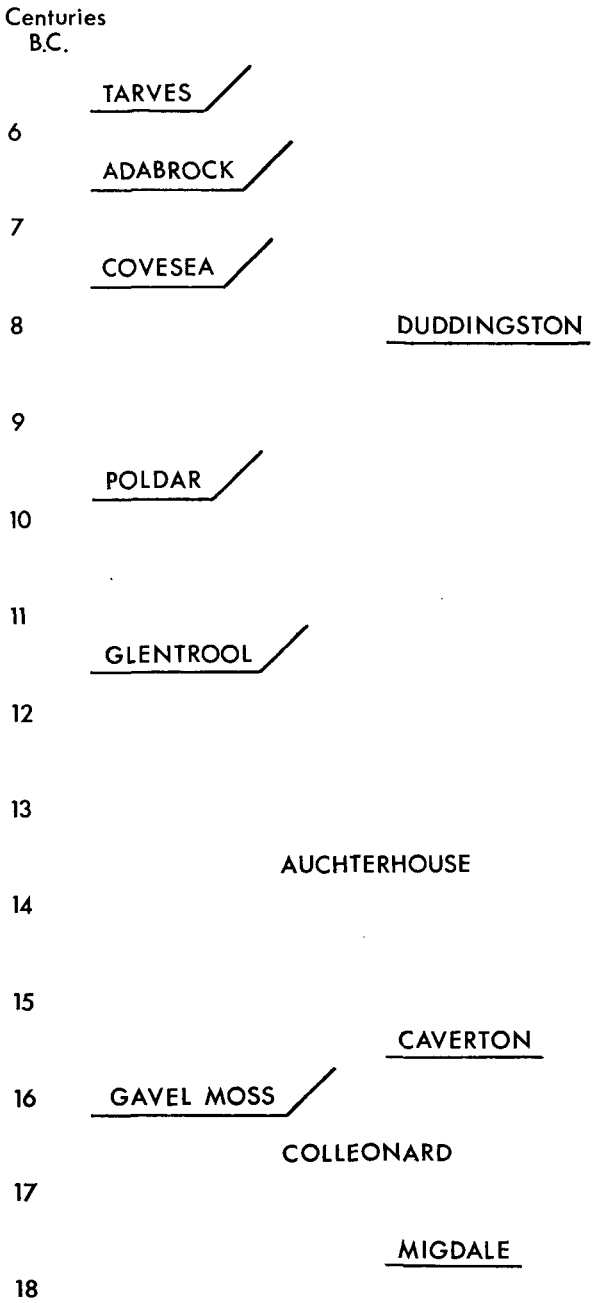

FIG. 52. Phases of industrial activity in the Scottish Bronze Age.

Scotland, and how it thereafter developed. In terms of absolute chronology, the eighteenth century is as early as we can see any metal industry in the country, according to traditional chronological methods, including radiocarbon. Thereafter, internal and external developments augmented the quality and quantity of metalwork, but throughout the Early Bronze Age the

dominant theme must have been standardisation and tradition. The Migdale phase saw the establishment of most of the metal types, just as the Caverton phase of the Middle Bronze Age began the slow and generally static process of industrial development in the later second millennium, and the Duddingston phase is essentially that of the bulk of Late Bronze Age industrial events. A schematic representation of the industrial phases for Scotland appears in fig. 52, in which episodes of restricted geographical or quantitative character are shown by diagonal lines. The other phases, while more widespread, are not of course self-cancelling, and in fact there can be little doubt that components of the Migdale and Colleonard phases continued to be produced for several centuries, perhaps, after the beginning of what we call the Middle Bronze Age. One would expect Type B axes and daggers, in particular, to be manufactured and used until late in the second millennium B.C., alongside flanged axes and dirks. Radiocarbon dates for the Early and Middle Bronze Age of Scotland do not conflict with this view.

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ABBREVIATIONS IN THE APPENDICES: REFERENCES

Arch.	*Archaeologia*
Arch. Ael.	*Archaeologia Aeliana*
Arch. Inst.	*Catalogue of Antiques, Works of Art and Historical Scottish Relics exhibited in the Museum of the Archaeological Institute of Great Britain and Ireland*, 1856 (1859)
Arch. Scot.	*Archaeologia Scotica*
Ayr and Wigt.	*Archaeological and Historical Collections relating to the counties of Ayr and Wigtown*
BACC	British Association Card Catalogue (British Museum)
Evans 1881	J. Evans, *The Ancient Bronze Implements of Great Britain and Ireland*, 1881
Gillies	W. Gillies, *In Famed Breadalbane*, 1938
Inv. Arch.	*Inventaria Archaeologica*
Jeffrey	A. Jeffrey, *History of Antiquities of Roxburgh*, vol. 1, 1864
Jervise	A. Jervise, *The History and Traditions of the Lindsays in Angus and Mearns*, 1882
Palace of History	Scottish Exhibition of National History, Art and Industry, Glasgow. *Palace of History. Catalogue of Exhibits*, 1911.
P. Berw. N.C.	*Proceedings of the Berwickshire Naturalists' Club*
PPS	*Proceedings of the Prehistoric Society*
PSAS	*Proceedings of the Society of Antiquaries of Scotland*
T. Dumf. Gall.	*Transactions of the Dumfries and Galloway Natural History and Antiquarian Society*
T. Glas. A.S.	*Transactions of the Glasgow Archaeological Society*
Wilson 1863	D. Wilson, *Prehistoric Annals of Scotland*, 2nd ed., 1863, vol. 1

ABBREVIATIONS IN THE APPENDICES: MUSEUMS

Aberdeen	Art Gallery and Industrial Museum, Aberdeen
BM	British Museum
Kelvingrove	Art Gallery and Museum, Glasgow
Marischal	Anthropological Museum, University of Aberdeen
NMA	National Museum of Antiquities of Scotland

COUNTY ABBREVIATIONS USED IN THE TEXT AND APPENDICES

Ab	Aberdeenshire	Kk	Kirkcudbrightshire
An	Angus	Ln	Lanarkshire
Ar	Argyll	Ml	Midlothian
Ay	Ayrshire	Mr	Morayshire
Bf	Banffshire	Nr	Nairnshire
Br	Berwickshire	Ok	Orkney
Bt	Buteshire	Pb	Peeblesshire
Ca	Caithness	Pr	Perthshire
Cl	Clackmannanshire	Rf	Renfrewshire
Df	Dumfriesshire	Ro	Ross and Cromarty
Db	Dunbartonshire	Rx	Roxburghshire
El	East Lothian	Se	Selkirk
Fi	Fife	Sh	Shetland
G	Galloway	Sl	Stirlingshire
In	Inverness-shire	Su	Sutherland
Kc	Kincardineshire	Wl	West Lothian
Kr	Kinross	Wg	Wigtownshire

APPENDIX A

Catalogue of Metal-finds

AXES

(Type A, B, Ba, Bb, Bc: p. 2; Class I: p. 26; Decoration: see Megaw and Hardy 1938; H: Hoard)

	Site	*Assoc.*	*Type*	*Decor.*	*Reference*	*Museum*
Aberdeenshire						
1	Aboyne		Bb		*PSAS* XVIII (1883–4), 15	NMA DA 51
2	Ardhuncark Farm, Kildrummy		Ba		*PSAS* XXII (1887–8), 357	Marischal 242
3	Birse		B		*Palace of History* 853	Hunterian B 1951. 3212
4	Collynie, Tarves		Bb		*PSAS* LX (1925–6), 98	NMA DA 91
5	nr. Fetternear		Ba		*PSAS* LXXII (1937–8), 69	NMA DA 102
6	Finglenny Hill, Rhynie	H	Ba		*PSAS* LXXXII (1947–8), 292	NMA DQ 307
7	,, ,, ,,	H	Ba		,, ,,	NMA DQ 308
8	,, ,, ,,	H	Ba		,, ,,	NMA DQ 309
9	,, ,, ,,	H	Ba		,, ,,	NMA DQ 310
10	,, ,, ,,	H	Ba		,, ,,	NMA DQ 310
11	,, ,, ,,	H	Ba		,, ,,	NMA DQ 311
12	,, ,, ,,	H	Bb		,, ,,	NMA DQ 312
13	,, ,, ,,	H	Ba		,, ,,	NMA DQ 313
14	Bog of Fintry		Ba			Marischal 241
15	Fyvie		B			NMA DA 113
16	Fyvie		B			NMA DA 114
17	? Fyvie		Bb			Farnham
18	nr. Fyvie		Bb	2		Hayes, Aberfeldy
19	Glack, Daviot		Ba		*PSAS* XXIV (1889–90), 446	NMA DA 63
20	Kildrummy		Ba		*PSAS* XXII (1887–8), 357	Marischal 243
21	Kincorth		Ba			Aberdeen 64.6.1
22	Kintore		Ba			Aberdeen 48.17.1
23	Kintore		Bb			Aberdeen 48.17.2
24	Kintore		Ba		*Palace of History* 853	Marischal 247[14]
25	nr. Kintore		Bb		*PSAS* VI (1864–6), 209	NMA DA 44

	Site	*Assoc.*	*Type*	*Decor.*	*Reference*	*Museum*
26	Mill of Laithers	H	B		*PPS* XXX (1964), 428	Banff
27	Muirtack, Cruden		?		*PSAS* XI (1874–6), 447	
28	Newseat of Ardo, Methlick		Ba		*PSAS* LX (1925–6), 98	NMA DA 92
29	Old Meldrum		Bc			Aberdeen 52.10.4
30	Old Rayne		Ba			Farnham
31	? Oyne		Bc	b3		Marischal 247[29]
32	Pitcow, Udny		Ba			Aberdeen 57.5.1
33	Potarch, Birse		Bb	2	*PPS* IV (1938), 298	Ashmolean 1927. 2718
34	Premnay		Ba		*PSAS* LXXII (1937–8), 69	NMA DA 105
35	Premnay		B		*PSAS* LXXII (1937–8), 69	NMA DA 107
36	The Lodge, Tarland		Bb			Marischal 243[2]
37	Tarland		Ba		*PSAS* VII (1866–8), 320	NMA DA 26
38	Tarves		?		*Arch. Inst.* 1856, 14	
39	Upper Towie		Ba		*PSAS* LXXII (1937–8), 69	NMA DA 103
40	Aberdeenshire		Bc		*PSAS* XXIV (1889–90), 13	NMA DA 60
41	,,		Ba		*PSAS* XXVI (1891–2), 4	NMA DA 66
42	,,		I		*PSAS* XL (1905–6), 11	NMA DC 88
43	,,		Ba		*PSAS* XXII (1887–8), 357	Marischal 243[1]
44	,,		Ba			Marischal 247[3]
45	,,		A B			Marischal 247[4]
46	,,		B			Marischal 247[12]
47	,,		Bb			Marischal 247[27]
48	,,		A			Inverurie DA 1
49	,,		Bb		*Palace of History* 852	Hunterian B1914. 265
50	,,		Ba		*Palace of History* 852	Kelvingrove 55-96 ci
51	Kinclune Farm, Towie		Ba		*PSAS* XXII (1887–8), 369	Banff
52	Hatton		Ba			Aberdeen
Angus						
1	Auchenreoch		?A		info. M. E. C. Stewart	
2	Auchnacree, Fern	H	Ba		*PSAS* LVI (1921–2), 117	NMA DQ 256
3	,, ,,	H	Ba		,, ,,	NMA DQ 257
4	,, ,,	H	Ba		,, ,,	Taylor Coll.
5	,, ,,	H	Ba		,, ,,	NMA DQ 258, Taylor Coll.
6	Angus		Bb			Marischal 247[22]
7	Balcalk, Tealing		Ba		*Palace of History* 852	
8	Baldowrie Farm, Newtyle		Ba			Perth 122
9	Colmallie, Glenesk		?	?2	Jervise 107	
10	Cottown Muir, Menmuir		Bb		*PSAS* II (1854–7), 462	BM WG 1799
11	Forfar		Bb		*PSAS* II (1854–7), 63	NMA DA 34
12	The Glebe, Clova		Ba			Kingussie
13	nr. Kirriemuir		Bb	2	*PSAS* LXXII (1937–8), 69	NMA DA 104
14	Monikie		Bb	3	*Palace of History* 853	Dundee 64-71-1
15	Hill of Redhall, East Kinwhirrie		I	b2	*PSAS* XC (1956–7), 223	NMA DC 137
16	Drumshade Farm, nr. Glamis		Ba			Dundee 64-16
17	Stracathro		?B		*PSAS* XXII (1887–8), 402	Montrose 63
18	Stracathro		Bc	2	*Palace of History* 854	Montrose 64
Argyll						
1	Achinroer, Barcaldine		I	b	*PSAS* VI (1864–6), 203	NMA DC 39
2	Du Bhar, Glengorm, Mull		Ba		*PSAS* LXXXIII (1948–9), 243	NMA DA 112
3	Glenforsa, Mull		Ba		*PSAS* XXXVII (1902–3), 348	NMA DA 70
4	Gortchan Moss, nr. Campbeltown		Ba			Campbeltown
5	Loch Fada, Colonsay		Ba		*PSAS* XV (1880–1), 105	NMA DA 43

	Site	Assoc.	Type	Decor.	Reference	Museum
6	nr. Oban		I	2		Strachan, Oban
7	Argyll		?		*Man* 1953, 150	Newbury OA 229
Ayrshire						
1	Bog Farm, Kilwinning		Bb	2	*Ayr and Wigt.* IV, 48	
2	Knockendon Hill, Dalry		?		*Palace of History* 854	
3	Ladyland, Kilbirnie		I		*PSAS* XIV (1879–80), 96	NMA DC 53
4	The Maidens, Port Murray	H	Bb		*PSAS* XVII (1882–3), 433	NMA L1950.4
5	,, ,, ,,	H	Ba		,, ,,	,,
6	,, ,, ,,	H	Bb		,, ,,	,,
7	,, ,, ,,	H	Ba		,, ,,	,,
8	,, ,, ,,	H	Ba		,, ,,	,,
Banffshire						
1	Auchindown, Dufftown		Bc	2		Marischal 247[23]
2	Boyndie		Bb			Inverness 50
3	Colleonard, nr. Banff	H	Bb	2	*PSAS* III (1857–60), 245	NMA DA 19
4	,, ,,	H	Bb	2	,, ,,	NMA DA 20
5	,, ,,	H	Bb	2	,, ,,	NMA DA 21
6	,, ,,	H	Bb	2	,, ,,	NMA DA 22
7	,, ,,	H	B		,, ,,	NMA DA 23
8	,, ,,	H	Ba	2	,, ,,	NMA DA 24
9	,, ,,	H	B	2	,, ,,	NMA DA 25
10	Fortrie of Balnoon, Inverkeithny	H	Ba		*PSAS* I (1851–4), 138	NMA DA 38
11	Hill Park Farm, The Enzie		Ba		*PSAS* XXXIII (1898–9), 55	Marischal 247[13]
12	Howbog Farm, the Cabrach		Ba		*PSAS* XVIII (1883–4), 326	NMA DA 106
13	Banffshire		Bb	2	*PSAS* XXI (1886–7), 288	NMA DA 55
Berwickshire						
1	Cornhill Farm, Cornhill-on-Tweed		Bb	b2	*PSAS* LXXX (1945–6), 151	NMA DC 126
2	Fogorig, Coldstream		A B			Hunterian B1951.530
3	Girth Gate, Muircleuch, Lauder		Ba		*PSAS* LV (1920–1), 16	NMA DA 81
5	Greenlees, Westruther		Bb	b3	*PSAS* XII (1877–8), 601	NMA DA 82
6	Hillhouse, Lauder		?		*PSAS* XXVIII (1893–4), 327	Hunterian B1914.266
7	Berwickshire		Ba		*PSAS* XXI (1886–7), 287	NMA DA 56
Bute						
1	Craigdhu, East Bennan, Arran	H	B		*T. Glas. A.S.* I (1881–90), 516	Brodick Castle
2	,, ,, ,, ,,	H	B			,,
3	Glenrickard, Arran		Bb			NMA
Caithness						
1	Brubster, Reay		Ba		*PSAS* XLIX (1914–5), 11	NMA DA 78
2	Lower Howe, nr. Thurso		?		*PSAS* XLV (1910–1), 16	Thurso
3	Stemster, Bower		Ba		*PSAS* LXVII (1932–3), 241	
4	Caithness		A B		*PSAS* LXXIX (1944–5), 179	NMA DA 108
5	Caithness		Bb		*PSAS* LXXIX (1944–5), 180	NMA DA 109
6	Caithness		?		*PSAS* LXII (1927–8), 82	NMA DA 94
7	Caithness		Bc		*PSAS* LXII (1927–8), 82	NMA DA 93
8	Caithness		Bc		*PSAS* LXXIX (1944–5), 180	NMA DA 110
Dumfriesshire						
1	Applegarth		I	b2	*PPS* IV (1938), 299	NMA DC 22
2	Brockhillstone, Dunscore		Ba		*PSAS* LIX (1924–5), 234	NMA DA 88
3	nr. Drumlanrig		Ba		Evans 1881, 55	Ashmolean 1927.2712

	Site	*Assoc.*	*Type*	*Decor.*	*Reference*	*Museum*
4	Hayfield Farm, Kirkpatrick-Fleming		Bb		*T. Dumf. Gall.* XLII (1965), 91	Dumfries 1948-50
6	Newfield, Dryfesdale		Ba		*T. Dumf. Gall.* XLII (1965), 91	Dumfries 1948-30
7	South Cowshawfarm, Tinwald		?		*PSAS* LX (1925–6), 31	
8	Steilston		Bb	b2	*T. Dumf. Gall.* XLII (1965), 91	Dumfries 1960-78
9	Trohoughton		Ba		*T. Dumf. Gall.* XLII (1965), 91	Dumfries 1958-52
Dunbartonshire						
1	Eastfield, Cumbernauld		A		*Arch. Ael.* 4th ser. XLI (1963), 227	King's College, Durham
East Lothian						
1	Camptown	H	Ba		*PSAS* XVI (1881–2), 228	NMA DA 28
2	Camptown	H	Ba		,, ,,	NMA DA 29
3	Doune Hill, Dunbar		A		*PSAS* LXVIII (1933–4), 191	NMA DA 98
4	Stobshiel, Humbie		?		*PSAS* XVI (1881–2), 476	
5	Waughton		Ba			NMA DA 4
Fife						
1	Abdie	?H	Ba		*PSAS* XXIV (1889–90), 13	NMA DA 61
2	Abdie	?H	Ba		,, ,,	NMA DA 62
3	Dams, Balbirnie		I	c3	*PSAS* XIII (1878–9), 119	NMA DC 32
4	Dunino	H	Bb			NMA DA 36
5	Dunino	H	?		Perth. Lit. and Ant. Soc., Donations	
6	nr. Falkland		Bb	2	*PPS* IV (1938), 299	Ashmolean 1927. 2714
7	nr. Falkland		Bb	2	*PPS* IV (1938), 299	Ashmolean 1927. 2715
8	nr. Falkland		Ba	3	Evans 1881, 59	Ashmolean 1927. 2716
9	Largo		Ba		*PSAS* XLV (1910–1), 418	NMA DA 76
Inverness-shire						
1	nr. Ardgour House		Ba		*PSAS* IX (1870–2), 182	NMA DA 52
2	Culloden		Bb			Nat. Mus. Wales
3	Culloden		Ba			Nat. Mus. Wales
4	Culloden		?		*Arch. Inst.* 1856, 9	
5	Dores		Ba			NMA DA 57
6	Fairfield Road, Inverness		Ba			Inverness
7	Glen Drynoch, Skye		Ba		*PSAS* XLI (1906–7), 418	NMA DA 73
8	Glenelg		B		*PSAS* LXV (1930–1), 413	NMA DA 95
9	Kinveachy, Boat of Garten		Ba			Inverness
10	Lianachan, Spean Bridge		Bb			Fort William
11	Loch Laggan		Ba		*BACC*	Wells, Harrow
12	nr. Urquhart Castle		Ba			Inverness 3/39
13	Inverness-shire		Ba			Hunterian B1914. 267
Kincardineshire						
1	Arbuthnot		Bb		*PSAS* LIV (1919–20), 13	NMA DA 79
2	Dunnottar		Ba		*PSAS* XXII (1887–8), 403	Montrose 65
3	Durris, Mearns	H	Ba		*PSAS* XVI (1881–2), 37	NMA DA 49
4	Durris	H	Ba		*PSAS* XXII (1887–8), 363	Marischal 247[11]
5	Muchalls		Ba			Marischal 247[25]
Kinross						
1	Little Seggie		Ba			Kinross

	Site	*Assoc.*	*Type*	*Decor.*	*Reference*	*Museum*
Kirkcudbrightshire						
1	Airds, New Abbey		Ba		*PSAS* xxx (1895–6), 313	NMA DA 65
3	Barclay Farm, Colvend		Bc		*T. Dumf. Gall.* xlii (1965), 91	Kirkcudbright 3836
4	Barwhillantry Hill		I		*T. Dumf. Gall.* xlii (1965), 91	Kirkcudbright 2594
5	nr. Brocklock, Carsphairn		Bb		*PSAS* lxviii (1933–4), 352	NMA DA 99
6	Drum Farm, Lochrutton		Bb		*T. Dumf. Gall.* xlii (1965), 91	Dumfries 1934-55
7	Gilsburn, Holm of Dalquhairn		Bb		*T. Dumf. Gall.* xlii (1965), 91	Anderson, Eskdalemuir
8	Mainshead of Terregles		Bb	a3	*PSAS* xxxii (1897–8), 244	NMA DA 67
Lanarkshire						
1	nr. Biggar		Bb	2	*PSAS* xvi (1881–2), 145	NMA DA 11
2	Culter		Bb		*PSAS* xvi (1881–2), 145	NMA DA 12
3	Dunside, Lesmahagow		B		*T. Glas. A.S.* iii (1899), Pl. I, fig. 2	
4	nr. Elvanfoot		Bb		*PSAS* xcviii (1964–6), 333	NMA DA 118
5	Lamington Burn		Ba			Lord Lamington
6	Lawhead Farm, Pentlands		Bb		*PSAS* vii (1866–8), 105	NMA DA 7
7	Lanarkshire		B		*PSAS* xvi (1881–2), 145	NMA DA 13
8	,,		A		*PSAS* xvi (1881–2), 145	NMA DA 14
9	,,		Bb		*PSAS* xvi (1881–2), 145	NMA DA 15
10	,,		Bb		*PSAS* xvi (1881–2), 145	NMA DA 16
11	,,		Bc		*PSAS* xvi (1881–2), 145	NMA DA 17
12	,,		Bc		*PSAS* xvi (1881–2), 145	NMA DA 18
13	High Crosshill, Rutherglen		?		*Book of the Bishop's Castle* 1888, 25	
Midlothian						
1	Bibleland, Canongate, Edinburgh		Bb			Huntly House
2	Cobbinshaw, Midcalder		Ba		Evans 1881, 56	Ashmolean 1927. 2713
3	Mountskip, Vogrie		Ba		*PSAS* li (1916–7), 236	NMA DA 2
4	Northplot Hill, nr. Ratho		Ba		*PSAS* li (1916–7), 236	NMA DA 30
5	Ratho Bog		?		*PSAS* ix (1870–2), 441	
6	Ravelston	H	Ba		*PSAS* ix (1870–2), 430	NMA DA 6
7	Midlothian		Bc		*PSAS* v (1862–4), 127	NMA DC 40
Morayshire						
1	Parish of Birnie		Ba			Forres
2	Braemoray, Edenkillie		Ba		*BACC*	BM WG 1795
3	Briach Hill, Rafford		Ba		*PSAS* xxii (1887–8), 353	Forres
4	Burgie Moss, Rafford		Ba		*PSAS* xxii (1887–8), 353	Forres
5	Culbin Sands	H	Ba		*PSAS* xxi (1886–7), 9	NMA DA 59
6	Culbin Sands	H	Ba		*PSAS* xxv (1890–1), 503	? Hunterian B 1951.2126
7	Culbin Sands		?		*PSAS* xxv (1890–1), 503	
8	Culbin Sands		?		*PSAS* xxv (1890–1), 503	
9	nr. Culbin Sands		?			Forres
10	Darnaway Castle		Ba			Robertson, Forres
11	nr. Darnaway		Bb	2	*PSAS* xxxvi (1901–2), 529	NMA DA 69
12	prob. Duffus		A B			Elgin 1874–9
13	Dyke and Moy		Ba		*BACC*	BM WG 1798
14	nr. Elgin		Ba			Ulster 181-1913a
15	Goatcraig, Dallas		Ba			Elgin 1865.1

	Site	*Assoc.*	*Type*	*Decor.*	*Reference*	*Museum*
16	Kintessack, Dyke		?			formerly MacEwan
17	Lhanbryd		Bb	2	*PSAS* XXXVIII (1903–4), 11	NMA DA 72
18	nr. Lhanbryd		Ba		*BACC*	BM WG 1797
19	Milton Moss, Knockando		A		*PSAS* LXX (1935–6), 358	NMA DA 101
20	Netherglen, Glenrothes		B			Elgin 1953.22
21	Newfield, Urquhart		Ba			Elgin 1897.1
22	Roseisle, Duffus		B			Elgin 1872.1
23	prob. Roseisle		Ba			Elgin 1872.3
24	St Andrew's-Lhanbryd		A?		*PSAS* LVIII (1923–4), 20	NMA DA 84
25	nr. Manse of St Andrew's-Lhanbryd		Bc	2	*PSAS* LIV (1919–20), 149	NMA DA 80
26	Sluie, Edenkillie	H	Ba		*PSAS* IV (1860–2), 187	NMA DA 32
27	Sluie, Edenkillie	H	Ba		,, ,,	NMA DA 33
28	Sluie Moor		Bc	3	Wilson 1863, 381	
29	nr. Spynie		I			Elgin 1875.3
30	nr. Spynie Castle		Bb			Elgin 1868.8
31	prob. Urquhart Castle		Ba			Elgin 1875.4
32	Wellbrae, Birnie		?		*PSAS* XXII (1887–8), 342	
33	Elgin area		B			Elgin 1943.1
Nairnshire						
1	Barevan Kirk, Cawdor	H	Ba	a2	*PSAS* LVI (1921–2), 358	NMA DQ 264
2	Barevan Kirk, Cawdor	H	Bb		,, ,,	NMA DQ 265
3	Cawdor		?		,, ,,	formerly MacEwen
4	nr. Nairn		Bb	a2	*PSAS* XIV (1879–80), 277	NMA DA 8
5	nr. Nairn		Ba		*BACC*	BM WG 1796
6	Wester Golcantray		I	c	*PSAS* XCV (1961–2), 306	NMA DC 128
Orkney						
1	Orkney		?		*PSAS* XIV (1879–80), 96	
Peeblesshire						
1	Harlawmuir		Bb	2	*PSAS* XXIV (1899–1900), 435	NMA DA 68
2	The Lee, Innerleithen		Bc		*PSAS* XLII (1907–8), 324	NMA DA 74
3	nr. Peebles		Bb			Kelvingrove 02-73 kg
4	Peeblesshire		I	b	*PSAS* XVI (1881–2), 146	NMA DC 6
5	Kingsmeadows, Peebles		Ba			Peebles
Perthshire						
1	Abernethy		Ba		*PSAS* IV (1860–2), 380	NMA DA 37
2	Bentick Farm, Braco		Bc	2	*PSAS* LXXXVII (1952–3), 192	Kelvingrove 53-37
3	Braco		Ba		*BACC*	Kinross, Slough
4	Bulleid		I	c	*PSAS* XLIV (1909–10), 330	NMA DC 93
5	Burrelton		Ba			Dundee 54-183
6	Cragganester, Loch Tay		?		Gillies 401	
7	Cranleigh Farm, Meikleour		Bb	a	*PSAS* XCI (1957–8), 178	Kelvingrove
8	Glencarse		Ba			Perth 16/1967
9	Drumlanrig		Bb			Perth 1/1946
10	Drumlanrig		Bb			Perth 1/A/46
11	Gask		?		*Arch. Scot.* ii, 199	
12	Glenboltachan, Comrie		B		*PSAS* LXVI (1931–2), 398	
13	Inchtuthil		Bb			excav. Richmond
14	Jordanhill, Meigle		Bc	b3	*PSAS* XXXVIII (1903–4), 12	NMA DA 71
15	Kilbryde Cres., Dunblane		I			Stirling A6818
16	Kirkmichael		Ba			Dundee 64-17-2

	Site	*Assoc.*	*Type*	*Decor.*	*Reference*	*Museum*
17	Loan Farm, Errol		Ba			Dundee 64-17-3
18	Newtyle Hill, Dunkeld		Ba			Blair Castle
19	nr. Perth		ingot		*PSAS* XXVII (1892–3), 373	NMA DA 64
20	nr. Perth		Bc	b3	*PSAS* XXVII (1892–3), 373	NMA DC 76
21	nr. Perth		I	b3	Evans 1881, 60	BM WG 1815
22	Pitlochry		A		*PSAS* XXIV (1889–90), 444	NMA DA 58
23	Redford Farm, Wolfhill		Bb			Perth 122A
24	Wolfhill		Ba		*PSAS* LXVI (1931–2), 25	NMA DA 96
25	Loch Tummel, north side		?			Perth
Renfrewshire						
1	Gavel Moss, Lochwinnoch	H	I	b	*PSAS* LXXXV (1950–1), 134	Kelvingrove 1-'52
2	,, ,,	H	I	c3	,, ,,	,, ,,
3	Kilmacolm		Bb		*Palace of History* 812	BM 91, 5-14, 59
4	Spean St, Cathcart		AB			Kelvingrove
5	Renfrewshire		Bb		*PSAS* XVIII (1883–4), 15	NMA DA 45
6	Renfrewshire		Bb		*BACC*	York
Ross and Cromarty						
1	Auchnagarron, Rosskeen		Ba		*PSAS* LIX (1924–5), 14	NMA DA 85
2	Bishop-Kinkell Farm, Conon Bridge		Ba		*PSAS* LXVII (1932–3), 17	NMA DA 97
3	Ladyhill, nr. Avoch Castle	H	Ba		*PSAS* XIX (1884–5), 404	Elgin 1868.1a
4	Ladyhill	H	Ba		,, ,,	,, 1b
5	Ladyhill	H	Ba		,, ,,	,, 1c
6	Ladyhill	H	Ba		,, ,,	,, 1d
7	Ladyhill	H	Ba		,, ,,	,, 1e
8	Rosskeen		Bc	b3	*PPS* IV (1938), 301	Ashmolean 1927.2720
9	nr. Torridon		?		info. Inverness Museum	
Roxburghshire						
1	Ashybank, Denholm		Bb		*PSAS* XVI (1881–2), 409	NMA DA 10
2	Dryburgh		Ba		Jeffrey pl. 11, 3	
3	nr. Eildon	?H	Bb	2	*PPS* IV (1938), 301	NMA DA 9
4	Gattonside, Melrose		?		*PSAS* XXVIII (1893–4), 333	
5	Scraesburgh, Jedburgh		Ba			Hunterian B1914.268
6	Kittyfield, Melrose		?	?	*P. Berw. N.C.* VII (1873–5), 356	
7	Lilliards Edge, Ancrum		Bb		*PSAS* XLVI (1911–2), 374	NMA DA 77
8	Melrose		Bb		*Palace of History* 853	Selkirk
9	Minto		A		*PSAS* XXII (1887–8), 390	NMA L1933.2107
10	Pinnaclehill, nr. Kelso		?		Jeffrey 349	
11	Southdean		?		*PSAS* XXII (1887–8), 381	
Selkirkshire						
1	Greenhill		Bb		*PSAS* XXVIII (1893–4), 341	Selkirk
Sutherland						
1	Faireal-aridh, Golspie		Bb	2		Dunrobin
2	Inchnadamff		Ba		*PSAS* III (1857–60), 363	NMA DA 31
3	Skibo		Bb			NMA DA 117
4	Migdale	H	Ba		*PSAS* XXXV (1900–1), 266	NMA DQ 335
Wigtownshire						
1	Barrach, Mochrum		AB		*PSAS* XIV (1879–80), 131	NMA DA 1
2	Boreland Farm, Inch	?H	Ba		*Palace of History* 853	Stranraer 1964-8
3	,, ,,	,,	,,		,,	,, 1964-9

	Site	*Assoc.*	*Type*	*Decor.*	*Reference*	*Museum*
4	nr. Craigcaffie		?		*PSAS* XII (1877–8), 570	
5	Cree Moss, Penninghame		Bb		*PSAS* XIV (1879–80), 130	NMA DA 35
6	Drumdoch, Inch		Bb		*Palace of History* 853	Kelvingrove 55-96
7	Freugh, nr. Stranraer		Bc		*BACC*	St Albans
8	Innermessan, Inch		Ba		*PSAS* XIV (1879–80), 112	Stranraer 1964-10
9	Kevans, Whithorn		Bc	a2	*PSAS* II (1854–7), 307	NMA DA 47
10	Knock and Maize, Leswalt		A		*Ayr & Wigt.* II (1880), 6	Stranraer 1964-7
11	Low Glenstockdale	H	Bb	a2	*T. Dumf. Gall.* XXVI (1947), 124	Stranraer 1947-1
12	Low Glenstockdale	H	Bb		,, ,,	Stranraer 1947-2
13	Tonderghie	H	Ba		*PPS* XXIX (1963), 311	
14	Stair estates, west Wigt.		Ba			Stranraer 1964-11
15	? nr. Stranraer		?		*Ayr & Wigt.* II (1880), 6	
No Specific provenance						
	Scotland		Bb	a	*PSAS* II (1854–7), 219	NMA DA 3
	Scotland		Ba	b2		NMA DA 5
	Scotland		Bb	2		NMA DA 27
	Scotland		B			NMA DA 39
	Scotland		?			NMA DA 40
	Scotland		Ba			NMA DA 41
	Scotland		Ba			NMA DA 46
	Scotland		Bb	2		NMA DA 48
	Scotland		Bb			NMA DA 53
	West Coast		Bb	2	*PSAS* XIX (1884–5), 330	NMA DA 54
	? Orkney		Bc		*PSAS* XLIII (1908–9), 9	NMA DA 75
	? Ross		Ba		*PSAS* LIX (1924–5), 14	NMA DA 86
	? Ross		Bb		*PSAS* LIX (1924–5), 14	NMA DA 87
	? Aberdeenshire		Ba		*PSAS* LX (1925–6), 18	NMA DA 89
	? Aberdeenshire		Bc		*PSAS* LX (1925–6), 18	NMA DA 90
	? Borders		Bb	b3	*PSAS* LXIX (1934–5), 440	NMA DA 100
	? Braco, Perthshire		Bb		*PSAS* LXXXII (1947–8), 317	NMA DA 111
	Scotland		Bc			NMA DA 115
	Scotland		B			NMA DA 116
	Scotland		I			NMA DC 16
	West of Scotland		I		*PSAS* XIX (1884–5), 330	NMA DC 50
	Scotland		I		*PSAS* LVIII (1923–4), 323	NMA DC 102
	? Midlothian		A B			NMA L1929.4
	? Argyll		Bc	a2		NMA Dunstaffnage 1
	? Aberdeenshire		Ba			Aberdeen 56.10.2
	? Aberdeenshire		Bb			Marischal 247[33]
	? Banffshire		Bc			Banff
	? South-west		Bc	b2		Dumfries
	Scotland		Ba		*Palace of History* 853	Dundee
	Scotland		Bb		*PSAS* XXVII (1892–3), 366	Royal Scottish 1890.498
	? Morayshire		Bb		*Palace of History* 852	Elgin 1953.24
	? Scotland		I		*BACC*	Hunterian B1951. 2173
	? Scotland		Bb			Kelvingrove
	? Lesmahagow		Ba			Kelvingrove LA6120
	? Inverness area		Ba			Inverness 50a
	? Aberdeenshire		Bc	2		Paisley
	? Perthshire		Ba		*PSAS* XXII (1887–8), 338	Perth 121
	? Comrie, Perthshire		I			Perth 123
	? Stirlingshire		Bb			Stirling A13
	Scotland		Ba		*BACC*	Manchester
	? Wigtownshire		?			Selby, Fort William

HALBERDS

(Type: see Ó Ríordáin 1936; H: hoard)

	Site	Assoc.	Type	Reference	Museum
Aberdeenshire					
1	New Machar	H	4	*Arch.* LXXXVI (1936), 203	Marischal 249
2	New Machar	H	4	,, ,,	Marischal 250
3	New Machar	H	4	,, ,,	Marischal 251
Argyll					
1	Dunadd		4	*PSAS* XCV (1961–2), 117	NMA HPO 18
2	Islay	?H	4	*PSAS* XVI (1881–2), 409	NMA DQ 45
Ayrshire					
1	Moss-side, nr. Crossraguel		4	*Arch.* LXXXVI (1936), 311	NMA DJ3
Banffshire					
1	Auchingoul, Inverkeithny	H		*PSAS* LXXV (1940–1), 208	NMA DJ 37
2	,, ,,	H	6	,, ,,	NMA DJ 38
3	,, ,,	H		,, ,,	NMA DJ 39
4	,, ,,	H		,, ,,	NMA DJ 40
Bute					
1	Kingarth	H	4	*Arch.* LXXXVI (1936), 203	NMA DJ 9
2	Kingarth	H	4	,, ,,	NMA DJ 10
3	Kingarth	H	4	,, ,,	NMA DJ 11
Fife					
1	Falkland		4	*Arch.* LXXXVI (1936), 311	Ashmolean 1927. 2717
2	nr. Strathmiglo		6	*PSAS* LXXV (1940–1), 207	lost
Inverness-shire					
1	Tom-na-Brataich		5		Fort William
2	Culloden		6	*Arch.* LXXXVI (1936), 311	BM WG 2061
Kinross					
1	Backside of Aldie, Cragton	H		*Arch.* LXXXVI (1936), 204	Kinross
2	,, ,,	H	6	,, ,,	Kinross
3	Portmoak Moss, Lochleven		6	*Arch.* LXXXVI (1936), 311	NMA DJ 2
Morayshire					
1	Sluie, Edenkillie	H	6	*PSAS* IV (1860–2), 187	NMA DJ 4
2	The Snab, Culbin			*PSAS* XXV (1890–1), 503	Forres
Nairnshire					
1	Assich, Croy and Dalcross		6	*PSAS* LXXIV (1939–40), 149	NMA DJ 36
Peeblesshire					
1	Lyne Farm			*PSAS* XXII (1887–8), 337	Peebles
Sutherland					
1	Baile-na-Coille, Strath Brora	H		*PSAS* XVI (1881–2), 240	Dunrobin
2	,, ,,	H		,, ,,	,,
3	,, ,,	H		,, ,,	
Wigtownshire					
1	Whiteleys, Stranraer			*PSAS* VII (1866–8), 423	NMA DJ 1
No specific provenance					
	Galloway		5	*PSAS* VIII (1868–70), 33	NMA DJ 5
	Scotland		5	*Arch.* LXXXVI (1936), 311	NMA DJ 6
	Scotland			*Arch.* LXXXVI (1936), 311	NMA DJ 7
	? Lanarkshire				NMA DJ 8
	Scotland				NMA DJ 13
	Scotland		5	*Arch.* LXXXVI (1936), 311	NMA DJ 14
	Scotland		5	*Arch.* LXXXVI (1936), 311	NMA DJ 24

Site	Assoc.	Type	Reference	Museum
? Borders			*PSAS* LXIX (1934–5), 440	NMA DJ 34
? Banffshire				Banff
? Banffshire				Banff
? Scotland			*Palace of History* 851	Hunterian B 1914. 320
Scotland				Kelvingrove

SPEARHEADS

(Class: p. 40; H: hoard)

Site	Assoc.	Class	Reference	Museum
Angus				
Dean Water		B	*PSAS* XVII (1882–3), 97	NMA DG 23
Ayrshire				
Whitehaugh Moss, Muirkirk		A	*PSAS* XXVIII (1893–4), 219	NMA DG 88
Berwickshire				
Birkeyden, Harfaulds		B	*PSAS* LV (1920–1), 17	NMA DG 84
Dumfriesshire				
Comlongan		B	*T. Dumf. Gall.* XLII (1965), 70	Ashmolean 1927. 2721
? Greyfriars Church, Dumfries	?H	B	*PSAS* XCVII (1963–4), 151	Dumfries (cast)
Fife				
Walton Farm, Crawford		A	*PSAS* XXVIII (1893–4), 219	NMA DG 108 (cast)
Lanarkshire				
Douglas		B	*PSAS* XVI (1881–2), 147	NMA DG 36
Perthshire				
Perthshire		B	*PSAS* LIX (1924–5), 234	NMA DG 87
No specific provenance				
Scotland		B		NMA DG 10

ARMLETS

(Type: p. 50; H: hoard; G: grave)

	Site	Assoc.	Type	Reference	Museum
Aberdeenshire					
1	Mill of Laithers	H	Band	*PPS* XXX (1964), 428	Banff
2–3	Tillychetly Moss, Alford		? Rib	*PSAS* IV (1860–2), 385	
Angus					
1	Auchnacree, Fern	H	Bar	*PSAS* LVI (1921–2), 117	NMA DQ 261
2	,, ,,	H	Bar	,, ,,	Taylor
3	Carnoustie	G	Band	*PPS* XXX (1964), 426	Carnoustie
Argyll					
1	Melfort	G	Rib	*PSAS* XIX (1884–5), 134	NMA DO 51
2	Melfort	G	Rib	,, ,,	
Ayrshire					
1	Cairntable, nr. Muirkirk	?G	Band	*PSAS* LXVIII (1933–4), 11	NMA FA 90
2	,, ,,	?G	Bar ring	,, ,,	NMA FA 91
3	The Maidens, Port Murray	H	Bar	*PSAS* XVII (1882–3), 433	NMA L 1950.4

	Site	Assoc.	Type	Reference	Museum
Fife					
1	Masterton, Pitreavie	G	Rib	*PSAS* XCVI (1962–3), 149	NMA EQ 639
2	,, ,,	G	Rib	,, ,,	NMA EQ 639
Kincardineshire					
1	Kinneff	G	Bar	*PSAS* XVII (1882–3), 449	NMA EQ 148
2	Kinneff	G	Bar	,, ,,	NMA EQ 149
Lanarkshire					
1	Crawford	G	Bar	*PSAS* XVII (1882–3), 451	NMA EQ 139
Midlothian					
1	Ratho	G	Bar	Wilson 1863, 319, 454	NMA EQ 158–162
Morayshire					
1	Netherglen, Glenrothes		Bar	*PSAS* XCVIII (1964–6), 90	Elgin 1953.23
Peebleshire					
1	nr. Stobo Castle	?G	Bar	*PSAS* II (1854–7), 276	
2	,, ,,	?G	Bar	,, ,,	
Perthshire					
1	Williamstown Farm, St Martins	G	Rib	*PSAS* LIII (1918–9), 15	Perth
Roxburghshire					
1	Cappuck		Rib	*PSAS* LIII (1918–9), 22	NMA
Sutherland					
1	Migdale	H	Bar	*PSAS* XXXV (1900–1), 266	NMA DQ 338
2	,,	H	Bar		NMA DQ 339
3	,,	H	Bar		NMA DQ 340
4	,,	H	Bar		NMA DQ 341
5	,,	H	Bar		NMA DQ 342
6	,,	H	Bar		NMA DQ 343
7	,,	H	Rib		NMA DQ 336
8	,,	H	Rib		NMA DQ 337
9	Uppat	H	Bar	*PPS* XXIX (1963), 314	Dunrobin
10	,,	H	Bar	,, ,,	Dunrobin

DAGGERS AND KNIVES

(Type: p. 42; H: hoard; G: grave)

	Site	Assoc.	Type	Reference	Museum
Aberdeenshire					
1	East Pitdoulsie, Auchterless	H	Tang		Aberdeen 37.43.2
Angus					
1	Auchnacree, Fern	H	Flat	*PSAS* LVI (1921–2), 117	NMA DQ 259
2	,, ,,	H	Flat	,, ,,	NMA DQ 260
3	Barnhill, Broughty Ferry	G	Flat	*PSAS* XXI (1886–7), 320	NMA EQ 198
4	,, ,,	G	Flat	,, ,,	
5	Cairn Greg, Linlathen	G	Flat	*PSAS* VI (1864–6), 98	
6	Gilchorn, nr. Arbroath	G	Midrib	*PSAS* XXV (1890–1), 460	NMA EQ 227
7	,, ,,	G	Midrib	,, ,,	NMA EQ 228
8	Redhall		Midrib	*PSAS* X (1872–4), 196	
9	West Mains, Auchterhouse	G	Midrib	*PSAS* XXXII (1897–8), 205	NMA EQ 255
Argyll					
1	Callachally, Glenforsa, Mull	G	Tang	*PSAS* IX (1870–2), 537	NMA EQ 136
2	Cleigh, Loch Nell	G	Flat	*PSAS* X (1872–4), 84	NMA DI 1
3	Kilmaho, Kintyre	G	Flat		Campbeltown

	Site	Assoc.	Type	Reference	Museum
4	Old Gallows, Campbeltown	G	Midrib		Inveraray
5	Salen, Mull	G	?		NMA EQ 270
Ayrshire					
1	Aird's Moss		Midrib		Hunterian B1914.318
Buteshire					
1	Blackwaterfoot, Arran	G	Midrib	*PSAS* XXXVI (1901–2), 73, 120	NMA EQ 268
2	Corriegills, Arran		Flat		Kelvingrove
Caithness					
1	nr. Yarhouse	G	?	*PSAS* VII (1866–8), 502	
Dunbartonshire					
1	Knappers, Kilbowie		Flat	*PSAS* LXIX (1934–5), 352	
East Lothian					
1	Skateraw, Dunbar	G	Flat	*PSAS* XXVII (1892–3), 7	NMA EQ 237
Fife					
1	Aberdour	G	?	*PSAS* XCVI (1962–3), 153	
2	Ashgrove, Methilhill	G	Flat	*PSAS* XCVII (1963–4), 166	Kirkcaldy
3	Gask Hill, Collessie	G	Flat	*PSAS* XII (1877–8), 439, 451	NMA EQ 52
4	Kirkcaldy	G	Flat	*PSAS* LXXVIII (1943–4), 112	Kirkcaldy
5	Kirkcaldy	G	Tang	*PSAS* LXXVIII (1943–4), 109	Kirkcaldy
6	Masterton	G	Flat	*PSAS* XCVI (1962–3), 149	NMA EQ 640
7	Masterton	G	Flat	,, ,,	NMA EQ 641
Inverness-shire					
1	Bught Park, Inverness	G	Flat	*PSAS* LXXXVIII (1954–6), 7	Inverness
2	Craigscorry	G	Midrib	*PSAS* LIX (1924–5), 204	NMA EQ 365
Kirkcudbrightshire					
1	Carlochan, Crossmichael	G	Flat	*PSAS* XII (1877–8), 454	NMA DI 3
Lanarkshire					
1	Law of Maudslie, Carluke	G	Midrib	*PSAS* VII (1866–8), 440	
2	Glenboig	G	Flat	*PSAS* LXIX (1934–5), 357	
Midlothian					
1	Old Liston	G	?	*PSAS* XII (1877–8), 449	
Morayshire					
1	Bishopmill, nr. Elgin	G	Midrib	*PSAS* VII (1866–8), 118	Elgin 1888.1
Orkney					
1	Flanders Moss, Wasbister		Flat	*PSAS* XLII (1907–8), 74	Hunterian B1914.317
2	St Andrews and Holm parishes		Midrib	*PSAS* XXI (1885–6), 340	Hunterian B1914.319
Peeblesshire					
1	Peeblesshire		Flat	*BACC*	Hunterian B1914.310
Perthshire					
1	Doune Road, Dunblane	G	Flat	*T. Stirling N.H.A.S.* 1, 19–28	Stirling A259
2	Drumlanrick, Callander	G	Flat	*PSAS* XII (1877–8), 456	NMA DI 2
3	Letham	G	Flat	*PSAS* XXXI (1896–7), 181	NMA EQ 242
Renfrewshire					
1	Gavel Moss, Lochwinnoch	H	Midrib	*PSAS* LXXXV(1950–1), 134	Kelvingrove 1-52

	Site	Assoc.	Type	Reference	Museum
Shetland					
1	Nordhouse, Northmavine		Tang	*PSAS* XI (1874–6), 471	NMA DO 6
Stirlingshire					
1	Blochairn Moor, Baldernock		Flat	*PSAS* XXII (1887–8), 350	Hunterian A106
2	,, ,,		Tang		Kelvingrove
Wigtownshire					
1	nr. Dunragit, Glenluce	G	Flat	*PSAS* LXVI (1931–2), 19	NMA DI 7
2	nr. Knockdoon		Flat	*Palace of History* 851	
3	Luce Sands		Flat	*Ayr & Wigt.* VI (1889), 95	
4	Mid Torrs, Glenluce		Tang	*PSAS* XIV (1879–80), 137	NMA BH
5	Low Torrs, Glenluce		Tang		Bowes Museum
No specific provenance					
	North-east Scotland		Tang	*PSAS* LXXXIV (1949–50), 234	Inverurie
	Scotland		Midrib		NMA DJ 15
	? East Lothian		Midrib		NMA DJ 19
	Scotland		Tang	*BACC*	Farnham
	Scotland		Tang		Ayr
	Scotland		Tang		Ayr

MOULDS

	Site	Matrices	Reference	Museum
Aberdeenshire				
	Borough Moor, Kintore	2 axes, 2 bars	*PSAS* II (1854–7), 33	NMA CM 1
	Burreldales, Fyvie	2 axes, 2 bars, 1 ingot	*PSAS* LXXXIX (1955–6), 458	NMA CM 42
	Foudland, Insch	4 axes, 3 blades, 2 bars	*PSAS* XXXVIII (1903–4), 492	Marischal 172
	New Deer	2 axes, 2 bars	*PSAS* XXXVIII (1903–4), 474	NMA CM 27
Banffshire				
	nr. Glenrinnes House, Dufftown	3 axes, 2 bars	*PSAS* LXIV (1929–30), 14	NMA CM 33
	Marnoch	1 axe, 1 bar, 1 ring	*PSAS* XXII (1887–8), 369	Banff
Inverness-shire				
	Kilmailie	2 rings	*PPS* XXIX (1963), 325	NMA CM 9
Morayshire				
	Culbin Sands	2 axes, 1 blade	*PSAS* XXXVIII (1903–4), 492	NMA CM 18
	Culbin Sands	2 axes	*PSAS* XXXVIII (1903–4), 492	NMA CM 19
	Cutties' Hillock, Spynie	1 axe	*PPS* XXIX (1963), 324	Elgin 1945.2
Ross and Cromarty				
	Ferintosh	3 axes	*PSAS* LXIII (1928–9), 12	NMA CM 32
	Strathconan	1 axe, 1 bar	*PSAS* XXXII (1897–8), 39	NMA CM 26

MISCELLANEOUS ORNAMENTS

	Site	Assoc.	Details	Reference	Museum
Aberdeenshire					
1-2	Lumphanan	?	2 bronze neckrings	Wilson 1863, 473	NMA FA 33–34
Angus					
1-2	Barnhill, Broughty Ferry	G	2 gold discs	*PSAS* XXI (1886–7), 320	NMA EQ 199–200
3	Comuston Cross, Monikie	G	gold pommel-mount	*PSAS* II (1854–7), 447	

	Site	*Assoc.*	*Details*	*Reference*	*Museum*
Argyll					
1	Balnabraid, Kintyre	G	decor. sheet bronze	*T. Dumf. Gall.* XLIV (1967), 88	Kelvingrove
2–3	,, ,,	G	2 bronze earrings?	,, ,,	,,
Buteshire					
1	Blackwaterfoot, Arran	G	gold pommel-mount	*PSAS* XXXVI (1901–2), 73	NMA EQ 268
Dumfriesshire					
1	Auchentaggart, Sanquhar		gold lunula	*PSAS* XIV (1879–80), 172, 222	NMA FE 3
East Lothian					
1	Skateraw, Dunbar	G	gold pommel-mount	*PSAS* XXVII (1892–3), 7	NMA EQ 238
2	Traprain Law		bronze earring	*PSAS* LVI (1921–2), 226	NMA
Fife					
1	Gask Hill, Collessie	G	gold pommel-mount	*PSAS* XII (1877–8), 439, 451	NMA EQ 53
Kirkcudbrightshire					
1	Balmae		? gold lunula	*T. Dumf. Gall.* XIV (1926–8), 291	
Morayshire					
1–2	Orbliston station, nr. Orton	G	2 gold earrings	*PSAS* VIII (1868–70), 28	NMA EQ 117(1)
3	nr. Orbliston station		gold lunula	*PSAS* VIII (1868–70), 32	NMA FE 2
Orkney					
1–4	Knowes of Trotty, Harray	G	4 gold discs	*PSAS* III (1857–60), 183, 195	NMA EQ 126–9
Peeblesshire					
1	Southside, Coulter	?H	gold lunula	*PSAS* IV (1860–62), 291	NMA FE 1
2	,, ,,	?H	gold lunula	*PSAS* L (1905–6) 16	NMA FE 74
Perthshire					
1	Monzie estate, Comrie or Perth		gold lunula	*PSAS* LXIII (1928–9), 176	NMA L1963.30
Sutherland					
1–2	Migdale	H	2 bronze earrings	*PSAS* XXXV (1900–1), 266	NMA DQ 358–9
3	,,	H	43 bronze beads	,, ,,	NMA DQ 344–51
4	,,	H	5 bronze cones	,, ,,	NMA DQ 353–7
5	,,	H	decor. sheet bronze	*PSAS* XCVI (1962–3), 150	NMA DQ 352
No specific provenance					
	? Ayrshire		gold lunula	*PSAS* XXXII (1897–8), 240	NMA

NOTES TO APPENDIX A

Axes

Aberdeen 15–16. Probably modern reproductions. Not mapped.

Aberdeen 39. Said to have come from a cairn above Upper Towie, perhaps a cairn above the farm of Newton Upper Towie, where in 1750 'trinkets and Roman medals' were found (6″ O.S. map).

Aberdeen 51. The axe referred to in *PSAS* was provenanced Kinclave, Gowie, Banffshire, presumably the modern Kinclune, Towie, Aberdeenshire.

Angus 5·6. Probably parts of the same axe.

Angus 7. Formerly Dudhope Park Museum, but not now in its successor, Dundee Museum.
Argyll 6. Now lost.
Banff 11. Catalogued at Marischal College as Aberdeenshire, Callender Coll., but recorded in *BACC* and in undated drawing as Hill Park Farm, The Enzie.
Berwick 2. Record of another axe, originally catalogued as Berwick 3, not certain; no evidence of existence of second Fogorig axe at Hunterian or at Fogorig Farm (1969).
Caithness 3. *BACC* drawing with provenance given only as ?Caithness.
Dumfries 5. Now deleted from Appendix A.
East Lothian 4. Formerly Lady Jane Scott collection. Possibly masquerading under another provenance or no provenance in a museum.
Fife 5. Formerly Perth Museum, now untraceable.
Fife 6–7. The reference quoted assumes an association not at all certain.
Inverness 4. Formerly Inverness Museum, now untraceable.
Inverness 11. Now lost.
Inverness 13. *BACC* drawing gives provenance as Aberdeenshire, Bishop Collection, but label on axe states Inverness-shire, Maj. Leslie Fraser Collection; the axes appear to be one and the same.
Kincardine 5. Traces of chevron decoration on faces probably not prehistoric.
Kirkcudbright 2. Now deleted from Appendix A.
Lanark 3. Almost certainly the same axe exhibited in *Palace of History* 853 by F. Hamilton.
Lanark 5. Information from Mr R. B. K. Stevenson. Axe now lost.
Lanark 6. Axe now lost.
Lanark 12. Perhaps modern. Not mapped.
Midlothian 6. Not an isolated find as quoted in Britton 1963, 279.
Moray 6. Formerly MacEwen Collection, described as similar to Moray 5. MacEwen axe sold to A. H. Bishop. Hunterian B1951.2126 closely recalls Moray 5, but is catalogued as 'Scotland' A.H.B. ex Moir-Bryce Coll.
Morayshire 11. National Museum catalogue gives no provenance but date of accession and dimensions of axe correlate with *PSAS* reference.
Moray 16. Sold to Earl of Moray, now lost.
Moray 32. Formerly Elgin Museum, now untraceable.
Nairn 3. Sold to Earl of Moray, now lost.
Perth 3. Now lost.
Perth 6. Probably flat axe.
Perth 11. Formerly Perth Literary and Antiquarian Society, now lost.
Roxburgh 6. Probably flat axe, decorated.
Roxburgh 10. Probably flat axe, decorated.
Roxburgh 11. Formerly Jedburgh Museum, now lost.
Wigtown 13. Now lost. Possibly not a genuine axe.
?Morayshire. Elgin Museum axe 1953.24 was presented in 1953 according to the museum catalogue, but the *Palace of History* notes this axe (same dimensions) already in Elgin Museum by this date 1911. Probably catalogue is incorrect.
?Scotland (Hunterian B1951.2173). *BACC* provides name 'Hanstown', A. H. Bishop Collection. No record of this name in museum.
Scotland (Dundee Museum). *Palace of History* suggests that a mark on one face indicates that this axe was deposited with a chisel-like object.

Additionally, there are several references to (1) flat axes in *Palace of History* which are lost to view at the moment and had no known provenance when exhibited in 1911, (2) flat axes without known provenance when exhibited to the Society of Antiquaries of Scotland in the nineteenth century, (3) axes and celts belonging to other private collectors, occasionally noted in local societies' journals. Without additional information it seems valueless to list these.

Halberds

Scotland. Kelvingrove. This was obtained from Middlesborough Museum in 1962, and bears the words 'Scotland' and 2 other words, including 'Bail-' or 'Rail-'. Mr J. Scott suggests that this may be the missing third halberd from the Baile-nan-Coile hoard, although it is smaller than the intact halberd from this hoard. See Appendix E.

Spearheads

?Greyfriars Churchyard, Dumfries. The reference suggests that this spearhead should not be considered as certainly a part of the hoard.

Armlets

Analysis (see Appendix B) suggests that the Cappuck (Roxb.) armlet is not Bronze Age; it is not mapped.

Daggers and knives

Yarhouse, Caithness. The dagger was in the British Museum in 1868, according to the reference.
Glenboig, Lanarkshire. L. Mann collection now untraceable.
Old Liston, Midlothian. Probably a dagger.
Peeblesshire. *BACC* states Perthshire, but Museum catalogue says Peeblesshire.
Nordhouse, Shetland. ?Bronze Age.
Blochairn, Stirling (Kelvingrove). Possibly the tang from a spearhead rather than a dagger.
A number of obscure references to presumed daggers or razors found with burials, crocks and urns have been omitted.

Moulds

Burreldales, Aberdeen. Probably the same mould as that reported from Pitdoulzie, *PSAS* XL (1905–6), 35.
Kilmailie, Inverness. Not certainly of the Early Bronze Age; not mapped.

Miscellaneous ornaments

Lumphanan, Aberdeen. No information exists about this association in a hoard or in a grave.
Balnabraid, Argyll. The recent study of these in *T. Dumf. Gall.* suggests that only bronze strips are recognisable. The two thicker fragments were 'identified' as earrings by Mr D. Simpson and the author.
Balmae, Kirkcudbright. A crescentic gold plate is likely to have been a lunula.
Orbliston, Morayshire. The lunula was found in 1868 in ballast gravel brought from the hillock where the earrings were found in 1863.
Southside, Peebles. *PPS* XVII (1951), 77 lists these as separate finds, but the *Royal Comm. Anc. Mon.* inventory treats these as an association.
Comrie or Perth. This lunula has been identified as being in the Monzie area collection by Miss J. J. Taylor.

APPENDIX B

Metal-Analyses

AXES (p. 79)

	SAM 2	*Sn*	*Pb*	*As*	*Sb*	*Ag*	*Ni*	*Bi*	*Au*	*Zn*	*Co*	*Fe*
Ab 1	7362	~10	Sp	·15	·04	·05	·41	0	0	0	0	0
Ab 4	7317	>10	0	·03	~·009	·16	Sp	0	0	0	0	Sp
Ab 5	7386	~10	0	·81	·22	·22	0	0	0	0	0	0
Ab 6	7395	~9·6	0	·84	·47	·18	Sp	0	0	0	0	Sp
Ab 7	7396	~10	0	·85	·5	·19	0	0	0	0	0	0
Ab 8	7397	~9	Sp	·95	·5	·11	Sp	0	0	0	0	0
Ab 9 or 10	7398	~10	·098	1·95	·39	·42	0	0	0	0	0	0
Ab 11	7399	~5·3	0	·3	·18	·047	Sp	0	0	0	0	0
Ab 12	7400	>10	·13	·88	·38	·22	0	0	0	0	0	0
Ab 13	7401	~10	Sp	·86	·39	·11	Sp	0	0	0	0	0
Ab 15	7328	~8·1	2·55	·46	·04	Sp	·11	·06	0	3·6	0	0
Ab 16	7329	~7·5	2·05	·8	·04	Sp	·11	·047	0	3·9	0	Sp
Ab 19	7370	>10	·13	1·05	·19	·22	0	0	0	0	0	Sp
Ab 25	7358	>10	·017	1·1	·47	·17	0	0	0	0	0	0
Ab 28	7309	~10	0	·96	·3	·12	0	0	0	0	0	0
Ab 34	7388	~10	Sp	·78	·34	·13	0	0	0	0	0	0

	SAM 2	*Sn*	*Pb*	*As*	*Sb*	*Ag*	*Ni*	*Bi*	*Au*	*Zn*	*Co*	*Fe*
Ab 37	7352	>10	·15	·83	·52	·36	0	Sp	0	0	0	Sp
Ab 39	7462	~10	Sp?	·29	·2	·21	0	0	0	0	0	0
Ab 41	7372	~10	0	·86	·46	·094	0	0	0	0	0	0
Ab 48	9285	0	0	·2	·13	·15	·04	0	0	0	0	Sp
Ab 50	9311	9·5	·04	·84	·24	·45	Sp	0	0	0	0	Sp
An 2	7451	3·1	0	·25	·43	·26	0	0	0	0	0	0
An 3	7452	>10	Sp	·82	·44	·24	0	0	0	0	0	0
An 5	7453	>10	Sp	1·0	·41	·2	0	0	0	0	0	·031
An 11	7324	>10	0	Sp	Sp	Sp	Sp	0	0	0	0	0
An 13	7387	~7·2	·18	·23	·01	1·15	Sp	0	0	·28	0	Sp
Ar 2	7321	>10	0	·73	·46	·24	0	0	0	0	0	0
Ar 3	7373	>10	Sp	1·03	·46	·27	0	0	0	0	0	0
Ar 5	7327	0	0	0	·1	·11	0	0	0	0	0	0
Ar 7	—	0	·005	4·8	·48	·3	·04	·003	—	·01	—	·3
Ay 4	7417	>10	0	·68	·4	·16	0	0	0	0	0	0
Ay 5	7414	>10	0	·82	·51	·16	0	0	0	0	0	0
Ay 6	7418	>10	·15	·84	·5	·28	Sp	0	0	Sp	0	0
Ay 7	7416	>10	·14	1·02	·41	·23	Sp	0	Sp	0	0	0
Ay 8	7415	>10	Sp	1·05	·17	·096	Sp	0	0	0	0	0
Bf 3	7407	~10	0	·62	·17	·085	Sp	0	0	0	0	0
Bf 4	7408	~10	0	·7	·17	·075	·11	0	0	0	0	0
Bf 5	7409	~10	0	·24	·09	·062	·062	0	0	0	0	0
Bf 6	7410	>10	0	·2	·12	·066	Sp	0	0	0	0	0
Bf 7	7411	>10	·22	·9	·46	·11	Sp	0	0	0	0	0
Bf 8	7412	>10	0	Sp	Sp	Sp	0	0	0	0	0	0
Bf 9	7413	~10	0	·09	~·008	Sp	0	0	0	0	0	0
Bf 10	7357	>10	·096	1·05	·48	·37	Sp	0	0	0	0	0
Bf 12	7389	~10	·2	1·15	·36	·2	0	0	0	0	0	0
Bf 13	7338	>10	Sp	1·04	·39	·16	·06	0	0	0	0	0
Br 1	7336	~10	0	·18	~·009	Sp	0	0	0	0	0	0
Br 4	7323	0	0	·007	·02	Sp	Sp	0	0	0	0	0
Br 7	7365	~10	0	·77	·46	·11	Sp	0	0	0	0	0
Ca 1	7377	~10	0	·03	·03	·034	Sp	0	0	0	0	0
Ca 4	7392	0	0	·63	·32	·14	·04	0	0	0	0	0
Ca 5	7393	~10	0	1·22	>·005	·03	0	0	0	0	0	0
Ca 6	7308	~10	·22	·22	~·009	Sp	Sp	0	0	0	0	0
Ca 8	7394	~10	0	1·3	·01	·17	Sp	0	0	0	0	0
Df 2	7310	~10	Sp	1·45	·53	·2	Sp	0	0	0	0	0
Df 4	7303	~10	Sp	·93	Sp	·16	0	0	0	0	0	Sp
Df 6	7305	0	0	·44	·33	·13	Sp	0	0	0	0	0
Df 8	11719	~9·3	0	·01	Sp	Sp	0	0	0	0	0	Sp
Df 9	7304	~10	Sp	·71	·17	·2	0	0	0	0	0	0
El 1	7353	~10	Sp	·74	·4	·2	·059	0	0	0	0	0
El 2	7326	>10	0	·29	·22	·28	0	0	0	0	0	0
El 3	7322	0	0	·86	·13	Sp	·44	<·001	0	0	0	0
El 5	7343	>10	0	·28	·07	·054	Sp	0	0	0	0	0
Fi 1	7369	>10	Sp	1·05	·49	·18	0	Sp	0	0	0	0
Fi 2	7318	>10	Sp	·8	·48	·18	Sp	0	0	0	0	0
Fi 4	7356	>10	·11	1·75	·03	·063	·13	0	0	0	0	Sp
Fi 9	7375	3·4	0	·65	·42	·17	Sp	0	0	0	0	0
In 1	7363	~10	0	·81	·43	·14	Sp	0	0	0	0	0
In 5	7366	>10	Sp	1·4	·54	·28	Sp	·02	0	0	0	0
In 7	7325	>10	Sp	·35	·31	·12	0	0	0	0	0	0
In 8	7383	0	0	·26	·36	·2	Sp	0	0	0	0	0
Kc 1	7378	~9·3	0	~·006	Sp	Sp	0	0	0	0	0	0
Kc 3	7319	>10	Sp	1·1	·54	·27	Sp	0	0	0	0	0
Kk 1	7371	~10	Sp	2·0	·55	·31	0	0	0	0	0	0
Kk 5	7385	>10	0	Sp	0	Sp	0	0	0	0	0	0
Kk 6	7302	~10	1·02	·82	·58	·13	0	0	0	0	0	0
Kk 8	7337	~8·6	0	·26	·01	Sp	0	0	0	0	0	0
Ln 1	7345	~10	0	·02	Sp	Sp	0	0	0	0	0	0

	SAM 2	*Sn*	*Pb*	*As*	*Sb*	*Ag*	*Ni*	*Bi*	*Au*	*Zn*	*Co*	*Fe*
Ln 2	7311	~10	0	1·0	·5	·35	Sp	0	0	0	0	0
Ln 6	7340	>10	0	Sp	Sp	Sp	0	0	0	0	0	Sp
Ln 7	7346	>10	Sp	·76	·36	·26	0	0	0	0	0	0
Ln 8	7347	0	Sp	·52	·29	·18	Sp	0	0	0	0	0
Ln 9	7348	~10	·09	1·75	·42	·42	Sp	Sp	0	0	0	0
Ln 10	7349	>10	Sp	·2	·17	·1	Sp	0	0	0	0	0
Ln 11	7350	~10	0	Sp	Sp	Sp	0	0	0	0	0	0
Ln 12	7351	3·65	3·0	·74	0	·082	·057	·035	0	>10	0	>·5
Ml 11	11712	~8·3	~·02	1·15	·56	·34	·02	0	0	0	0	+
Ml 2	—	8·9	·14	·30	·26	·10	·02	·002	0	<·01	<·001	·003
Ml 3	7342	>10	0	·37	·23	·15	0	0	0	0	0	0
Ml 4	7354	>10	0	·15	·18	·078	0	0	0	0	0	0
Ml 6	7344	>10	·27	·82	·35	·16	0	0	0	0	0	0
Mr 5	7368	>10	·18	1·35	·43	·25	0	0	0	0	0	0
Mr 1	11711	~10	0	Sp	0	Sp	0	0	0	0	0	Sp
Mr 12	9300	~8	~·02	·86	·28	·37	Sp	0	0	0	0	Sp
Mr 15	9305	~10	~·02	1·4	·46	·43	Sp	0	0	0	0	Sp
Mr 17	7374	~10	0	Sp	Sp	Sp	0	0	0	0	0	0
Mr 19	7331	0	0	Sp	·18	·12	Sp	0	0	0	0	0
Mr 20	9291	~10	·03	·53	·17	·51	0	0	0	0	0	Sp
Mr 21	9302	~10	·09	·93	·33	·56	Sp	0	0	0	0	Sp
Mr 22	9298	~10	Sp	·73	·28	·27	~·01	0	0	0	0	Sp
Mr 23	9299	0	0	·25	·25	·31	Sp	0	0	0	0	Sp
Mr 24	7320	0	Sp	1·1	·85	·37	Sp	Sp	0	0	0	0
Mr 25	7341	>10	0	·11	Sp	Sp	0	0	0	0	0	0
Mr 26	7404	>10	·13	·67	·48	·26	0	0	0	0	0	0
Mr 27	7405	>10	·13	1·03	·4	·28	Sp	0	0	0	0	0
Mr 30	9297	~10	·03	1·2	·28	·29	Sp	0	0	0	0	Sp
Mr 31	9301	~10	Sp	1·1	·63	·47	Sp	0	0	0	0	Sp
Mr 33	9303	~10	0	·03	Sp	<·01	Sp	0	0	0	0	+
Nr 1	7402	~10	Sp	·82	Sp	·081	·058	0	0	0	0	0
Nr 2	7403	~8·8	Sp	·7	·33	·09	·069	0	0	0	0	0
Nr 4	7339	>10	Sp	·28	·07	·062	·074	0	0	0	0	0
Pb 2	7333	~8·2	0	·03	~·005	·11	Sp	0	0	0	0	0
Pb 3	9309	10	Sp	Sp	0	<·01	0	0	0	0	0	Sp
Pr 1	7314	5·1	1·45	2·2	·52	·3	Sp	0	0	0	0	·019
Pr 2	9308	9·8	Sp	·3	0	<·01	·12	0	0	0	0	Sp
Pr 19	7316	0	0	1·9	·63	·27	~·027	Sp	0	0	0	0
Pr 22	7367	0	0	·82	·29	·33	Sp	0	0	0	0	0
Pr 24	7335	>10	0	·41	·45	·082	0	0	0	0	0	0
Rf 2	9313	10	Sp	·52	·06	·06	·11	0	0	0	0	Sp
Rf 1	9314	>10	0	0	0	~·01	Sp	0	0	0	0	Sp
Rf 4	9312	0	Sp	1·0	·44	·19	·01	0	0	0	0	0
Rf 5	7360	~10	0	·61	·44	·12	0	0	0	0	0	0
Ro 1	7379	~10	·34	1·05	·5	·13	0	0	0	0	0	0
Ro 2	7384	>10	0	·34	·23	·17	0	0	0	0	0	0
Ro 3	9292	~6·3	·15	2·2	·56	·27	<·01	0	0	0	0	Sp
Ro 4	9293	~9·7	·02	·9	·34	·43	Sp	0	0	0	0	Sp
Ro 5	9294	~9·1	·66	1·15	·39	·4	<·01	0	0	0	0	Sp
Ro 6	9295	~7·7	·05	1·2	·3	·42	Sp	0	0	0	0	Sp
Ro 7	9296	~10	~·02	1·55	·41	·56	Sp	0	Sp	0	0	Sp
Rx 1	7312	~10	Sp	·18	·05	·064	·15	0	0	0	0	Sp
Rx 7	7376	>10	·12	·7	·49	·23	0	0	0	0	0	0
Rx 9	7330	0	Sp	2·7	·78	·32	Sp	0	0	0	0	0
Su 2	7313	~10	Sp	1·3	·45	·24	Sp	0	0	0	0	0
Su 3	7439	>10	0	·76	·45	·24	0	0	0	0	0	0
Su 4	7440	>10	Sp	·46	·37	·3	0	0	0	0	0	0
Wg 1	7307	0	0	·7	·37	·15	Sp	0	0	0	0	Sp
Wg 5	7355	~10	0	<·005	Sp	Sp	0	0	0	0	0	Sp
Wg 6	9310	10	0	·1	0	~·01	1·25	0	0	0	·13	—
Wg 9	7361	~10	Sp	·8	·02	Sp	·11	0	0	0	0	Sp

	SAM 2	*Sn*	*Pb*	*As*	*Sb*	*Ag*	*Ni*	*Bi*	*Au*	*Zn*	*Co*	*Fe*
No provenance												
NMA DA41	7359	~10	0	·78	Sp	·13	Sp	Sp	0	0	0	0
NMA DA54	7364	~10	0	~·007	~·005	Sp	Sp	·027	0	0	0	0
NMA DA75	7315	~10	Sp	·1	·11	·084	0	Sp	0	0	0	0
NMA DA86	7332	~8·4	Sp	·84	·15	·24	0	0	0	0	0	0
NMA DA87	7380	>10	0	Sp	Sp	Sp	0	0	0	0	0	0
NMA DA89	7381	>10	Sp	·77	·49	·27	0	0	0	0	0	0
NMA DA90	7382	>10	Sp	·01	Sp	Sp	0	0	0	0	0	Sp
NMA DA111	7390	>10	Sp	·61	·33	·25	0	0	0	0	0	0
NMA 1.929.4	7391	0	Sp	·51	·28	·2	Sp	0	0	0	0	0
Elgin 1953.24	9304	~6·7	·03	1·2	·25	·24	Sp	0	0	0	0	Sp

HALBERDS

(r: rivet of halberd analysed) (p. 87)

	SAM 2	*Sn*	*Pb*	*As*	*Sb*	*Ag*	*Ni*	*Bi*	*Au*	*Zn*	*Co*	*Fe*
Ar 1	7457	0	0	3·1	Sp	Sp	0	0	0	0	0	0
Ar 2	7334	~10	0	·75	·46	·24	0	0	0	0	0	0
Ay 1	7429	0	·06	3·2	·6	·33	Sp	0	0	0	0	0
Ay 1r	7430	0	Sp	2·0	·26	·36	·022	0	0	0	0	0
Bf 1	7423	Sp	Sp	3·3	·43	·21	·03	0	0	0	0	0
Bf 2	7424	Sp	0	~5·3	·4	·22	·029	Sp	0	0	0	0
Bf 3	7425	Sp	0	4·2	·32	·28	·033	·011	0	0	0	0
Bf 4	7426	0	Sp	3·7	·29	·13	·052	·01	0	0	0	0
Bu 1	7420	0	0	2·9	·24	Sp	·49	·034	0	0	0	Sp
Bu 2	7421	0	Sp	2·5	·54	·34	·036	Sp	0	0	0	0
Bu 3	7422	0	·098	3·9	·28	Sp	·58	·016	0	0	0	0
In 1	9287	0	·03	3·3	·65	·23	·03	0	0	0	0	0
In 1r	9288	0	0	·24	·11	·19	·04	0	Sp	0	0	Sp
Kr 3	7428	~10	·11	2·4	·37	·33	·035	0	0	0	0	0
Mr 1	7406	0	0	3·5	·31	·41	·028	Sp	0	0	0	0
Nr 1	7427	>10	Sp	·8	·46	0	0	0	0	0	0	0
Wg 1	7460	0	·19	·96	·4	·29	Sp	0	0	0	0	0
No provenance												
NMA DJ5	7431	~10	Sp	<·005	·01	Sp	0	0	0	0	0	0
NMA DJ6	7432	0	·05	1·35	·5	·41	·033	Sp	0	0	0	0
NMA DJ6r	7433	0	0	·46	·3	·21	Sp	0	0	0	0	Sp
NMA DJ7	7434	3·55	Sp	5·1	·61	·26	Sp	Sp	0	0	0	0
NMA DJ13	7435	0	0	3·0	·72	·26	Sp	Sp	0	0	0	0
NMA DJ14	7436	0	0	·86	·41	·11	·043	0	0	0	0	0
NMA DJ24	7458	·12	·09	3·4	·39	·4	Sp	0	0	0	0	Sp
NMA DJ24r	7459	0	0	·69	·19	·3	Sp	0	0	0	0	0
NMA DJ34	7437	0	0	3·35	·14	·047	·46	·027	0	0	0	0
NMA DJ34r	7438	0	0	·26	·24	·11	Sp	0	+	0	0	0

ARMLETS (p. 88)

	SAM 2	*Sn*	*Pb*	*As*	*Sb*	*Ag*	*Ni*	*Bi*	*Au*	*Zn*	*Co*	*Fe*
An 1	7454	>10	0	·66	·48	·33	Sp?	0	0	0	0	·15
Ay 3	7419	>10	0	1·8	·65	·47	·06	Sp	+ +	0	0	0
Kc 1	11716	~7·8	~·02	·43	·33	·24	·02	0	0	0	0	+
Kc 2	11717	~6·7	~·02	·76	1·0	·36	0	0	0	0	0	+
Ln 1	11718	~9·4	·05	2·7	·68	·37	<·01	·006	0	0	0	+
Mr 1	9290	~10	0	·52	·35	·49	Sp	0	0	0	0	Sp
Rx 1	11713	~10	1·6	0	·14	·06	Sp	0	0	3·5	0	+
Su 1	7741	~10	0	·86	·42	·28	0	0	0	0	0	0
Su 2	7475	~10	0	·61	·42	·26	0	0	0	0	0	0
Su 3	7444	~10	·37	·94	·42	·17	0	0	0	0	0	0
Su 4	7443	~10	0	1·06	·39	·14	0	0	0	0	0	0
Su 5	7442	>10	0	·26	·27	·2	0	0	0	0	0	0

	SAM 2	*Sn*	*Pb*	*As*	*Sb*	*Ag*	*Ni*	*Bi*	*Au*	*Zn*	*Co*	*Fe*
Su 6	7446	>10	0	·66	·53	·26	0	0	0	0	0	0
Su 7	7447	>10	0	·93	·48	·31	0	0	0	0	0	Sp
Su 8	7448	>10	Sp	1·05	·5	·39	0	0	0	0	0	Sp

DAGGERS (p. 89)

	SAM 2	*Sn*	*Pb*	*As*	*Sb*	*Ag*	*Ni*	*Bi*	*Au*	*Zn*	*Co*	*Fe*
Ab 1	9322	0	Sp	2·8	·12	·06	·58	·016	0	0	0	0
An 1	7455	>10	0	·89	·52	·27	0	0	0	0	0	Sp
An 2	7456	>10	0	·7	·37	·24	0	0	0	0	0	·027
Fi 6	11714	~10	·38	<·005	~·008	·04	·16	Sp	0	0	0	+
Mr 1	9289	~9·9	0	·22	~·007	Sp	·31	0	0	0	0	+
Rf 1	9315	>10	0	0	0	·03	0	0	0	0	0	0
No provenance												
Inverurie	9286	0	0	2·6	·12	<·01	·74	0	0	0	·03	Sp

MISCELLANEOUS (p. 91)

	SAM 2	*Sn*	*Pb*	*As*	*Sb*	*Ag*	*Ni*	*Bi*	*Au*	*Zn*	*Co*	*Fe*
Ab 1	9323	0	·15	·07	·25	·25	0	0	0	0	0	0
Ab 2	9324	0	0	·02	·27	·06	·07	0	0	0	0	0
Ar 1	9321	10	Sp	0	0	<·01	0	0	0	0	0	Sp
Su 3	7450	>10	0	1·17	·6	·36	0	0	0	0	0	Sp
Su 4	7449	>10	Sp	1·05	·53	·26	0	0	0	0	0	0

GRAPH POSITIONS

n.d.	not detected	
tr.	trace,	<·0075
Low	·0075 –	·01334
	·01335–	·02371
	·02372–	·04217
	·04218–	·07499
Medium	·075 –	·1334
	·1335 –	·2371
	·2372 –	·4217
	·4218 –	·7499
High	·75	1·334
	1·335 –	2·371
	2·372 –	4·217
	4·218 –	7·499
Very high	7·5 –	13·34
	>13·34	

ANALYSES: METAL CLUSTERS

Flat axes

Ab 1 D, Ab 4 E, Ab 5 A, Ab 6 A, Ab 7 A, Ab 8 A, Ab 9/10 C, Ab 11 A, Ab 12 C, Ab 13 A, Ab 19 C, Ab 25 C, Ab 28 A, Ab 34 A, Ab 37 C, Ab 39 A, Ab 41 A, Ab 48 D, Ab 50 C, An 2 A, An 3 A, An 5 A, An 11 B, An 13 C, Ar 2 A, Ar 3 A, Ar 5 A, Ar 7 D, Ay 4 A, Ay 5 A, Ay 6 C, Ay 7 C, Ay 8 A, Bf 3 A, Bf 4 D, Bf 5 D, Bf 6 A, Bf 7 C, Bf 8 B, Bf 9 B?, Bf 10 C, Bf 12 C, Bf 13 D, Br 1 B?, Br 4 B, Br 7 A, Ca 1 A, Ca 4 D, Ca 5 E, Ca 6 other, Ca 8 E, Df 2 A, Df 4 E, Df 6 A, Df 8 B, Df 9 A, El 1 D, El 2 A, El 3 other, El 5 A, Fi 1 A, Fi 2 A, Fi 4 D, Fi 9 A, In 1 A, In 5 A, In 7 A, In 8 A, Kc 1 B, Kc 3 A, Kk 1 A, Kk 5 B, Kk 6 C, Kk 8 B?, Ln 1 B, Ln 2 A, Ln 6 B, Ln 7 A, Ln 8 A, Ln 9 C, Ln 10 A, Ln 11 B, Mr 1 C, Ml 2 C, Ml 3 A, Ml 4 A, Ml 6 C, Mr 5 C, Mr 11 B, Mr 12 C, Mr 15 C, Mr 17 B, Mr 19 A, Ml 20 C, Mr 21 C, Mr 22 D, Mr 23 A, Mr 24 A, Mr 25 B?, Mr 26 C, Mr 27 C, Mr 30 C, Mr 31 A, Mr 33 B?, Nr 1 D, Nr 2 D, Nr 4 D, Pb 2 E, Pb 3 B, Pr 1 C, Pr 2 other, Pr 19 D, Pr 22 A, Pr 24 A, Rf 1 B, f 4 A, Rf 5 A, Ro 1 C, Ro 2 A, Ro 3 C, Ro 4 C, Ro 5 C, Ro 6 C, Ro 7 C, Rx 1 D, Rx 7 C,

Rx 9 A, Su 2 A, Su 3 A, Su 4 A, Wg 1 A, Wg 5 B, Wg 6 other, Wg 9 D, DA 41 E, DA 54 B?, DA 75 A, DA 86 A, DA 87 B, DA 89 A, DA 90 B, DA 111 A, L 1929.4 A, Elgin 1953.24 C.

Halberds

Ar 1 other, Ar 2 A, Ay 1 C, Ay 1r D, Bf 1 D, Bf 2 D, Bf 3 D, Bf 4 D, Bu 1 other, Bu 2 D, Bu 3 other, In 1 C, In 1r D, Kr 3 C, Mr 1 D, Nr 1 A, Wg 1 C, DJ 5 B, DJ 6 C, DJ 6r A, DJ 7 A, DJ 13 A, DJ 14 D, DJ 24 C, DJ 24r A, DJ 34 D, DJ 34r A. (r rivet).

Armlets

An 1 A, Ay 3 A, Kc 1 C, Kc 2 C, Ln 1 C, Mr 1 A, Su 1 A, Su 2 A, Su 3 C, Su 4 A, Su 5 A, Su 6 A, Su 7 A, Su 8 A.

Knives

Ab 1 other, An 1 A, An 2 A, Fi 6 other, Mr 1 other, Rf 1 B, Inverurie other.

Misc.

Ab 1 other, Ab 2 other, Ar 1 B, Su 3 A, Su 4 A.

APPENDIC C

Metalwork associated with graves

(I: inhumation; C: cremation; for references and museums see Appendix A)

	Grave	*Contents*
Angus		
Barnhill, Broughty Ferry	?I. cist on edge of cairn	blade, 2 gold discs
Barnhill, Broughty Ferry	cist	blade
Cairn Greg, Linlathen	?I. cist under cairn	dagger, Beaker
Comuston Cross, Monikie	I.	gold pommel-mount, ? Food Vessel
Carnoustie	cist	armlet
Gilchorn, Arbroath	?I. ? cist under cairn	2 daggers, wood and hide sheath
West Mains, Auchterhouse	C. cist under tumulus	dagger, horn hilt and sheath
Argyll		
Balnabraid, Kintyre	C. ? cist on edge of cairn	2 earrings?, sheet fragments, 2 jet disc-beads, flint flake, bone toggle, cordoned urn
Callachally, Mull	in tumulus	dagger, greenstone bracer, Beaker and sherds
Cleigh, Loch Nell	I. cist under cairn	dagger
Kilmaho, Kilkenzie, Kintyre	I. cist	dagger, 2 flints, Food Vessel, awl
Melfort	I. cist	2 armlets, jet spacer-plate necklace
Old Gallows, Campbeltown	C.	dagger, 'crock'
Salen, Mull		dagger, flints, Beaker
Ayrshire		
Cairntable, Muirkirk	cairn	armlet, ring
Buteshire		
Blackwaterfoot, Arran	?I. cist under cairn	dagger, gold pommel-mount
Caithness		
nr. Yarhouse	I. cist in cairn	dagger
East Lothian		
Skateraw, Dunbar	I. cist under cairn	dagger, gold pommel-mount
Fife		
Aberdour		dagger
Ashgrove, Methilhill	I. cist	dagger, horn hilt, hide sheath, Beaker
Gask Hill, Collessie	C. pit secondary in cairn	dagger, wood and hide sheath, gold pommel-mount
Kirkcaldy	I. cist	dagger, horn hilt, hide sheath

	Grave	*Contents*
Kirkcaldy	I. cist	tanged blade, awl, flint flake, 12 V-bored jet buttons, jet bead, Beaker
Masterton, Pitreavie	I. cist	dagger, blade, 2 armlets, jet fusiform and disc-beads
Inverness-shire		
Bught Park, Inverness	I. cist	dagger
Craigscorry	C. cist	dagger, flint knife, flint barb and tang arrowhead
Kincardineshire		
Kinneff	I.	2 armlets, Food Vessel
Kirkcudbrightshire		
Carlochan, Crossmichael	?I. cist under cairn	dagger
Lanarkshire		
Crawford	?C. cist in cairn	armlet, Beaker, ?2 spearheads
Law of Mauldslie	I. cist	dagger
Glenboig		dagger, hide sheath, jet beads, Food Vessel
Midlothian		
Old Liston	C. barrow	dagger
Ratho	I. tumulus	armlet fragments, Food Vessel
Morayshire		
Bishopmill	?I. cist	dagger
Orbliston Station	?I. cist in cairn	2 gold earrings
Orkney		
Knowes of Trotty	C. cist in barrow	4 gold covers for shallow cones, amber beads incl. spacer-plate pieces
Peeblesshire		
Stobo Castle	?C. cairn	2 armlets
Perthshire		
Drumlanrick	cist	dagger
Doune Rd., Dunblane	I. cist	dagger
Letham	?I. cist	dagger, bone pin, boar's tusk
Williamstown, St Martins	I. cist	armlet
Wigtownshire		
Dunragit, Glenluce	?C. ? cist	dagger

APPENDIX D

Miscellaneous Data

Composition of hoards

	Type B axes	*Armlets*	*Halberds*	*Knives*	*Flanged axes*	*Spear-heads*	*Other*
Finglenny	8						'buckle'
Balnoon	7–8						
Dunino	7–8						
Colleonard	7						pot
Durris	6						
Tonderghie	6						pot
Ladyhill	5						
Craigdhu	2						
Camptown	2						'Ferrules'
Abdie	2						

	Type B axes	*Armlets*	*Halberds*	*Knives*	*Flanged axes*	*Spear-heads*	*Other*
Ravelston	2						
Culbin	2						
Barevan	2						
Boreland	2						
Low Glenstockdale	2						
Laithers	1	1					
Port Murray	5	1					
Migdale	1	8					beads, earrings, etc.
Auchnacree	4	2		2			
Uppat		2					
Eildon	1					1	
Sluie	2		1				
Auchingoul			4				
New Machar			3				
Kingarth			3				
Baile-nan-Coille			3				
Aldie			2				pot
Islay			1				L.B.A.
Gavel Moss				1	2		

Axe sets with appropriate mould matrices

(italic: associated find)

Ab 25 Mr 30 Pr 23 Ay 7 Ml 1	Culbin
Pr 9 Ln 2 Wg 6 no prov. NMA DA 111	unknown
Fi 4 Se 1	,,
Ar 14 no prov. NMA DA 87	,,
Mr 11 Br 1 no prov. NMA DA 27 + DA 48	,,
Ab 40 Ln 12 (?)	,,
Ab 29 Ln 11 no prov. NMA DA 75	,,
An 18 Mr 25	,,
Bf 11 Ab 30 In 12 Mr 23	,,
Nr 5 In 13 Df 9	,,
Ab 34 *Ab 13* An 16 In 5 In 9 Ar 3	,,
Ml 2 Mr 2	,,
Fi 9 Ab 32	,,
Mr 1 Kc 5	,,
An 4 Mr 3 *?Ay 7*	,,
Mr 5 Mr 6 no prov. Perth 121 + Inverness 50a	,,
Ay 5	Foudland
Mr 27	Culbin
Mr 26 Ab 8	New Deer
Wg 2 Wg 3	unknown
Pr 16 *Ml 6 Ab 6*	Kintore
Wg 14 Ab 37 Kc 2 Mr 14 Ab 14 Ab 51	Foudland
Df 2 Ar 4 *Nr 1 Ab 7* no prov. Manchester	Culbin
Ab 28 Pb 5 Ab 24 Pr 18 Ab 44 Df 6	Strathconan
Bf 10 Ab 21 *An 3* Pr 17 An 12 Kk 1 *An 5* Ar 2 Ab 41 *An 2* In 1 ?Kc 3 no prov. Kelvingrove	Culbin, Strathconan
Ab 20 An 8 Su 2 Fi 2 *Su 4*	Culbin, Marnoch, Foudland, New Deer, Burreldales
In 7 Ab 19	Foudland
Pr 5 *Fi 1* ?Ab 39	unknown

Type B waisted axes: Ab 2, Ab 13, Ab 30, Ab 34, An 16, Ar 3, Ar 5, Bf 11, Br 7, Df 9, El 5, In 5, In 9, In 12, In 13, Ml 2, Mr 2, Mr 13, Mr 18, Mr 23, Nr 5, Pr 24.

Type B bevelled axes: Ab 6, Ab 7, Ab 33, Ay 1, Bf 3, Bf 4, Bf 5, Bf 6, Br 1, Br 7, Bu 3, Ca 7, Df 2, Df 3, Fi 6, Fi 8, Fi 9, In 13, Kk 6, Ml 3, Mr 25, Nr 4, Nr 5, Ro 1, Ro 3, Wg 2, Wg 3, no prov. NMA DA 27, NMA DA 48, NMA DA 86, NMA DA 87, Nr 1, Wg 11.

Broken axes: Ab 8, Ab 9, Ab 10, Ab 11, Ab 26, Ab 46 (butt reworked), An 5, Bf 7, Bf 9, Bf 10, Ca 6, El 5, Fi 2, Fi 4, Mr 9, Mr 22, Pr 1, Pr 4, Ro 1, no prov. NMA DA 40 +DA 116.

Objects appearing to have a tin-rich surface: axes: Ab 6, Ab 7, Ab 8, Ab 12, Ab 26, Ar 3, Bf 10, El 2, Fi 2, ?In 6, Ml 6, Mr 26, Mr 27, Su 4. *Other*: Migdale sheet bronze strip.

Analyses:	*Sn*	*Cu*	*Hydrate of copper and carbonate*
Ml 6	37·26	10·23	52·51
Mr 26	24·36	15·49	60·15
Mr 27	32·7	18·14	49·08

APPENDIX E

Metalwork Hoards

Finglenny Hill, Aberdeenshire

1. Bibliography: *PSAS* LXXXII (1947–8), 292. *PPS* XXIX (1963), 312.
2. Site: At foot of Hill of Finglenny, at about 1,000′ O.D., 750 yards before Ealaiche Burn joins Kirkney Water, Rhynie, Aberdeenshire.
3. Circumstances: Found under a stone in 1947 by Forestry Commission, and presented to National Museum.
4. Description of site: Hoard beneath a stone.
5. Description of objects (fig. 50):

(1) Flat axe, 17 cm long, blade broken at side, bevelled	DQ307
(2) Flat axe, 15·4 cm long, blade 8·9 cm wide, bevelled	DQ308
(3) Flat axe, 15·5 cm long, blade 8·6 cm wide, broken across middle	DQ309
(4) Flat axe, butt portion, 6·4 cm long, not part of (5)	DQ310
(5) Flat axe, blade portion, 9 cm long, blade 8·7 cm wide	DQ310
(6) Flat axe, 14·2 cm long, blade 8·3 cm wide, broken across middle	DQ311
(7) Flat axe, 13·4 cm long, blade broken at side	DQ312
(8) Flat axe, 14 cm long, blade 8·8 cm wide, waisted	DQ313
(9) 'Bronze object like a buckle'	Lost

6. Comparisons: All Type Ba axes except (7) which is probably Type Bb. Individual comparisons: (1) Perthshire 16 and Kintore mould; (2) Dumfries 2 and Nairn 1 (Barevan hoard) and Culbin mould; (3) Morayshire 26; (6) Banffshire 4 (Colleonard hoard); (7) Perthshire 13; (8) Aberdeenshire 34.
7. Observations: Metal clusters A and C. Tinning noted on surfaces of (1–3) and (7).

Mill of Laithers, Aberdeenshire

1. Bibliography: *PPS* XXX (1964), 428.
2. Site: On the farm of Mill of Laithers, west of Turriff, Aberdeenshire.
3. Circumstances: Said to have been found in a grave. All objects formerly in Banff Museum, where the armlet now resides.
4. Description of site: No further details.
5. Description of objects (Fig. 39:21–22):
   (1) Flat axe, butt portion, 4·1 cm long (now lost); blade portion (lost).
   (2) Armlet, flat band 1 cm wide, 1 mm thick, bent to form armlet 5·5 cm diameter, outer surface decorated with traced lines forming borders and criss-cross design more elaborate at ends.
6. Comparisons:
   (1) Broken axes in Finglenny hoard.
   (2) Castern, Staffordshire: *PPS* XXX (1964), 427.

New Park, New Machar, Aberdeenshire

1. Bibliography: *PSAS* LVII (1922–3), 127. *Arch.* LXXXVI (1936), 203.
2. Site: At New Park, New Machar, Aberdeenshire
3. Circumstances: Found in 1908 during excavations for a bridge, lying on subsoil and covered by peat. Purchased by Anthropological Museum, University of Aberdeen.
4. Description of site: Beneath approx. 10′ of peat.
5. Description of objects (fig. 30: 4–6):
   (1) Halberd, 28·3 cm long, butt 9·2 cm wide, 3 rivet holes midrib — 249
   (2) Halberd, 26·3 cm long, butt broken, 1 rivet hole survives, midrib — 250
   (3) Halberd, blade portion, 22·6 cm long, midrib — 251
6. Comparisons: Ó Ríordáin's Type 4 halberds.

Auchnacree, Angus

1. Bibliography: *PSAS* LVI (1921–2), 351. *Inv. Arch.* GB 27.
2. Site: In a field near Auchnacree Lodge, Fern, Angus.
3. Circumstances: Found in 1921 during farm operations. Objects purchased for National Museum but three retained by Mr J. M. Taylor.
4. Description of site: Two feet beneath the surface.
5. Description of objects (fig. 49: 1–8):
   (1) Flat axe, 14·8 cm long, blade 8·2 cm wide — DQ256
   (2) Flat axe, 14·0 cm long, blade 7·9 cm wide — DQ257
   (3) Flat axe, 11·7 cm long, blade 6·2 cm wide — Taylor
   (4) Flat axe, 14·3 cm long, blade 8·2 cm wide, broken across middle — DQ258 (blade) Taylor (butt)
   (5) Dagger, 16·6 cm long, 5·1 cm wide, eleven rivet holes, flat — DQ259
   (6) Dagger, 9·9 cm long, 4·5 cm wide, five rivet holes, flat — DQ260
   (7) Armlet, oval-sectioned rod, butt-jointed, internal diameter 6·3 cm — DQ261
   (8) Armlet, D-sectioned rod, butt-jointed, internal diameter 6·1 cm — Taylor
6. Comparisons: Type Ba axes; (1–2, 4) Banffshire 10 (Balnoon hoard), Perthshire 17, and Culbin or Strathconan mould; (3) Ayrshire 7 (Port Murray hoard), Morayshire 3; (5) Leicester (Piggott 1963, 84–5); (7–8) Port Murray, Ayrshire, Migdale, Sutherland.
7. Observations (1–2, 4–7): Cluster A metal.

Islay, Argyll

1. Bibliography: *PSAS* XVI (1881–2), 409. *Arch.* LXXXVI (1936), 202.
2. Site: Islay.
3. Circumstances: Acquired by the Purchase Committee for the National Museum in 1881. The association is not certain.
4. Description of site: No details.
5. Description of objects:
   (1) Halberd, 25·2 cm long, butt 8·4 cm wide, midrib — DQ45
   (2) Socketed axe, 9·5 cm long, octagonal section, loop — DQ47
   (3) Socketed axe, 9·0 cm long, oval section, broken loop — DQ48
   (4) Spearhead, 16·0 cm long, flattened loops at blade base, ogival leaf-shaped blade — DQ46
   (5) Chisel, adze-like, flanges — DQ49

Port Murray, Ayrshire

1. Bibliography: *PSAS* XVII (1882–3), 433. *Inv. Arch.* GB 31.
2. Site: The edge of a bay known as The Maidens, at Port Murray, Ayrshire.
3. Circumstances: Found in 1883 during clearance of rock faces, 100 yards inland from and 25 feet above high water mark. On loan to the National Museum by the Marquis of Ailsa (all L 1950.4).
4. Description of site: A crevice under a rock ledge.
5. Description of objects (fig. 49: 9–14):
   (1) Flat axe, 9·8 cm long, blade 4·4 cm wide, damaged blade
   (2) Flat axe, 14·1 cm long, blade 8·2 cm wide, damaged blade
   (3) Flat axe, 9·4 cm long, blade 3·3 cm wide, damaged butt and blade

(4) Flat axe, 11·1 cm long, blade 6·8 cm wide, damaged blade
(5) Flat axe, 12·5 cm long, blade 7·0 cm wide, damaged blade
(6) Armlet, oval-sectioned rod, butt-jointed, internal diameter 5·9 cm

6. Comparisons: (2, 4–5) Type Ba axes; (2) Foudland mould; (4) Angus 4 (Auchnacree hoard); (5) Aberdeenshire 32; (1, 3) chisel-like Type Bb axes; (6) Migdale, Sutherland, and Auchnacree, Angus.
7. Observations: Cluster A and C metal.

Auchingoul, Banffshire

1. Bibliography: *PSAS* LXXV (1940–1), 208. *PSAS* LXXVI (1941–2), 133.
2. Site: A field about a quarter of a mile SE. of the farmstead at Mains of Auchingoul, Inverkeithny, Banffshire.
3. Circumstances: Found in 1939 during ploughing. The find consisted of seven or eight halberds, of which four were recovered and presented to the National Museum in 1941–2.
4. Description of site: A field in the low terrace of the Deveron River, about 15 feet above the stream.
5. Description of objects (fig. 31: 1–4):
   (1) Halberd, 25·6 cm long, butt 8·4 cm wide, no rivet holes, midrib — DJ37
   (2) Halberd, 27·2 cm long, butt 10·4 cm wide, 5 rivet holes, midrib — DJ38
   (3) Halberd, 28 cm long, butt 9·1 cm wide, no rivet holes, midrib — DJ39
   (4) Halberd, 29·3 cm long, butt 10 cm. wide, no rivet holes, grooved midrib and blade — DJ40
   (5–7 or 8) Halberds, lost.
6. Comparisons: (2) Portmoak, Kinross and Baile-nan-Coile, Sutherland (hoard); (4) Dunadd, Argyll (grooved).
7. Observations: All cluster D metal.

Colleonard, Banffshire

1. Bibliography: *PSAS* III (1857–60), 245. *Inv. Arch.* GB 29.
2. Site: A field north of the farm of Colleonard, near Banff.
3. Circumstances: Found in 1857 during trenching in a field. Acquired by the National Museum in 1857.
4. Description of site: The axes were packed in the pot, with their blades uppermost. The pot was found one foot below the surface of the field, protected on two sides by two stones.
5. Description of objects (fig. 11: 1–7):
   (1) Flat axe, length 13·3 cm, blade 8·4 cm wide, rain decoration on faces, bevelled — DA21
   (2) Flat axe, length 17 cm, blade 7·5 cm wide, rain decoration on faces — DA24
   (3) Flat axe, length 13·7 cm, blade 8·1 cm wide, rain decoration on faces, bevelled — DA22
   (4) Flat axe, blade portion, 8 cm long, blade 7·5 cm wide — DA23
   (5) Flat axe, lacking blade and butt, 8 cm long, grooved facets on faces — DA25
   (6) Flat axe, length 15 cm, blade 8·1 cm wide, grooved facets on faces and notch decoration on sides, bevelled — DA20
   (7) Flat axe, length 8·3 cm, blade 9 cm wide, grooved facets on faces, bevelled — DA19
   (8) Pottery vessel, coarse brown ware, height 18 cm, decorated by impressed row of dots below rim, irregular zigzag scratches, and slashed cordon — EA18
6. Comparisons: (1, 3) Aberdeenshire 18; (6) Nairnshire 1 (Barevan hoard); (7) Buteshire 3.
7. Observations: Metal clusters A, B, C and D.

Fortrie of Balnoon, Banffshire

1. Bibliography: *PSAS* I (1851–4), 138. *PSAS* IX (1870–2), 428. *Letter Book of the Literary and Antiquarian Society of Perth* 244.
2. Site: West shoulder of the Hill of Fortrie of Balnoon, Inverkeithny, Banffshire.
3. Circumstances: Found about 1836 when one of seven ditched tumuli was excavated. The axes were found in a heap. One axe was donated to the (now) National Museum in 1853.
4. Description of site: Apparently in a tumulus.
5. Description of objects (fig. 18: 5):
   (1) Flat axe, length 14·5 cm, blade 82 cm wide, broken, butt damaged — DA38
   (2–7 or 8) Flat axes, all lost
6. Comparisons: Type Ba axe; Angus 3 and 5 (Auchnacree hoard), Kincardineshire 3 (Durris hoard).
7. Observations: Surface of axe analysed: tin 35·84%, copper 64·16%, including portion of underlying metal. Axe is cluster C metal.

Craigdhu, Arran, Buteshire

1. Bibliography: *T. Glas. A.S.* I (1881–90), 516.
2. Site: A hilltop on the farm of Craigdhu, East Bennan, Arran.
3. Circumstances: Found in the spring of 1887 on a farm belonging to Alexander Stewart. Brodick Castle collection.
4. Description of site: Found 12–14″ below the surface on the hilltop, near an ancient fort.
5. Description of objects:
   (1) Flat axe, length 15 cm, lunate blade 8·3 cm wide, convex butt 3 cm wide.
   (2) Flat axe, length 12·7 cm, lunate blade 8·3 cm wide, convex butt 3 cm wide.

Kingarth, Buteshire

1. Bibliography: *PSAS* IV (1860–2), 396. *Arch.* LXXXVI (1936), 203.
2. Site: Parish of Kingarth, Bute.
3. Circumstances: Found before 1862, when three halberds were presented to the National Museum. The report is not clear if three or five halberds were found.
4. Description of site: no further details.
5. Description of objects (fig. 29: 1–3):
   (1) Halberd, length 33·6 cm, butt 7·5 cm wide, 1 rivet hole, midrib with moulding, ribbing at blade edge DJ9
   (2) Halberd, length 28·5 cm, blade tip missing, blade edges destroyed, 1 rivet hole, midrib DJ10
   (3) Halberd, length 24·3 cm, butt 8 cm wide, originally 4 rivet holes, midrib DJ11
6. Comparisons: Ó Ríordáin's Type 4 halberds.
7. Observations: Mixed metals.

Camptown, East Lothian

1. Bibliography: *PSAS* XVI (1881–2), 176, 228. *New Statistical Account* 11 (1845), 50.
2. Site: A field on the farm of Camptown, 3 miles N. of Haddington, East Lothian.
3. Circumstances: Found in 1833 during ploughing. Bronze 'ferrule-like objects' were discovered at the same time, and may have been associated. One axe was presented to the National Museum in 1882, and one axe was purchased for the Museum in 1876. An urn was found at the same place in 1843. The association of these two axes is not certain.
4. Description of site: No further details.
5. Description of objects (fig. 28: 3–4):
   (1) Flat axe, length 14·4 cm, blade 7·4 cm wide DA28
   (2) Flat axe, length 11·8 cm, blade 7 cm wide DA29
   (3) Bronze 'ferrule-like objects. They seemed as if they might have fixed the barb to the shaft of an arrow'. Lost
6. Comparisons: Both Type Ba axes. (1) Morayshire 21. (3) Migdale tubular beads?
7. Observations: Metal clusters A (2) and D (1). Surface of (2) has tinned appearance.

Abdie, Fife

1. Bibliography: *PSAS* XXIV (1889–90), 13.
2. Site: Parish of Abdie, Fife.
3. Circumstances: Purchased by the National Museum from the Sturrock collection in 1889. The association is not certain.
4. Description of site: No further details.
5. Description of objects (fig. 28: 5–6):
   (1) Flat axe, length 16·7 cm, blade 9·2 cm wide DA61
   (2) Flat axe, length 15·0 cm, blade 8·3 cm wide, blade and butt damaged DA62
6. Comparisons: Axes of Type Ba. (1) Perthshire 5; (2) Aberdeenshire 20, Sutherland 4 (Migdale hoard).
7. Observations: Both axes of cluster A metal. Tinning noted on surface of (2).

Dunino, Fife

1. Bibliography: *Book of List of Donations, Literary and Antiquarian Society of Perth* (1835) 16.
2. Site: Near Dunino Church, Fife.
3. Circumstances: Found in 1834 by a ploughman. One axe was obtained for the (now) National Museum

in 1835, without record of association. Another axe was presented to the Literary and Antiquarian Society of Perth by Mr James Thomson, recording the find of 7 or 8 axes; the Perth axe is now lost, as are the remaining 5 or 6 axes.
4. Description of site: Ploughsoil. No further details.
5. Description of objects (fig. 8:6):
(1) Flat axe, length 11·5 cm, blade 6·2 cm wide DA36
(2–7/8) Flat axes
6. Comparisons: Axe of Type Bb. Selkirkshire 1.
7. Observations: Cluster D metal.

Durris, Kincardineshire

1. Bibliography: *PSAS* XVI (1881–2), 37. *PSAS* XXII (1887–8), 363.
2. Site: The parish of Durris, Mearns, Kincardineshire.
3. Circumstances: Found in 1860 in removing a cairn of stones. One axe presented to the National Museum in 1882, and another axe was in the Free Church College, Aberdeen, museum in 1888, now in the Anthropological Museum, Aberdeen. Four other axes are lost.
4. Description of site: A cairn.
5. Description of objects (fig. 28: 1–2):
(1) Flax axe, length 14·4 cm, blade 9·2 cm wide NMA DA49
(2) Flat axe, length 18·1 cm, blade 12·1 cm wide Marischal 247[11]
6. Comparisons: Both Type Ba axes. (1) Banffshire 10 (Fortrie of Balnoon hoard), Angus 5 (Auchnacree hoard), and Culbin or Strathconan mould; (2) Dumfriesshire 3, Perthshire 8, large axes.
7. Observations: (1) Cluster A metal.

Backside of Aldie, Kinross

1. Bibliography: *Arch.* LXXXVI (1936), 204.
2. Site: West of the farm, Backside of Aldie, Craigton, Kinross.
3. Circumstances: Found about 1854, presented to Kinross Museum. The association of the halberds with the urn is uncertain. Originally a label in the Museum read 'Two bronze spearheads found along with cinerary urn about 1854 . . .' but the urn in the Museum is unlabelled. Uncertain association.
4. Description of site: No further details.
5. Description of objects (fig. 31: 1–6):
(1) Halberd, length 24·5 cm, blade tip missing, blade edges damaged, midrib, 1 rivet hole surviving.
(2) Halberd, length 23·7 cm, blade width 6·2 cm, blade damaged, midrib, 4 rivet notches.
(3) Pottery sherds of urn, twist cord-impressions on inner rim of zigzag line inside bordering lines; on outer surface of vessel, twist cord-impressions at mouth of two irregular lines from lowest of which are adjacent pendant and upright triangles filled with hatching, and which are bordered by two lines below; immediately below this is a slender cordon. Diameter of mouth estimated at 10″.

Ravelston, Midlothian

1. Bibliography: *PSAS* IX (1870–2), 430. *Archaeologia Scotica* III, App. II, 32.
2. Site: South-east end of Wester Hill of Ravelston, Corstorphine, Edinburgh.
3. Circumstances: Found before 1784. One axe was presented to the (now) National Museum in 1784; the other axe is lost.
4. Description of site: One foot beneath the surface.
5. Description of objects (fig. 18: 3):
(1) Flat axe, length 17·3 cm, blade 9 cm wide, butt damaged DA6
(2) Flat axe Lost
6. Comparisons: Type Ba axe; Aberdeenshire 6 (Finglenny hoard) and Kintore mould.
7. Observations: Analysis of surface metal: tin 37·26%, copper 10·23%, carbonate and hydrate of copper 52·51%. Axe metal is cluster C.

Culbin Sands, Morayshire

1. Bibliography: *PSAS* XXI (1886–7), 9. *PSAS* XXV (1890–1), 503.
2. Site: Culbin Sands, Morayshire.

3. Circumstances: Found before 1885 during forestry operations on the sands. One axe was obtained for the National Museum in 1885; the other axe 'of similar size and form' was in the collection of the Rev. J. McEwan of Dyke in 1891. At the sale of McEwan's collection, Lot No. 11, a bronze axe, sharpened, with no locality attached, was purchased by A. H. Bishop and is now in the Hunterian Museum B 1951.2126, no known provenance. This axe is probably the second axe from this hoard, although it is catalogued under the names A. H. B(ishop) ex Moir Bryce.
4. Description of site: No further details.
5. Description of objects (fig. 17: 2–3):
   (1) Flat axe, length 15·2 cm, blade 9 cm wide — NMA DA59
   (2) Flat axe, length 14·8 cm, blade 8·6 cm wide — Hunterian B 1951.2126
6. Comparisons: Axes of Type Ba. Perthshire 17 resembles these axes, but does not possess the squared butt.
7. Observations: (1) is cluster C metal.

Sluie, Morayshire

1. Bibliography: *PSAS* IX (1870–2), 432. *Inv. Arch.* GB 30.
2. Site: Moor of Sluie, Edenkillie, Morayshire.
3. Circumstances: Found in a cist in 1818, and presented to the (now) National Museum in 1861. There is no reason to doubt the association.
4. Description of site: Cist.
5. Description of objects (fig. 17: 6–8):
   (1) Flat axe, length 15·6 cm, blade 7·7 cm wide — DA32
   (2) Flat axe, length 15·7 cm, blade 8·5 cm wide — DA33
   (3) Halberd, length 27·6 cm, width 8·7 cm, midrib, 4 rivet holes — DJ4
6. Comparisons: (1–2) Type Ba axes; (1–2) Aberdeenshire 8 (Finglenny hoard); (3) Kingarth, Bute (hoard); Islay, Argyll; Assich, Inverness-shire.
7. Observations: The tin-enriched surfaces of the two axes were analysed in 1870–2; DA 32—tin 24·36, copper 15·49, carbonate and hydrate of copper 60·15; DA 33—tin 32·78, copper 18·14, carbonate and hydrate of copper 49·08.
   Axes metal cluster C, halberd metal cluster D.

Barevan Kirk, Nairnshire

1. Bibliography: *PSAS* LVI (1921–2), 358.
2. Site: In the precincts of the old church at Barevan, near Cawdor, Nairnshire.
3. Circumstances: Found in or before 1833 near a cist. One axe lay on top of the other. Presented to the National Museum in 1922.
4. Description of site: Fourteen inches below the surface on a 'small height' near a cist.
5. Description of objects (fig. 21: 6–7):
   (1) Flat axe, length 16 cm, blade 9·2 cm wide, grooved decoration on faces and notch decoration on edges, ridged lozenge decoration on sides — DQ264
   (2) Flat axe, length 14·9 cm, blade 8·6 cm wide — DQ265
6. Comparisons: (1) Dumfriesshire 2, Aberdeenshire 7 (Finglenny hoard) and Culbin mould; decoration resembles Banffshire 4 (Colleonard hoard). (2) Roxburghshire 1, Buteshire 3.
7. Observations: Both of cluster D metal.

Gavel Moss, Renfrewshire

1. Bibliography: *PSAS* LVII (1922–3), 127. *PSAS* LXXXV (1950–1), 134. *Inv. Arch.* GB 28.
2. Site: Gavel Moss Farm, Lochwinnoch, Renfrewshire.
3. Circumstances: Found in 1790 during ploughing. Owned by Mr D. Patrick, and on loan to Glasgow Art Gallery and Museum (1-'52).
4. Description of site: No further details.
5. Description of objects (fig. 51; pl. 3a):
   (1) Dagger, length 25·5 cm, width 6·6 cm, triple moulded midrib, 3 rivet holes, modern damage.
   (2) Flanged axe, length 15·4 cm, blade 8·9 cm wide, cast flanges and stop, oblique ribs on flanges.
   (3) Flanged axe, length 9·5 cm, butt missing, blade 6·5 cm wide, cast flanges, chevron and punch decoration on faces, ripple ribbing in flanges, modern hole.

(4) 'Armour . . . was scrapped owing to its poor condition.'
6. Comparisons: (1) Teddington, Middlesex (*Arch.* XLIII (1873), pl. XXXV, 2); (2–3) Class I flanged axes; (2) Peeblesshire 4; (3) Nairnshire 6.
7. Observations: Metal of clusters B and D.

Ladyhill, Ross and Cromarty

1. Bibliography: *PSAS* XIX (1884–5), 404.
2. Site: near Ladyhill, Avoch, Ross and Cromarty.
3. Circumstances: Found before 1885 during trenching operations in a field. Presented to Elgin Museum
4. Description of site: No further details.
4. Description of objects (fig. 21: 1–5):
   (1) Flat axe, length 12·3 cm, blade 7·1 cm wide, bevelled — 1868.1a
   (2) Flat axe, length 12·7 cm, blade 6·6 cm wide — 1868.1b
   (3) Flat axe, length 10·9 cm, blade 6·2 cm wide — 1868.1c
   (4) Flat axe, length 12·3 cm, blade 6·7 cm wide — 1868.1d
   (5) Flat axe, length 12·2 cm, blade 5·3 cm wide — 1868.1e
6. Comparisons: Axes of Type Ba; (1) Scotland NMA DA86; (2) Angus 7; (5) Ross 4.
7. Observations: All of cluster C metal.

Eildon, Roxburghshire

1. Bibliography: *Catalogue of the National Museum of Antiquities of Scotland* (1892).
2. Site: Near Eildon, Roxburghshire.
3. Circumstances: Found under a large cairn. Obtained by the (now) National Museum. The association is recorded only in the *Catalogue*.
4. Description of site: A large cairn.
5. Description of objects (fig. 10: 5):
   (1) Flat axe, length 17·9 cm, blade 7·9 cm wide, rain decoration on faces, hammered flanges, slight swelling at middle of axe faces — DA9
   (2) Spearhead, length 8·6 cm, blade damage possibly obscuring perforations in blade base, groove at socket base — DG41
6. Comparisons: Type Bb axe; decoration, Banffshire 5–6 (Colleonard hoard).

Baile-nan-Coille, Sutherland

1. Bibliography: *PSAS* XVI (1881–2), 240. *Arch.* LXXXVI (1936), 203.
2. Site: At the foot of a slope near Baile-nan-Coille, Strath Brora, Sutherland.
3. Circumstances: Found before 1882 during gravel digging. Three halberds were found, of which two are preserved in Dunrobin Castle Museum. The third may be in the Art Gallery and Museum, Glasgow (see Notes to the halberd list in Appendix A).
4. Description of site: Under one foot of gravel, capped by three feet of earth.
5. Description of objects (fig. 32: 5–6, ?4):
   (1) Halberd, length 26·4 cm, width at butt 9·6 cm, midrib, 5 rivet holes — Dunrobin
   (2) Halberd fragment, 12·9 cm long, midrib — Dunrobin
   (3) Halberd, 'the same style as the whole one, but rather longer' — ?Lost
6. Comparisons: (1) Auchingoul, Banffshire (hoard).

Migdale, Sutherland

1. Bibliography: *PSAS* XXXV (1900–1), 266. *Inv. Arch.* GB 26.
2. Site: Knoll on moor at west end of Loch Migdale, Creich, Sutherland.
3. Circumstances: Found before 1901 during rock blasting. Donated to National Museum 1964–5. The axe illustrated in *Inv. Arch.* GB 26, 1 is not from this hoard.
4. Description of site: On a granite knoll.
5. Description of objects (fig. 39: 1–13):
   (1) Flat axe, length 15·1 cm, blade 8·1 cm wide — DQ335
   (2) Armlet, butt-jointed strip, triple moulding on exterior with vertical milled surface between moulding, nicks along edges, internal diameter 6·2 cm — DQ336
   (3) Armlet, as (3), but milling more distinct — DQ337

(4) Armlet, D-sectioned rod, butt-jointed (now overlapped) internal diameter 6·2 cm DQ343
(5) Armlet, D-sectioned rod, butt-jointed (now overlapped) internal diameter 6·4 cm DQ341
(6) Armlet, D-sectioned rod, butt-jointed (now overlapped) internal diameter 5·8 cm DQ340
(7) Armlet, D-sectioned rod, butt-joined (now overlapped) internal diameter 5·6 cm DQ338
(8) Armlet, oval-sectioned rod, butt jointed (now overlapped), internal diameter 6·2 cm DQ342
(9) Armlet, D-sectioned rod, butt-jointed (now overlapped), internal diameter 6·6 × 6·2 cm DQ339
(10–52) Forty-three tubular beads of sheet bronze, with remains of wooden cores: 6 beads and 3 fragments 34 mm long, 6·5 mm diameter, DQ 344; 1 bead 27 mm long, split, DQ 345; 8 beads 28–29 mm long, 5 mm diameter, DQ 346; 12 beads and 2 fragments 25–26 mm long, 5 mm diameter, DQ 347; 2 beads 23 and 24 mm long, 4 mm diameter, DQ 348; 1 bead 18 mm long, 3·5 mm diameter, DQ 349; 15 fragments, including 2 with 6·5 mm diameter, 2 with 5 mm diameter, 2 with 4 mm diameter, DQ 350; perforated wooden cores and fragments, DQ 351 and DQ 205
(53) Sheet bronze fragment, 18 mm wide, bent, with outer surface of longer side decorated by bosses and short lines DQ352
(54–58) Five sheet cones, diameters 23 mm to 26 mm, with performation traces at bases DQ353–7
(59) Earring, sheet bronze with rod hook DQ358
(60) Sheet fragment, length 4·3 cm, probably as (59) DQ359
(61–66) Six buttons of jet, V-bored, diameters 3 cm to 4·6 cm DQ360–5

6. Comparisons: (1) Aberdeenshire 20, Angus 8; (2–3) St Martin's, Perthshire; Melfort, Argyll; (4–9) Auchnacree, Angus and Port Murray, Ayrshire; (10–52) Eynsham, Oxford; Tara, Ireland (*Inv. Arch.* GB 14); (53) ?Balnabraid, Argyll; (54–58) Únětician and Danubian E.B.A. form, see von Brunn 1959; (59–60) Cowlam, Yorkshire (Greenwell, *British Barrows*, (1877)); ?Balnabraid, Argyll; Traprain Law, East Lothian; (61–66) Kirkcaldy, Fife (*Inv. Arch.* GB 32).
7. Observations. Metal: 10 objects cluster A, 1 cluster C. Highly polished surfaces on (4–9), tinning effect on (1) and on (53).

Uppat, Sutherland

1. Bibliography: *PSAS* LVII (1922–3), 127. *PPS* XXIX (1963), 314.
2. Site: Uppat, 3 miles NE. of Golspie, Sutherland.
3. Circumstances: Unknown. In Dunrobin Castle Museum.
4. Description of site: No further details.
5. Description of objects:
(1–2) Two armlets, D-sectioned rods, butt-jointed, rod thickness 1 cm, diameters 8 cm.
6. Comparisons: (1–2) Migdale, Sutherland; Auchnacree, Angus.

Boreland, Wigtownshire

1. Bibliography: *Palace of History* 853. *T. Dumf. Gall.* XLII (1965), 68.
2. Site: The Farm of Boreland, Inch, Wigtownshire.
3. Circumstances: Exhibited in 1911 by the Earl of Stair and donated to Stranraer Museum in 1964. The association of these two axes in a hoard is not entirely certain.
4. Description of site: No further details.
5. Description of objects (fig. 18: 1–2):
(1) Flat axe, length 17·7 cm, blade 13·2 cm wide 1964-8
(2) Flat axe, length 17·5 cm, blade 12·3 cm wide 1964-9
6. Comparisons: Matched pair of Type Ba bevelled axes; Knockasarnet Co Kerry (Harbison 1969, 586).

Low Glenstockdale, Wigtownshire

1. Bibliography: *T. Dumf. Gall.* XXVI (1947), 124. *T. Dumf. Gall.* XLII (1965), 68.
2. Site: Low Glenstockdale, near Stranraer, Wigtownshire.
3. Circumstances: Found during peat-digging, at depth of 4 feet. Obtained by Stranraer Museum in 1947.
4. Description of site: In peat.
5. Description of objects (fig. 11: 8–9):
(1) Flat axe, length 16·9 cm, blade 9·1 cm wide, rain decoration on septum of faces, irregular chevron decoration on blade faces, lozenge decoration on sides, slight swelling at middle of axe faces, bevelled 1947-1
(2) Flat axe, length 14·3 cm, blade 7·7 cm wide 1947-2
6. Comparisons: Type Bb axes; (1) Roxburghshire 3 (Eildon hoard), Ayrshire 1.

Tonderghie, Wigtownshire

1. Bibliography: *Statistical Account of Scotland* 16 (1795), No. 16, Whithorn parish, 285. *PPS* XXIX (1963), 311.
2. Site: Tonderghie estate, 3 miles S. of Whithorn, Wigtownshire.
3. Circumstances: Found before 1795. All of the finds are lost.
4. Description of site: No further details.
5. Description of objects (fig. 14: 5):
   (1) Flat axe, length 12 cm, width 3·5 cm, irregular butt, one face flat, the other convex
   (2–6) Flat axes, as (1)
   (7) Pottery vessel, containing (1–6)
6. Comparisons: Type B axe by shape.
7. Observations: metal described as 'pieces of copper'.

Since this paper was completed in October 1969, several articles have been published which may be thought to alter some of the statements here. (1) Recent work on metal analyses by E. A. Slater and J. A. Charles (*Antiquity* 44 (1970), 207) suggests that the segregation of bismuth and lead under ancient casting conditions may affect single sampling of objects for spectrographic analysis. For the Scottish analyses presented here, the concluding statement by Slater and Charles is considered to be important: 'Although other elements commonly present may segregate to some extent . . . the degree of variation in analysis introduced is not important in the present context.' The metal clusters presented here are therefore considered to be valid in archaeological terms. (2) Research on the radiocarbon dating method, using bristlecone pine for dendrochronology, has indicated that dates in radiocarbon years before *c.* 1500 B.C. are to be increased according to a scale still undergoing revision (see C. Renfrew, *Proc. Prehist. Soc.* 36 (1970), 280). It appears, however, that if a new scale is to be employed, the Migdale phase may begin in the twenty-first century, the Colleonard phase and the Gavel Moss phase in the twentieth or nineteenth century B.C. (see below). (3) A recent paper on lunulae by J. J. Taylor (*Proc. Prehist. Soc.* 36 (1970), 38) suggests that lunulae decoration is derived from indigenous Beaker pottery motives, and therefore that lunulae pre-date the Wessex Bronze Age graves; this would place lunulae before spacer-plate necklaces, but the lack of precise Beaker chronology, and lunulae associations, may be thought to leave the problem unsolved. (4) The division of the Scottish Early Bronze Age industrial phases into the Colleonard and Gavel Moss phases was based upon the current ideas of a bipartite Wessex community. Such a division may be typologically more apparent than real, and the difficulties of demonstrating such distinct phases, noted on page 29, seem now to be even greater on the basis of continental chronology and Wessex gold-work (J. M. Coles and J. J. Taylor, *Antiquity* 45 (1971)). This suggests that the material of the Gavel Moss phase may have been initiated at the same time as the industry of the Colleonard phase. The basic pre-Wessex Migdale industry is unaffected.

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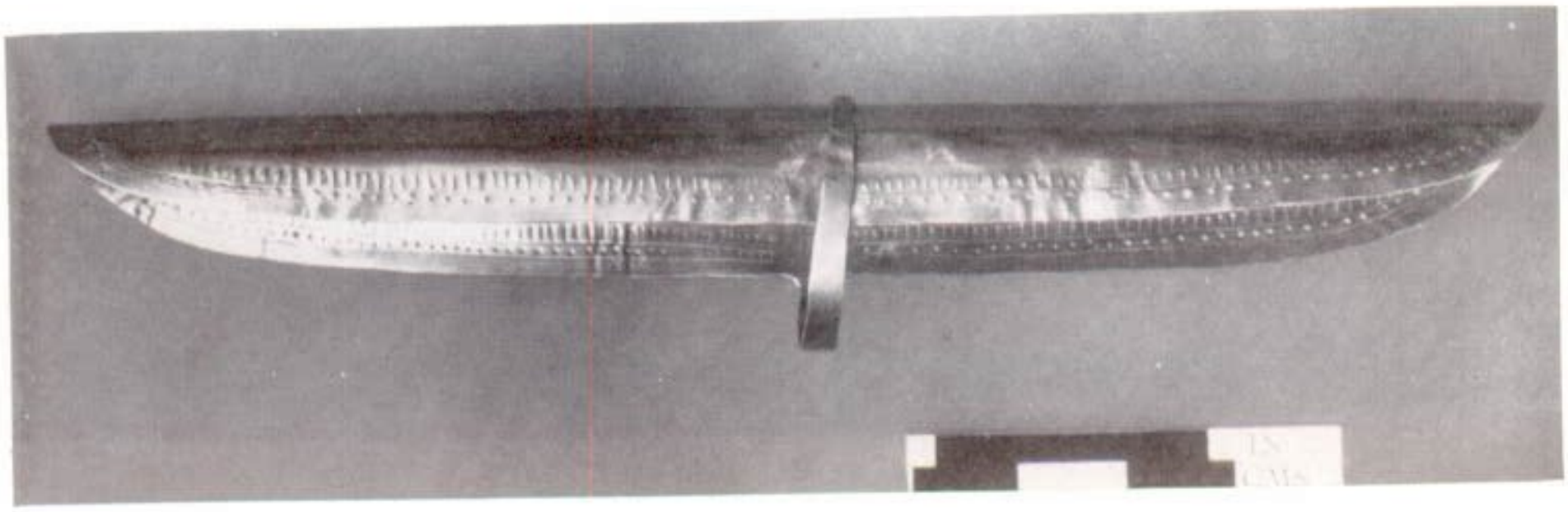
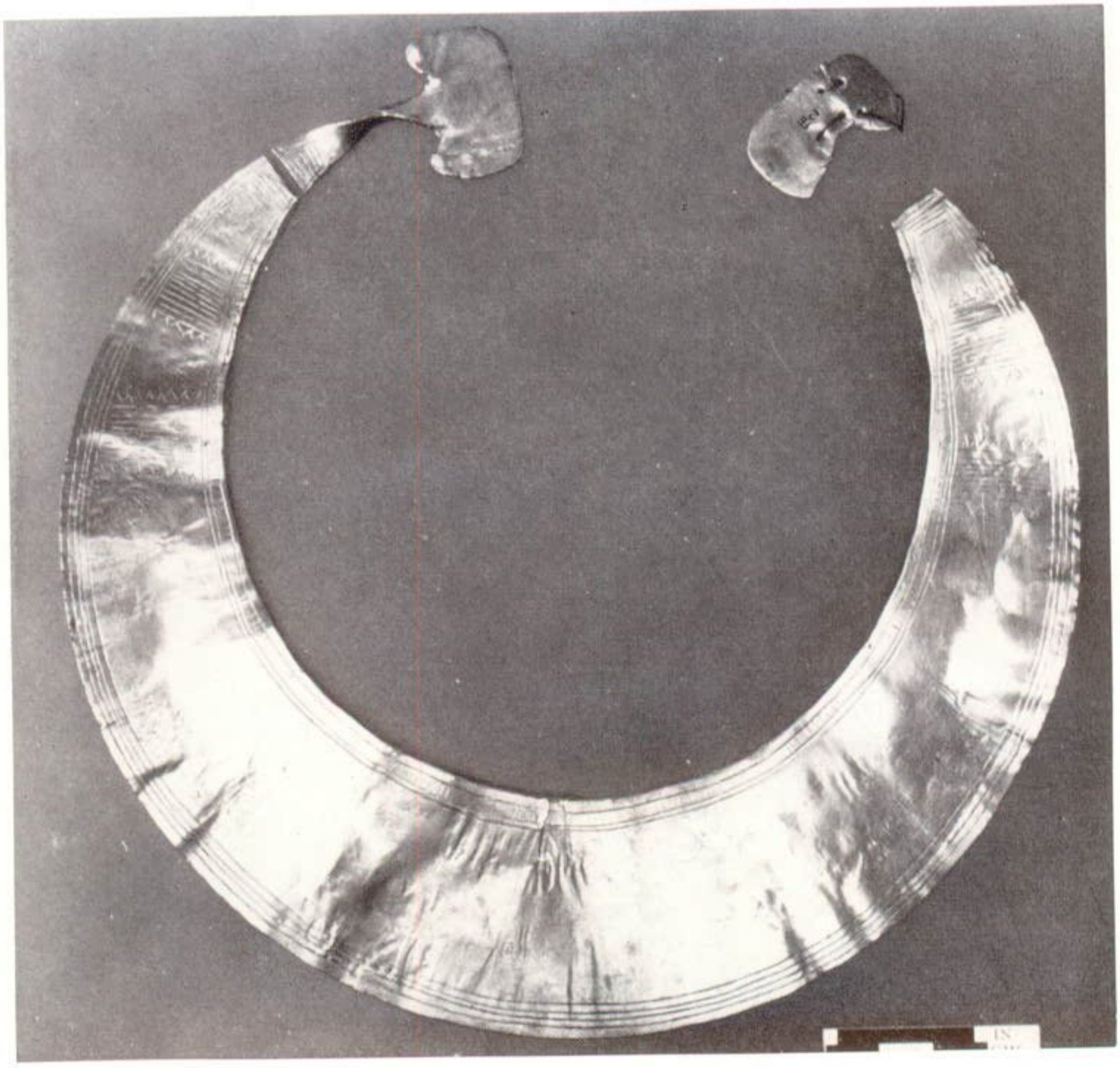
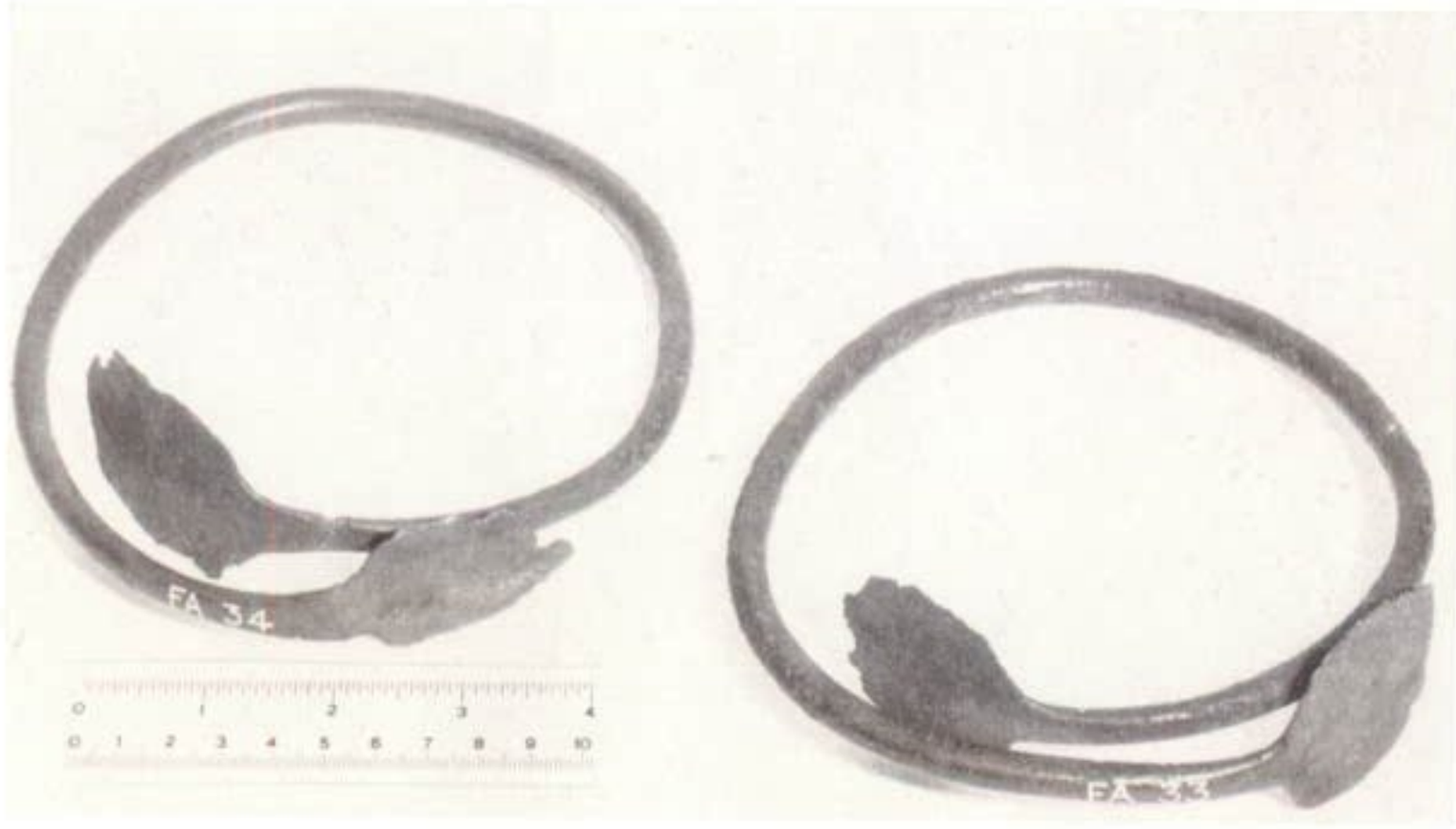


a Gold earring from Orbliston, Morayshire. Photo: J. J. Taylor



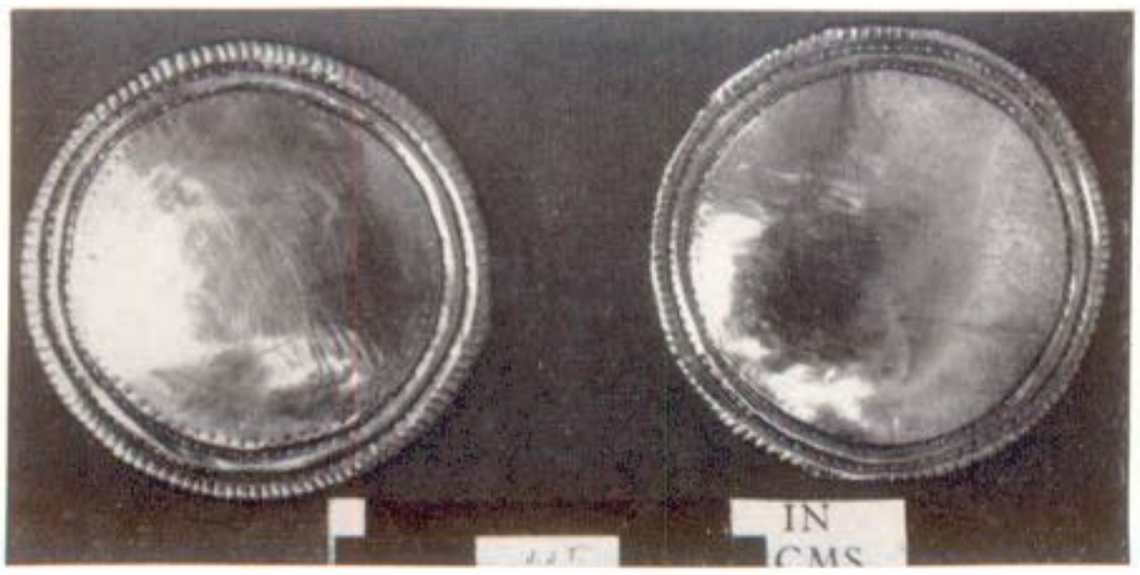
b Gold lunula from Orbliston, Morayshire. Photo: J. J Taylor

a Gold discs from Knowes of Trotty, Orkney. Photo: National Museum of Antiquities of Scotland

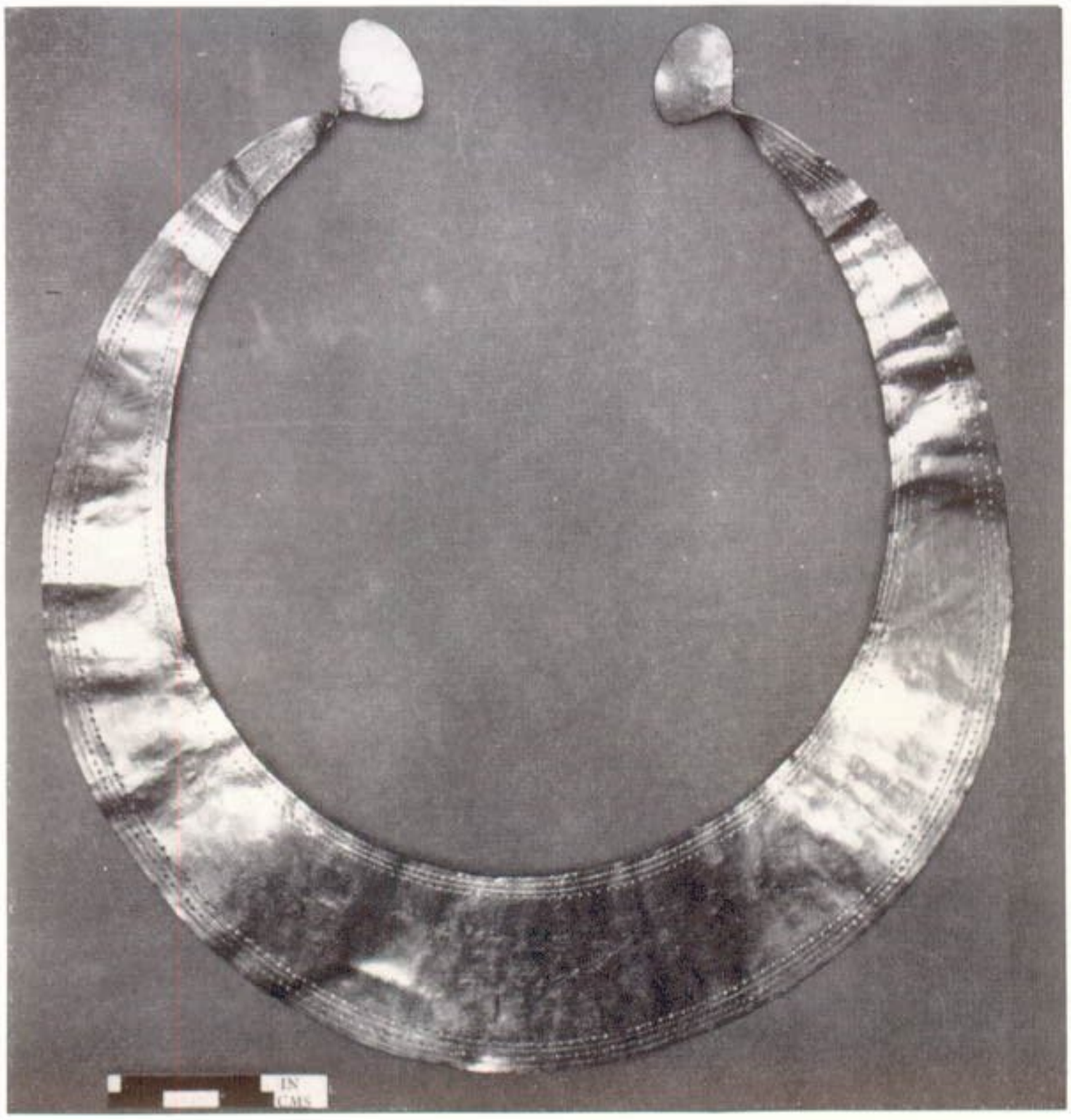


b Copper neckrings from Lumphanan, Aberdeenshire. Photo: National Museum of Antiquities of Scotland

a Hoard from Gavel Moss, Renfrewshire. Photo: Art Gallery and Museum, Glasgow



b Gold discs from Barnhill, Fife. Photo: J. J. Taylor



a Gold lunula from Coulter, Lanarkshire. Photo: J. J. Taylor

b Stone mould from Strathconon, Ross and Cromarty. Photo: Nat. Mus. Ant. Scot.

Gold lunula from Auchentaggart, Kirkcudbright. Photo: J. J. Taylor