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Ben W. Roberts

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Metals and Societies

**Studies in honour
of Barbara S. Ottaway**

Tobias L. Kienlin – Ben Roberts (eds.)

Contents

Ben Roberts – Tobias L. Kienlin

Foreword 9

Caroline Jackson

Of Barbara 11

Christian Strahm

Die Begegnung mit Barbara Ottaway:

Erinnerungen an die Impulse für die frühen akademischen Studien 16

Publications of Barbara S. Ottaway 18

I. Metals and Societies

Christopher P. Thornton

Archaeometallurgy: Evidence of a Paradigm Shift? 25

Martin Bartelheim

Elites and Metals in the Central European Early Bronze Age 34

Rüdiger Krause

Bronze Age Copper Production in the Alps:

Organisation and Social Hierarchies in Mining Communities 47

Tobias L. Kienlin – Thomas Stöllner

Singen Copper, Alpine Settlement and Early Bronze Age Mining:

Is There a Need for Elites and Strongholds? 67

Emma C. Wager

Mining Ore and Making People:

Re-thinking Notions of Gender and Age in Bronze Age Mining Communities 105

Christian Strahm – Andreas Hauptmann

The Metallurgical Developmental Phases in the Old World 116

Ben Roberts

Origins, Transmission and Traditions: Analysing Early Metal in Western Europe 129

Benoît Mille – Laurent Carozza

Moving into the Metal Ages:

The Social Importance of Metal at the End of the Neolithic Period in France 143

Dirk Brandherm

The Social Context of Early Bronze Age Metalworking in Iberia:

Evidence from the Burial Record 172

John Bintliff

Is the Essence of Innovative Archaeology a Technology for the Unconscious? 181

II. Aspects of Copper and Bronze Age Metallurgy

Dušan Borić

Absolute Dating of Metallurgical Innovations in the Vinča Culture of the Balkans 191

Nikolaus Boroffka

Simple Technology: Casting Moulds for Axe-adzes 246

Tobias L. Kienlin – Ernst Pernicka

Aspects of the Production of Copper Age Jászladány Type Axes 258

Mark Pearce

How Much Metal was there in Circulation in Copper Age Italy? 277

Paul Ambert – Valentina Figueroa-Larre – Jean-Louis Guendon –

Veronika Klemm – Marie Laroche – Salvador Rovira – Christian Strahm

The Copper Mines of Cabrières (Hérault) in Southern France

and the Chalcolithic Metallurgy 285

Roland Müller – Ernst Pernicka

Chemical Analyses in Archaeometallurgy: A View on the Iberian Peninsula 296

Susan La Niece – Caroline Cartwright

Bronze Age Gold Lock-rings with Cores of Wax and Wood 307

Trevor Cowie – Brendan O'Connor

Some Early Bronze Age Stone Moulds from Scotland 313

Viktoria Kiss

The Life Cycle of Middle Bronze Age Bronze Artefacts

from the Western Part of the Carpathian Basin 328

Elka Duberow – Ernst Pernicka – Alexandra Krenn-Leeb

Eastern Alps or Western Carpathians: Early Bronze Age Metal within the Wieselburg Culture 336

Marianne Mödlinger – Gerhard Trnka

Herstellungstechnische Untersuchungen an Riegseeschwertern aus Ostösterreich 350

Barbara Horejs

Metalworkers at the Çukuriçi Höyük?

An Early Bronze Age Mould and a “Near Eastern Weight” from Western Anatolia 358

Vincent C. Pigott

“Luristan Bronzes” and the Development of Metallurgy in the West-Central Zagros, Iran. 369

Quanyu Wang – Jianjun Mei

Some Observations on Recent Studies of Bronze Casting Technology in Ancient China 383

III. Approaches to Early Metallurgy

Walter Fasnacht

7000 Years of Trial and Error in Copper Metallurgy – in One Experimental Life. 395

Caroline Jackson

Experimental Archaeology and Education:

Theory without Practice is Empty; Practice without Theory is Blind 400

Salvador Rovira – Ignacio Montero-Ruiz – Martina Renzi

Experimental Co-smelting to Copper-tin Alloys 407

Julia Heeb

Thinking Through Technology – An Experimental Approach to the Copper Axes

from Southeastern Europe 415

Colin Merrony – Bryan Hanks – Roger Doonan

Seeking the Process: The Application of Geophysical Survey

on some Early Mining and Metalworking Sites 421

IV. Studies in Historical Metallurgy

Alessandra Giumlia-Mair – Péter Gaboda – Hedvig Györy – Irén Vozil

Two Statuettes with *ḥmty km* Inlays in the Fine Arts Museum Budapest 433

Nerantzis Nerantzis

Using Mills to Refine Metals: Iron Smelting Technology

of the Transitional Byzantine to Ottoman Period in Macedonia, Greece 443

Paul T. Craddock

Perceptions and Reality: The Fall and Rise of the Indian Mining and Metal Industry 453

List of Contributors 465

Some Early Bronze Age Stone Moulds from Scotland

Abstract

This paper presents details of a number of previously unpublished or relatively inaccessibly published Early Bronze Age stone moulds from Scotland. Viewed in the wider context of Early Bronze Age metalworking in Britain, they are important additions to the inventory of finds, for as well as augmenting the concentration of discoveries long known from northeast Scotland, they expand the distribution southwards into eastern and central Scotland and into the Scottish Borders and therefore go some way to filling the gap that previously existed between Aberdeenshire and Northumberland.

Introduction

Barbara Ottaway's wide-ranging interests in early metallurgy have included bronze production and the practical experimental reproduction of cast objects. Scotland has an unusually rich inventory of finds of Early Bronze Age stone moulds, so we hope that this contribution from the north will not only reflect those interests but will also remind her of her time in Edinburgh, where they were first developed in the course of her doctoral research (and where, one of the writers was told recently by another distinguished student of early metallurgy and contributor to this volume, she had bought him the best steak he had ever eaten!).

This paper presents details of six Early Bronze Age moulds that have been discovered or come to light in Scotland since the early 1980s. As such, we hope that it will usefully complement the most insightful overview of the mould evidence which formed part of Stuart Needham's excellent paper 'Migdale-Marnoch: sunburst of Scottish metallurgy', where he explored many aspects of early metalworking in Scotland (Needham 2004: see especially 223–226). We have therefore mainly restricted ourselves to detailed descriptions and limited discussion of the six moulds in question; two of the finds have been published before (Inglis/Inglis 1983; Cowie 2000), but their details have been included here for reasons explained below.

Previous work

In total, the six discoveries described here represent a significant increment to the inventory of Early Bronze Age stone moulds recorded in Scotland over the previous century. In discussing moulds in *Ancient Bronze Implements*, John Evans (1881: 430) noted the axe mould from Kintore, Aberdeenshire, and the mould for casting rings from Kilmailie, Inverness-shire, amongst others of later date. However, the first detailed discussion of the Scottish material was undertaken by J. G. Callander (1904) in publishing the elaborate mould from Foudland, Insch, Aberdeenshire. In his list of comparative material, Callander noted seven axe moulds from Scotland. Over half a century elapsed before the next general survey, with the publication of Hodges's (1958/59) review of the Scottish and northern English material (complemented by further papers by Hodges [1960] on the English material and by Coghlan/Raftery [1961] on Irish finds, the latter supplemented by a separate paper by Collins [1970] on Ulster). Hodges listed and briefly discussed twelve Early Bronze Age stone moulds from Scotland (Hodges 1958/59: 130–131, 135; note that Hodges's no. 13, Pittdoulzie, can be discounted, as this represents double-counting of the mould from Burreldeals).

Only a few years later Dennis Britton's seminal work on the 'Migdale-Marnoch' metalworking tradition presented the first really detailed consideration of these moulds, their technology and relationship to contemporary metalwork, together with a fully descriptive catalogue of the moulds from Scotland – still with an overall tally of twelve, including Kilmailie (Britton 1963). Working with the same inventory of material, John Coles recognised the potential for matching surviving axeheads to individual matrices, estimating that nearly 50 axeheads could be identified with the 11 axe moulds from Scotland and thus that the extant moulds might account for as much as 20% of the surviving population of axeheads (Coles 1969: 29–33). As part of their corpus of bronze axeheads from Scotland and northern England, Peter Karl Schmidt and Colin Burgess provided brief catalogue entries of the moulds for axeheads, still eleven

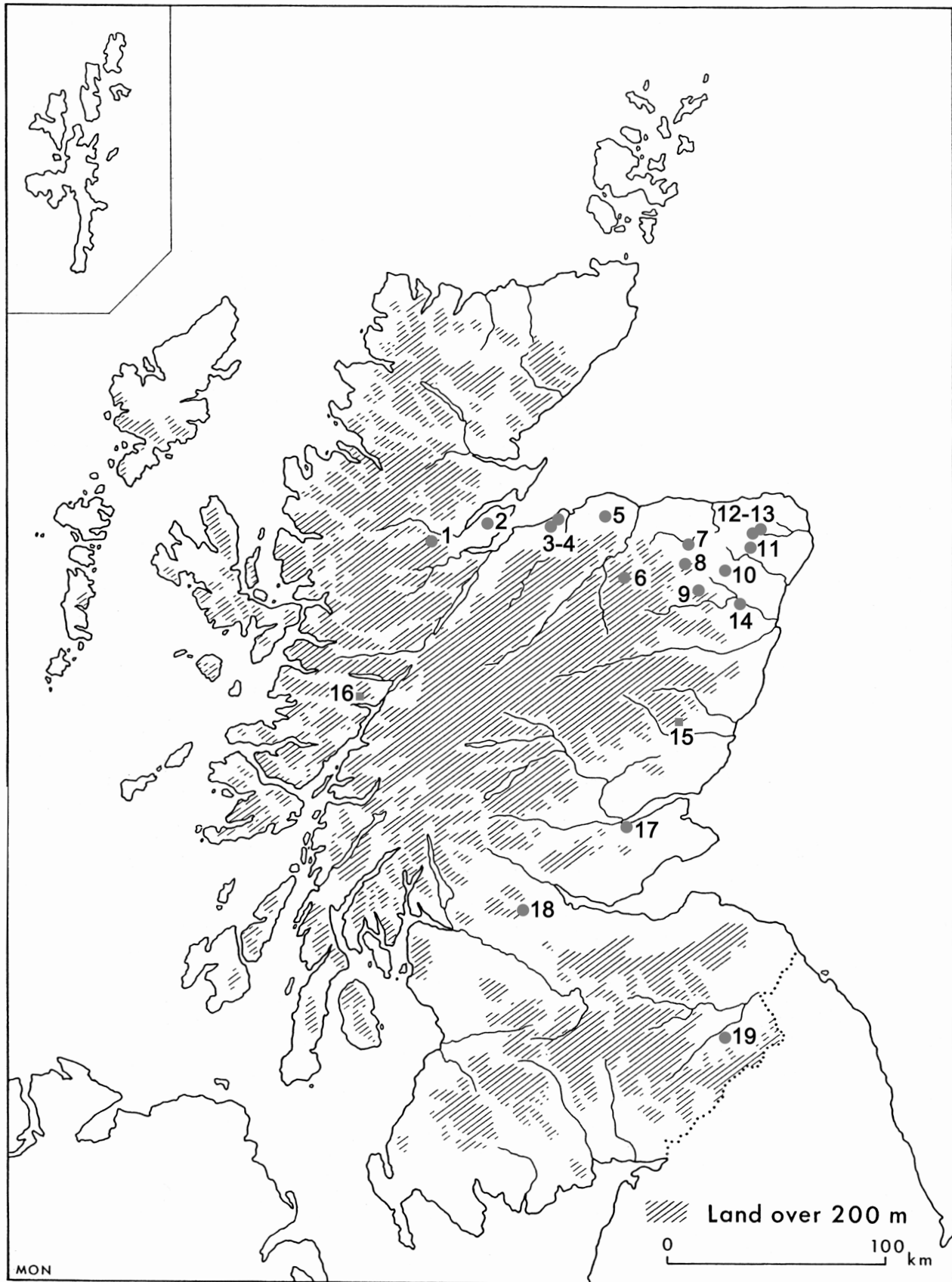


Fig. 1: Map of Early Bronze Age moulds from Scotland (after Needham 2004 with amendments). SB = Schmidt/Burgess (1981) corpus number. 1) Strathconon, Ross-shire (SB 304); 2) Ferintosh, Ross-shire (SB 303); 3) Culbin Sands 1, Moray (SB 301); 4) Culbin Sands 2, Moray (SB 302); 5) Cuttie's Hillock, Elgin, Moray (SB 305); 6) Glenrinnies, Banffshire (SB 299); 7) Marnoch, Banffshire (SB 300); 8) Foudland, Insch, Aberdeenshire (SB 296); 9) East Cruchie, Aberdeenshire (this paper); 10) Burreldale Moss, Aberdeenshire (SB 295); 11) New Deer, Aberdeenshire (SB 297); 12) Mains of Corsegight 1, New Deer, Aberdeenshire (this paper); 13) Mains of Corsegight 2, New Deer, Aberdeenshire (this paper); 14) Kintore, Aberdeenshire (SB 298); 15) Ledmore, Menmuir, Angus – status as mould uncertain (see this paper); 16) Kilmallie, Inverness-shire; 17) Easter Clunie, Abernethy, Fife (this paper); 18) Glenhead, near Denny, Stirlingshire (this paper); 19) Rubers Law/The Dunion, Roxburghshire (this paper). (© NMS: drawing by Marion O'Neil/Craig Angus).

in total, accompanied by illustrations of most of those with identifiable matrices (Schmidt/Burgess 1981: 52–54 and pls. 23–26B); however, for more comprehensive descriptions of those moulds and also related moulds for casting artefacts other than axeheads, Britton (1963: 265–270, 319–325) remains invaluable.

Taking into account the new material that has been found or come to notice since then, the Scottish total now stands at eighteen, comprising seventeen moulds with matrices for axes, to which may be added the mould for casting rings from Kilmaillie (fig. 1). As we have noted above, these have recently been discussed by Stuart Needham (2004: 223–226) as part of his overview of early metalworking in Scotland and mapped together with other Early Bronze Age axe moulds from Britain and Ireland (ibid: fig. 19.8). Drawing on Schmidt and Burgess's corpus and on his own detailed metrical analysis of Early Bronze Age axeheads, Needham recognised that the British and Irish moulds are susceptible to classification on the basis of the axehead matrices and has distinguished three categories: the *Burreldale* series producing what may be regarded as the blank castings for making 'classic Migdale' axeheads; the *Culbin-Walleybourne* series producing 'near-Migdale' type axeheads, and the *Ballyglisheen* series, with axe matrices corresponding with Killaha type axeheads (ibid: 223–224). In summary, Needham's classic Migdale type axeheads are characterised by medium broad butts, lenticular long profiles, medium broad cutting edges and modestly curved sides. By contrast, the 'near-Migdale' axeheads trend away from that classic type; there is some variety – the sides may range from being flared in outline to being noticeably curved – but the class is chiefly distinguished by a tendency to have narrower butts and haft-ends with a consequent effect on their overall proportions. Although subtle, Needham has shown that these distinctions appear to have geographical and possibly also chronological value, the distribution of 'near-Migdale' axeheads being predominantly southern British (ibid: 220–221). First distinguished by Harbison (1969: 24–32), Killaha type axeheads are characterised by their proportionately broad form and distinctive broad cutting edges and have an overwhelmingly Irish distribution (see also Schmidt/Burgess 1981: 33–35).

The chronology of the stages of early metalworking has also become progressively better understood since the 1970s – so that the main series of stone moulds can be related to that stage of the Early Bronze Age in Britain which saw the introduction of full tin-bronze metallurgy and the currency of the Migdale/Brithdir metal assemblage – a vigorous phase of change now firmly datable to the period from c. 2150–2000 (Needham 1996: 130; Rohl/Needham 1998: 88; Needham 2007: 289). As Needham has noted, with a matrix for casting Dunnottar type axeheads – made of bronze but resembling copper axes in form (Needham

2004: 223–224, fig. 19.9) – the mould from Glenrinnies, Moray, stands at the head of the series of Burreldale type moulds and is arguably the earliest typologically of all the moulds found to date in Britain. In his discussion of copper axes Dennis Britton perceptively noted that stone moulds with matrices that could have produced flat axeheads of the forms known solely in copper were unknown, as opposed to the bronze types made from the moulds considered here (Britton 1963: 261; Allen/Britton/Coghlan 1970: 54). At least for Scotland, this is still the case. So whether or not the matrix was used for casting in copper or bronze, there may have been a change in casting technology with the introduction of bronze.

Finds from Scotland since 1980

1–2.) Mains of Corsegight, New Deer, Aberdeenshire (fig. 2)

Circumstances of discovery:

Two moulds have been found on separate occasions by Mr. C. Coutts on the farm of Mains of Corsegight, New Deer, Aberdeenshire (in the present local authority area of Aberdeenshire Council, and formerly Grampian Region).

The first (our Mains of Corsegight 1) was initially recorded in 1982 (Shepherd 1982) and was subsequently reported and donated to the Marischal College Museum (now the Marischal Museum) at the University of Aberdeen. This mould was published by J. C. Inglis and R. B. Inglis (1983) but it is convenient to summarise the details again here. The location of the find was a field on a low eastward sloping flank of a low hill (NGR: NJ 845 499; not shown on the Ordnance Survey map but known locally as 'Redhill'). Inglis and Inglis drew attention to the presence of nearby archaeological sites – a promontory with the remains of a ditch enclosing its southern end and traces of what may have been the ditch of a ploughed-out earthwork revealed when a drain was laid close to the findspot of the mould.

The following year, a second mould was discovered in the same field (probably at NGR: NJ 849 499); precise findspots are lacking but the relatively small size of the field suggests they cannot have been more than about a hundred metres apart at most. Apart from a note in *Discovery and Excavation in Scotland* (Inglis 1984) and entries on the University of Aberdeen web-based LEMUR database (<http://www.abdn.ac.uk/virtualmuseum>), this find has not previously been fully described or illustrated. For convenience, both Corsegight moulds are therefore described below and the opportunity has been taken to have them drawn to a uniform style. Both finds are mentioned and mapped by Needham (2004: 223, fig. 19.8), where they are referred to as New Deer 2 and 3 respectively, New Deer 1 being a stone mould with matrices for

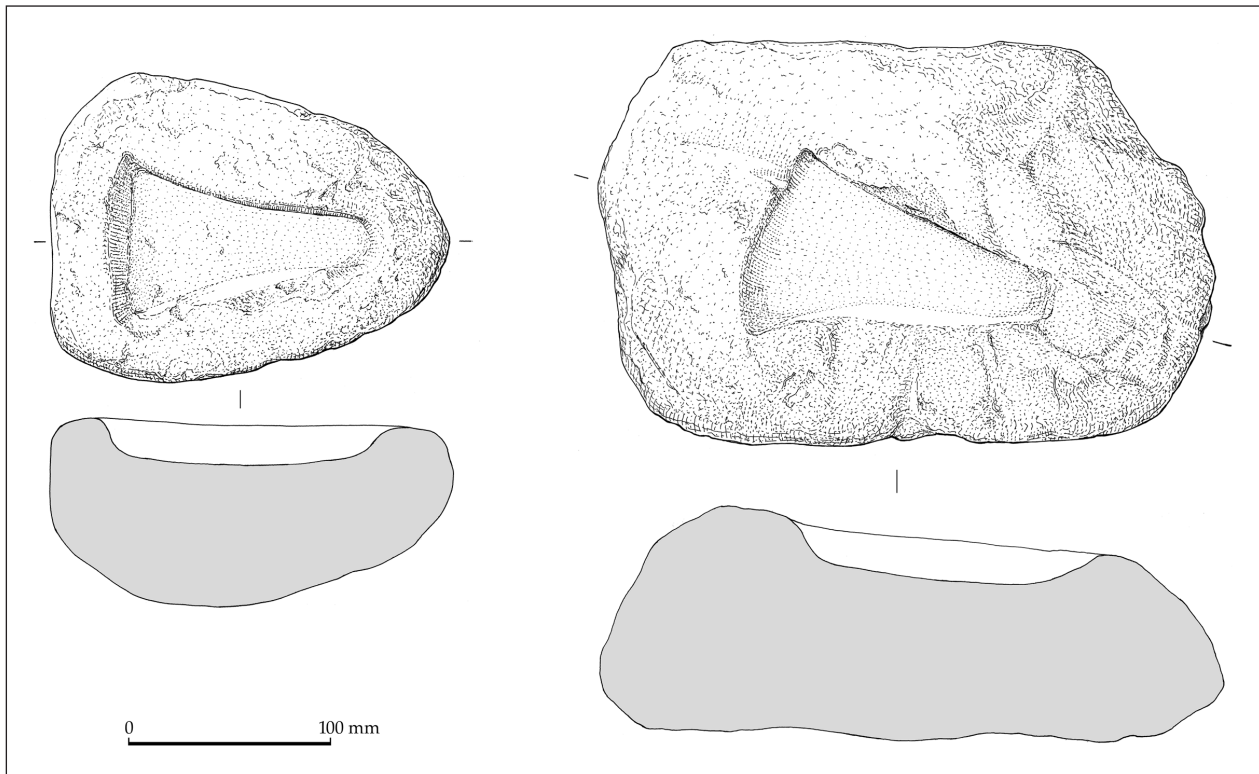


Fig. 2: Stone moulds from Mains of Corsegight 1 (left) and 2 (right), New Deer, Aberdeenshire (© NMS: drawing by Jan Dunbar).

two flat axes and a bar, found about 1902 and with only a general parish provenance (see Schmidt/Burgess 1981: 53, no. 297, pl. 24).

Description:

Mains of Corsegight 1 (= New Deer 2 in Needham 2004)

A single matrix for an axehead of Needham's (2004: 223) 'near-Migdale' type is carved into the flattened or only slightly convex upper surface of a relatively small stone, irregularly pear-shaped in plan with a rounded keel-like cross-section; the sides have probably been coarsely worked to reduce their bulk. The stone is grey to greyish-red in colour, though reddish where exposed by scuffing or damage in the ploughsoil. Overall it is in good condition apart from one longitudinal scrape on the surface of the mould face and another on the base of the stone. Overall dimensions: length 159 mm; width 123 mm; thickness 72 mm. Weight: 1.40 kg.

The matrix for the axehead is complete but damaged at several points along one side, and it has been suggested that this may have occurred during the removal of the castings, an interpretation apparently supported by the presence of discolouration both inside and outside the matrix (cf. Inglis/Inglis 1983: 636, who refer to metallic traces). The absence of similar damage to the other side might support this explanation of wear-and-tear damage associated with use, rather than accidental damage (whether ancient or modern). Consequently, one side preserves the 'clean'

outline of the blade from butt to cutting edge whereas the other is defaced and incomplete. The overall form and dimensions are clear – from the rounded butt, the sides of the matrix expand in an even concave curve before flaring slightly to meet the tips of the cutting edge. The intact side has a near vertical edge; the damaged side appears to have been slightly more angled, which would have resulted in an asymmetrical casting. Dimensions: length 112 mm; width (cutting edge) 69.5 mm; width (butt) 20 mm; average depth 15 mm.

Present location: Marischal Museum, Aberdeen (accession no. ABDUA: 15503).

Mains of Corsegight 2 (= New Deer 3 in Needham 2004)

A single matrix for an axehead of Needham's (2004: 223) 'near-Migdale' type is carved into the upper surface of a block of sandstone; the sides of the block have probably been dressed, resulting in a roughly rectangular shape in plan; on the underside, the reasonably flat, natural weathered rock surface provides a stable base and the stone appears to be largely unmodified; the upper surface is at a slight angle resulting in a wedge-shaped longitudinal section. The stone is a darker reddish-brown colour than Corsegight 1. Apart from one of the sides, all the surfaces bear plough scars, scratches and scuffs; despite this, the matrix for the axehead is virtually undamaged. Overall dimensions: length 245 mm; width 158 mm; thickness 89 mm. Weight: 4.50 kg.

The matrix indicates a casting of an axehead of slightly different form from Corsegight 1, in this case with a more flattened butt and more evenly concave sides. The interior of the matrix is a slightly darker grey colour, possibly indicative of use, and intact apart from two or three minor scratches on its base. The matrix is quite deeply cut and is mostly intact apart from an irregular spall at the left hand side of the cutting edge which has probably resulted in the loss of the tip; originally the width of the cutting edge may have been c. 75–80 mm. The absence of any obvious plough scar at this point might indicate that the loss of this area is not recent and could have occurred in antiquity. Dimensions: length c. 122 mm; width (cutting edge) c. 72 mm (originally c. 75–80 mm?); width (butt) 20 mm; depth varies from 17–18 mm.

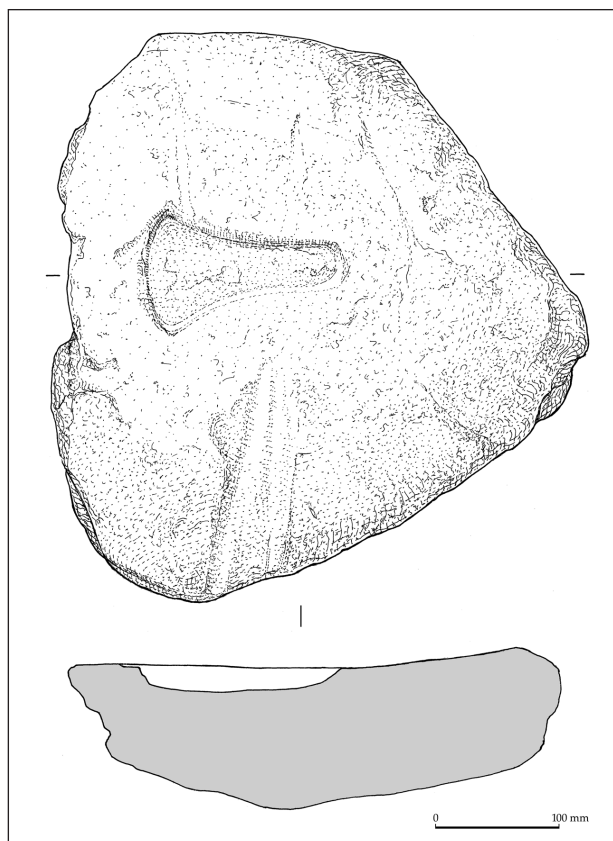
Present location: Marischal Museum, Aberdeen (accession no. ABDUA: 15947).

3. East Cruchie (or Cruichie), Drumblade, Aberdeenshire (fig. 3)

Circumstances of discovery:

A boulder with a single matrix for a flat axehead was found in 1975 on East Cruchie Farm, Drumblade, near Huntly, Aberdeenshire (NGR: NJ 5889 4249), and was reported to the local authority archaeological service by the farmer Mr. R. Johnstone (Greig 1975). The findspot lay to the southeast of the farm buildings in

Fig. 3: Stone mould from East Cruchie, Aberdeenshire (© NMS: drawing by Jan Dunbar).



an arable field sloping down to the Drumblade Burn and it is likely that the stone had been dragged down-slope in the course of ploughing (Ian Shepherd pers. comm.). No prehistoric sites have been recorded in the immediate vicinity.

Description:

An irregularly shaped slabby boulder of light grey schistose stone contains a single matrix for a flat axehead of 'near-Migdale' type, occupying a small space relative to the surface area of the stone. Part of one end has broken away and but otherwise the original overall shape and form of the boulder appears to be unaltered. It is possible that the underside has been partially dressed to create a more level surface; however, an area of the upper surface c. 150 by 200 mm across has been artificially worked and prepared by pecking and then probably smoothed by use, suggesting that prior to the carving of the axehead matrix, the boulder may have been used as a saddle quern, so any modification of the base very probably relates to its earlier use. The worn surface extends to the break edge; this and the reasonably central position of the axe mould may indicate that the quern was already broken when this was carved (rather than fracturing after its use as a mould). Certainly, this mould is unusual in that the matrix takes up only a small proportion of the surface of the stone and this is best explained as a function of its reuse. Plough scars (up to 20 mm in width) run across the upper surfaces, deeply enough to have removed the weathered surface of the stone to reveal the underlying lighter grey surface. Dimensions: length 374 mm; width 350 mm; thickness 92 mm. Weight: 17.60 kg.

Cut into the area smoothed by use as a quern, is a single matrix for a flat axe; as cast, the axehead would have expanded from the gently rounded butt in an even concave curve to the tips of the cutting edge. In places, the base of the matrix is chipped (one flake being up to 17 mm long) but is otherwise sound. The sides of the matrix are steep but slightly sloped rather than vertical. Dimensions: length 132–133 mm; width (cutting edge) 76–77 mm; width (butt) 30–31 mm; depth varies from 13–15 mm.

Present location: Marischal Museum, Aberdeen (accession no. ABDUA: 37856).

4. Easter Clunie, Abernethy, Perthshire (fig. 4)

Circumstances of discovery:

This previously unpublished mould was discovered by Mr. D. Baird 'about thirty years ago' (i.e. during the late 1970s) in an arable field to the west of Easter Clunie Farm, on the Perthshire/Fife county boundary near Newburgh (NGR: c NO 21 17). The findspot lies within the present local authority area of Perth and Kinross Council (formerly part of Tayside Region). The mould remains in private possession.

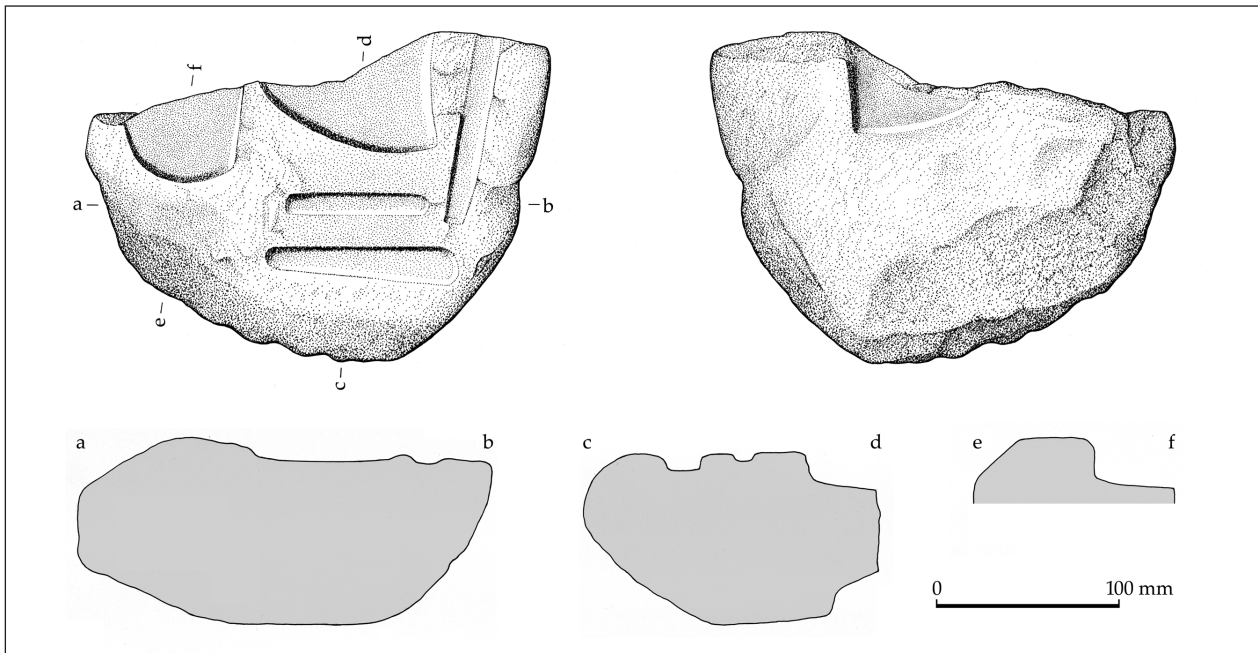


Fig. 4: Stone mould from Easter Clunie, Abernethy, Perthshire: Face A, left; Face B, right (© NMS: drawing by Marion O'Neil).

Description:

Broken sandstone block with a minimum of six matrices carved into the upper and lower surfaces – two of them for flat axeheads; one possibly for a large blade; one for a small axehead or chisel, and two for bars (described in detail below). The block is composed of reddish sandstone and was probably worked from a small boulder; it has a relatively level upper surface, from which the sides taper inwards to form a fairly broad, level base. A series of flake scars on the surviving end suggest that parts of the stone have been prepared by dressing to reduce unnecessary bulk. The stone has broken leaving the original overall shape uncertain: however in order to allow space for the matrices of the two flat axeheads indicated on the upper face, the block must have been almost as large again. If dressed to reduce weight and accommodate the matrices with as economical a use of space as possible, then it may have had a roughly oblong form with relatively straight sides and rounded ends. Despite its recovery from a ploughed field the stone shows little modern damage apart from some minor scratches and scuffs, and the main breakage has the appearance of being old, if not ancient. Overall the stone is in remarkably good condition; however as a result of being kept in the open in a garden, the sides and underside of the stone have developed extensive green algal growth and require conservation; this may also be obscuring some details of the matrices such as tool marks. The only other significant modern damage is an elongated splash of paint which defaces the upper surface between the matrices. A whitish deposit in one of the bar matrices is possibly due to salts leaching out. Overall dimensions: length 250 mm; width 195 mm; thickness 109 mm. Weight: 4.16 kg.

Face A: the upper surface has five matrices cut into it, of which two are still complete. The matrices consist of:

1) Flat axe. Matrix for a large flat axehead, possibly of Killaha type, represented by most of the cutting edge and part of one concave side; remainder missing due to breakage of mould. The width of the matrix at the cutting edge was at least 100 mm but is unlikely to have been more than 105 mm. The matrix is of considerable depth with steep, well defined sides and a steeply rising blade profile. There has been some abrasion of part of the cutting edge. Dimensions: length not known; width (cutting edge) at least 100 mm (estimated original width c. 100–105 mm); width (butt) not known; depth c. 18.5 mm. The surviving portion of the cutting edge indicates an axehead of considerable size: its possible significance is discussed below. Comparison with axeheads in the National Museums of Scotland collection suggests that the original length of the matrix may have been in the range 140–160 mm; if so, this would indicate that perhaps as much as half of the length of the mould has been lost as a result of breakage. The products of this matrix would have had a distinct angle between one face and the cutting edge. This feature may have been designed to assist the production of a sharp edge after casting. By chance, one of the authors recently saw on display in Lough Gur Visitor Centre an axehead with this feature, from Knockadoon Hill, Co. Limerick.

2) Matrix of uncertain form, but possibly for a large dagger blade (Stuart Needham, pers.comm.), represented by most of the rounded heel and part of one straight side, the remainder missing due to the breakage of the stone. The width of the matrix appears to

have been at least 62 mm, and most probably lies in the range from c. 65–70 mm, with a pronounced curve relative to width. The matrix is of considerable depth (up to 24 mm at the corner of the blade), with steep, well defined sides and a steeply rising profile at the heel. Dimensions: length not known; width (? heel of blade) at least 62 mm (estimated original width c. 65–70 mm); depth varies from 16–24 mm.

3) Small axe or chisel. Intact matrix for a small elongated axe or chisel; in outline, the form is tapered with ends slightly rounded off; the cross-section rectangular to slightly trapezoidal; in longitudinal profile, the cutting edge is steeper and more abrupt than the butt end. Dimensions: length 108.5 mm; width ('cutting edge') 21 mm; width (butt) 13.5 mm; depth varies from 7–9 mm.

4) Bar. Intact matrix for a bar; almost straight apart from a very slight expansion from one end to the other; the ends rounded, one more so than the other; the cross-section sub-rectangular/trapezoidal. Dimensions: length 77.5 mm; width 11–11.5 mm; depth 5–5.5 mm.

5) Bar. Incomplete matrix for a bar extending to break edge so overall length unknown; one side of the matrix is damaged where the division between this and the adjacent flat axe matrix has been lost (probably when the mould fractured); surviving end rounded. Trapezoidal cross-section. A slight channel joins this to the end of the adjacent matrix but this appears

to be due to modern damage. Dimensions: length at least 103 mm; width 17 mm; depth 7–7.5 mm.

Face B: the surviving portion of this face has a single matrix cut into it.

6) Flat axe. Carved into the irregular broad base of the stone is the incomplete matrix for a flat axehead, represented by most of the cutting edge and part of one concave side; the remainder is missing due to breakage of mould. The width of the matrix at the cutting edge has been at least 74 mm – and most probably lay in the range from c. 75–80 mm. The matrix is of considerable depth with steep, well defined sides and a steeply rising blade profile. Some chisel traces appear to be present on the sides of the matrix. Dimensions: length not known; width (cutting edge) at least 74 mm (estimated original width c. 75–80 mm); width (butt) not known; depth varies from 12–14 mm.

Present location: currently in private possession (details with NMS).

5. Glenhead Farm, Carron Bridge, near Denny, Stirlingshire (fig. 5)

Circumstances of discovery:

This has been published in detail by one of us (Cowie 2000), but as the journal in question is not easily or widely accessible, this paper offers an opportunity to summarise the main features of this find, the first Early Bronze Age mould from central Scotland.

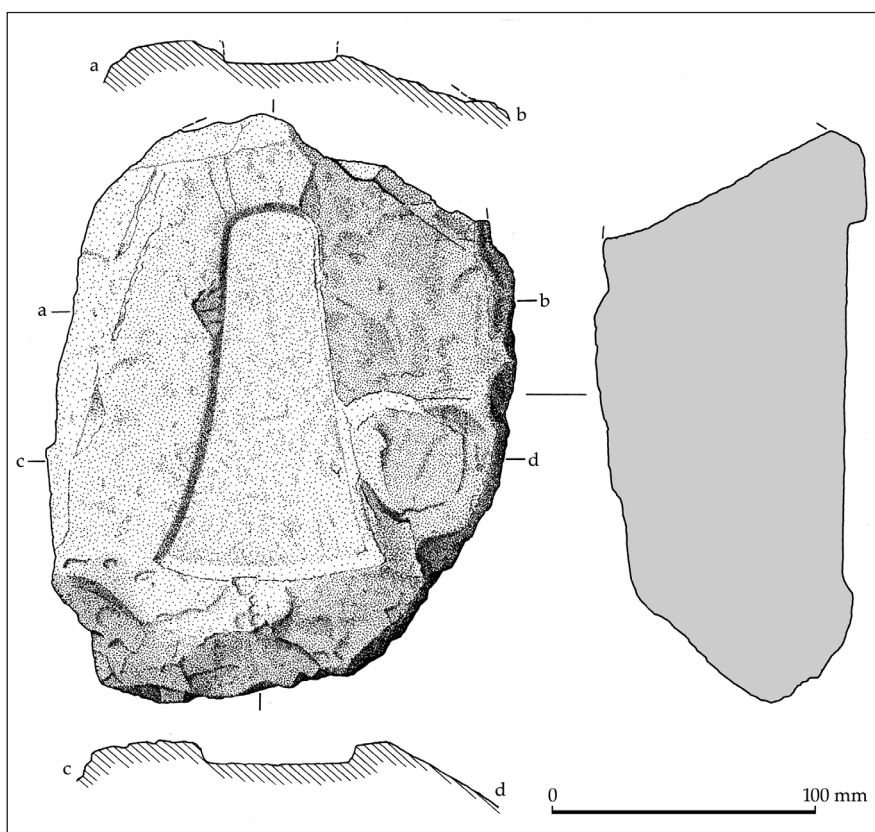


Fig. 5: Stone mould from Glenhead, Carron Bridge, near Denny, Stirlingshire (© NMS: drawing by Alan Braby).

The stone mould was found in June 1997 by Mr. David Petch at his farm at Glenhead, Carron Bridge, near Denny in Stirlingshire (NGR: NS 757 850), where it had apparently been grubbed up by his pigs among loose stones and rubble on the eastern edge of the farm buildings. The circumstances suggest that the mould has almost certainly been re-deposited since the 18th century AD and the original context and circumstances of deposition are unknown. However, there seems no real reason to doubt a relatively local provenance.

Description:

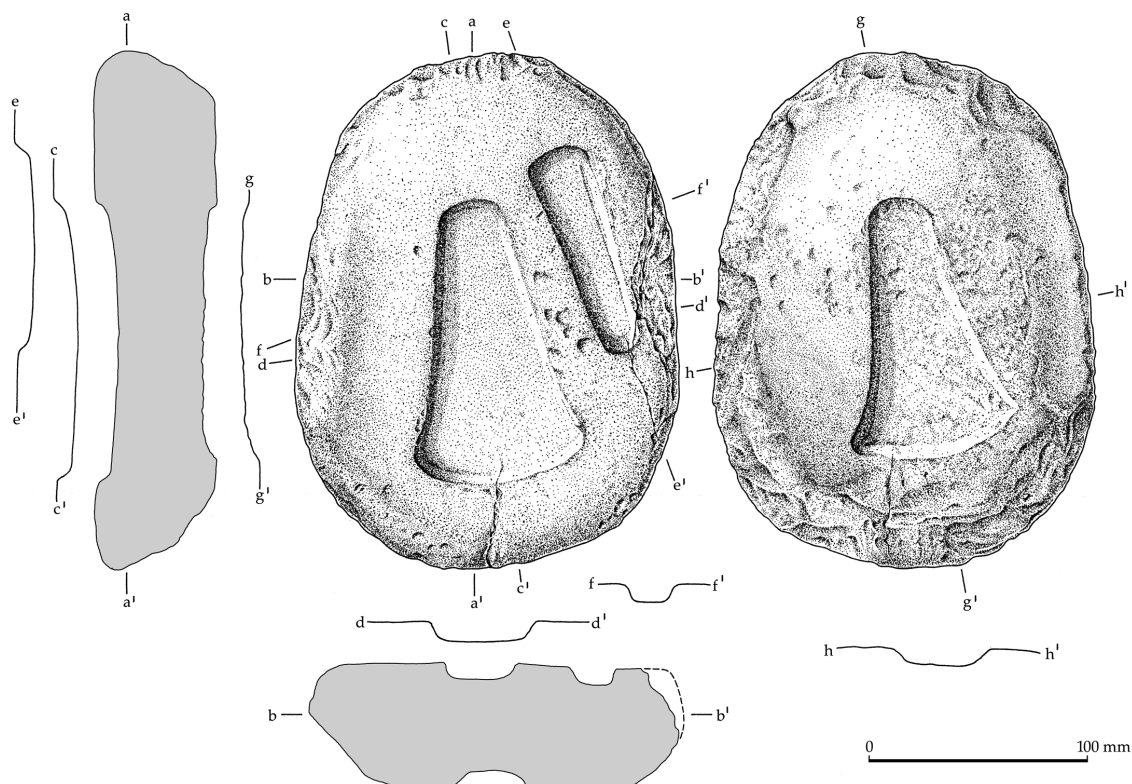
The object consists of a rather irregular sub-rectangular block of red sandstone whose flat upper surface contains a single matrix for a flat axehead of 'classic Migdale' type. The parent block has been fashioned from a small weathered boulder, but at least some of the faces appear to have been roughly dressed to reduce its bulk. The stone has a small number of clearly fresh scuffmarks and scratches, but given the find circumstances, there is remarkably little damage that is obviously modern. However, differential coloration and weathering suggest that the block has incurred damage on at least two separate occasions in the past. At some stage, one end of the block has sheared off completely (see longitudinal cross-section): this level of damage could be accounted for if the block of stone was

accidentally incorporated into the rubble make-up of the farm steading, as suggested above. However, the condition of the stone suggests that the upper surface had also been damaged at an earlier stage in the history of the object. On the face bearing the matrix, the loss of a large spall of stone has reduced the depth of the matrix to about 2 mm (see cross-section A-B), and while the outline of the matrix is still clearly visible, this would not have been viable for casting. Admittedly, it is possible that this spall was detached at a much later date, but if the damage to this surface was incurred at the time of the manufacture of the mould, this could possibly have resulted in its premature discard or deposition. Overall dimensions: length 220 mm; width 175 mm; thickness: 95–105 mm. Weight: 4.14 kg.

The matrix for the axehead is almost intact despite the alteration of the outline at the rim due to the loss of the large flake of stone noted above. From the curved butt, the sides appear to have expanded in an even concave curve to meet the tips of the relatively shallow cutting edge. The base of the matrix seems to be relatively freshly pecked and shows no obvious signs of use, strengthening the possibility that detachment of the flake may have rendered the matrix unserviceable. Dimensions: length 142 mm; width (cutting edge) 91 mm; width (butt) 34 mm; depth varies from 6.5–8.5 mm.

Present location: Falkirk Museum (FALKM.1998-37).

Fig. 6: Stone mould from Rubers Law/The Dunion, Roxburghshire: Face A, left; Face B, right (© NMS: drawing by Sylvia Stevenson).



6. 'Rubers Law' or 'The Dunion', Roxburghshire (figs. 6–7)

Circumstances of discovery:

This artefact formerly belonged to the late Councilor George Dorward of Hawick who very kindly allowed it to be recorded by the National Museum in the 1980s. The mould had been given to Mr. Dorward by an acquaintance who was by that time deceased. Nothing is now known about the precise find circumstances but it was allegedly found on either Rubers Law near Hawick or The Dunion near Jedburgh, both well-known hills in Roxburghshire (within the present local authority area of the Scottish Borders Council, or former Borders Region). It has not previously been published apart from passing mention (Cowie 2000: 101; Needham 2004: 323, where the location is referred to as the 'Jedburgh area').

Rubers Law and The Dunion are important archaeologically, both hilltops being crowned by significant hill-forts (Rubers Law: RCAHMS 1956: no. 145; Dunion: *ibid.*: no. 33, Rideout 1992: 73–119). Given that nothing is known about the precise circumstances of discovery, it is quite possible that the attribution of the findspot to such well-known local archaeological sites might simply reflect an element of wishful thinking; however, in correspondence with one of the writers, Mr. Dorward did incline towards Rubers Law. If these place-names were being used as convenient shorthand for the locality of the find, Rubers Law is possibly the more plausible candidate, since a number of arable fields on the lower slopes have produced a range of prehistoric artefacts (*cf.* Primrose 1958; Stevenson 1958). In any case, while the loss of a reliable location is regrettable, there seems no reason to doubt a Roxburghshire provenance.

Description:

The mould comprises a block of sandstone with matrices for an axehead and a small axehead or chisel on one face and a further axehead on the reverse. Needham (2004: 223) has identified this mould as one of his Culbin-Walleybourne series moulds, which would have produced castings of 'near-Migdale' type axeheads. The block of stone has apparently been dressed around most of its periphery into an oval shape, with rounded ends, but the presence of some original, undressed areas around the sides suggest the utilisation of a small flattish boulder whose natural surfaces probably required only a limited amount of preparation prior to the creation of the matrices. However, some preparation was certainly carried out on the underside (face B), while the upper face (face A) has also been well smoothed, although this may have been accentuated in the course of use. As a result, the block of stone sits virtually level on both faces. The stone has a dark grey weathered surface but where the upper surface has been rubbed or

scuffed it is a lighter reddish-brown colour; unweathered rock shows through grey. The overall condition is good apart from what is probably mainly modern impact damage, but as nothing is known about the circumstances of discovery it is uncertain whether this was incurred in the ground or after recovery. One sizeable crack appears to extend from the lip of the blade end of the larger matrix to the edge of the mould, but this has been filled with tinted plaster. A small flake has been detached from the side adjacent to smallest matrix, and beyond this a further hairline crack has developed. Some small flakes have clearly been detached from the surfaces of the mould in the recent past as their loss has revealed the underlying unweathered surface; however small areas of spalling on the upper surface (particularly between the two matrices) are matt and weathered and more likely to be ancient. Overall dimensions: length 235 mm; width 175 mm; thickness 55 mm. Weight: 2.81 kg.

Face A is relatively level apart from a slight undulation towards one side. The artificially smooth surface accommodates two matrices, as follows:

- 1) Flat axe. From the gently curved butt the sides diverge before expanding slightly to meet the rounded tips of the cutting edge; the expansion of the right-hand tip is slightly more pronounced than the other but overall the matrix is neatly and symmetrically cut. The floor of the matrix is smooth. Dimensions: length 128 mm; width (cutting edge) 75 mm; width (butt) 24 mm; depth varies from 6–9 mm.
- 2) Small axe or chisel. Intact matrix for a small elongated axehead or chisel; in outline, the form is tapered with slightly rounded off ends; the cross-section is trapezoidal; in longitudinal profile, the cutting edge is steeper and more abrupt than the butt end. Dimensions: length 95 mm; width ('cutting edge') 29 mm; width (butt) 14 mm; depth varies from 6–8 mm.

Fig. 7: Stone mould from Rubers Law/The Dunion, Roxburghshire: Face A, left; Face B, right. Note the unused matrix on the lower face (© NMS).



Face B: The opposite surface is considerably more uneven, with more pronounced undulations and around much of one side and end an attempt has been made to reduce the unevenness of the original boulder surface by pecking.

3) Flat axe. From the gently curved butt the sides expand in a concave curve to meet the tips of the cutting edge; overall the matrix is neatly and symmetrically cut. Although clearly intended for casting an axehead of Migdale type, the matrix on this face is clearly unfinished, the floor of the matrix still being in a rough pecked state while its edges lack the definition and clarity of matrix (1). Preparation of the matrix appears to have involved the extraction of the stone using a pecking technique, in this case abandoned prior to final grinding and smoothing of surface (fig. 7). Dimensions: length 116 mm; width (cutting edge) 76 mm; width (butt) 25 mm; depth varies from 4–6 mm.

Present location: formerly in private possession (current whereabouts uncertain).

The possible mould from Ledmore (fig. 8)

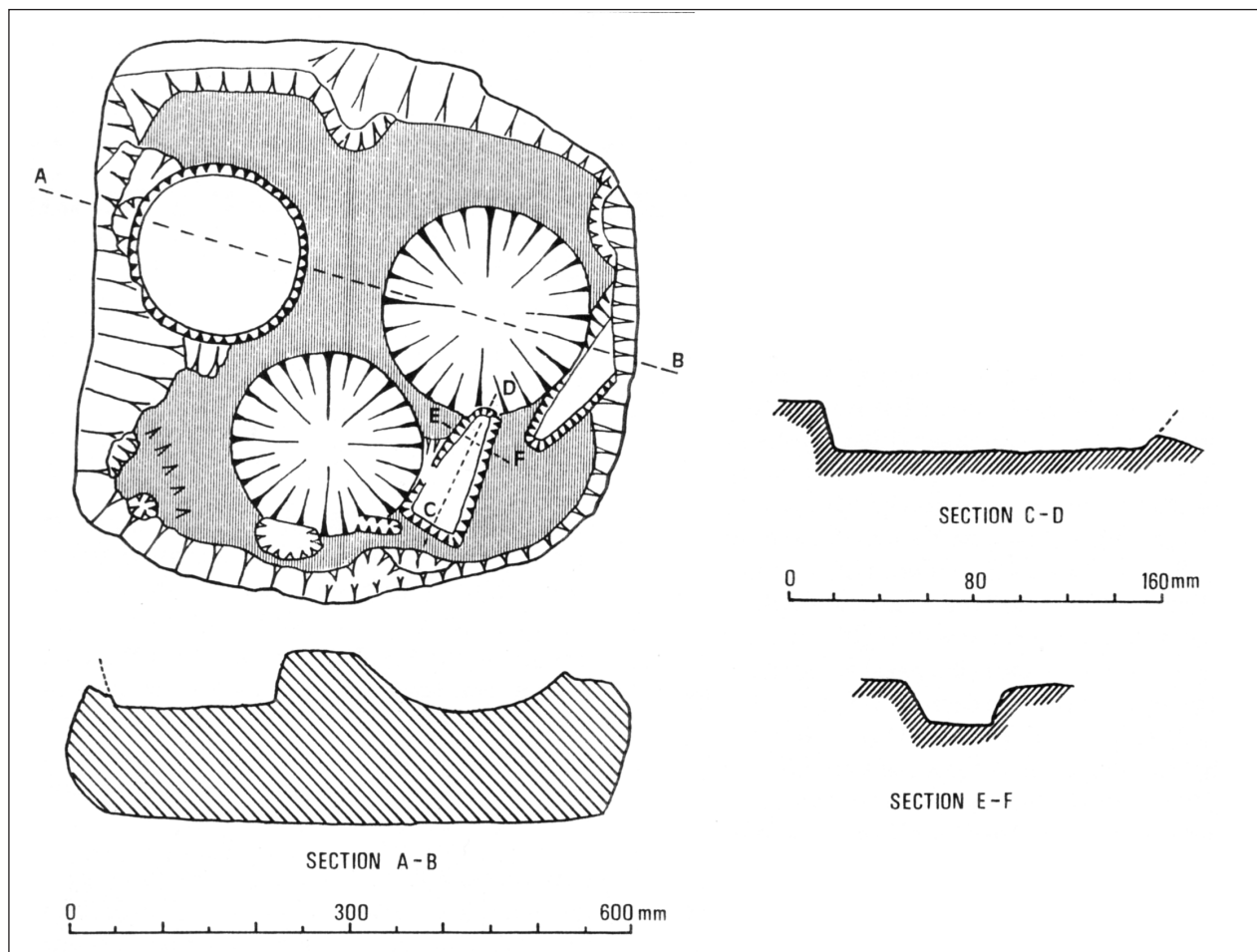
One other object which needs to be mentioned in the context of this review of recent finds is the curious

carved stone recorded at Ledmore, Menmuir, Angus, and interpreted as a possible Early Bronze Age mould (Sherriff 1997). The present writers have had no opportunity to examine this object, but on the basis of the published evidence we are not convinced by this interpretation so we have not included it in our catalogue for this paper.

As Sherriff himself recognised, the large overall size of the parent block (590 mm by 585 mm and up to 180 mm in thickness) sets it apart from all the other known Early Bronze Age moulds from Britain and Ireland nearly all of which are relatively portable (ibid: 55, fig. 1d). While the bulkiness of the stone does not necessarily preclude such comparison – though we have noted above that the East Cruchie mould is unusually large at 374 by 350 mm – the dimensions and rather elongated triangular shape of the alleged matrices also set them apart from typical matrices for flat axeheads (ibid: 57, fig. 1c). Sherriff suggests that this may reflect the production of crude ingots rather than the more accomplished castings of the typical moulds.

Some rather crude straight-sided triangular ‘axe-heads’ (Schmidt/Burgess 1981: e.g. nos. 259 ‘Angus’, 260 ‘Aberdeenshire’ and 261 Scotland [? Lanarkshire/ Peeblesshire]) do occur among the unclassified flat

Fig. 8: Possible mould from Ledmore, Angus. The circular depressions are secondary features (after Sherriff 1997).



axes from Scotland, so the hypothetical possibility of simple triangular matrices can perhaps not be ruled out entirely. Also it is worth recalling the unusual mould from New Mills, Newtown, Powys (Green 1985). This has matrices presumably for flat axeheads but of forms that cannot readily be matched among surviving Bronze Age metalwork, suggesting that we may not yet have a complete picture of the range of moulds or their products. However, while it is entirely possible that various forms of axe-shaped ingots were in circulation and may by their very nature be under-represented in the archaeological record, the axe-like ingots that *are* known tend to resemble rough castings of axes and are not of an elongated triangular form (Schmidt/Burgess 1981: 30, especially no. 40 from Perth; for Irish examples, see Harbison 1969: 22–24, pls. 17–18). In sum, while accepting that the features described by Sherriff may well represent matrices of some kind (though not necessarily for casting bronze), the object stands apart from the *known* moulds on so many grounds that attribution of an Early Bronze Age date currently appears to require special pleading. While its possible date and function certainly merit further consideration, they remain very uncertain, and the Ledmore mould is not discussed further here.

Discussion: how do the new finds change the existing picture?

Circumstances of discovery

The discoveries described in this paper include moulds found in ploughed fields at Mains of Corsegight and East Cruchie, both in Aberdeenshire, and at Easter Clunie, near Newburgh in Fife, while the specimen found at Glenhead Farm in Stirlingshire was grubbed up by pigs (see above for details). In the case of the fine mould from the Scottish Borders the circumstances of discovery are uncertain, as the original finder had died and the eventual reporter of the find was in some doubt about the findspot, with the environs of Rubers Law near Hawick being the more likely of the two alleged locations. As chance surface finds, no significant light has been shed on the original context of any of these moulds but the potential for further fieldwork certainly exists in several cases where the locus of the discovery is still known. For example, although the mould from East Cruchie may have been displaced by ploughing, the relatively large size of the stone (a re-used saddle quern) might suggest that it had not been moved far from the site of its use. At Mains of Corsegight, two moulds have been retrieved from a single field, close to a possible ditched enclosure currently of unknown date – intriguing circumstances of discovery which again invite further investigation.

Typology and technology

The three modern finds from the northeast of Scotland – Mains of Corsegight 1 and 2 and East Cruchie – consolidate what had already long been recognised as a striking regional concentration (see fig. 1). By one of those strange quirks of discovery, the new finds have all been single-matrix moulds; apart from the mould from Cuttie's Hillock, near Elgin (Schmidt/Burgess 1981: no. 305), previous discoveries from the region have been multiple-matrix moulds, exemplified by the well-known specimen found at Foudland, near Inch, which has no less than nine matrices (Calander 1904; Britton 1963: 321–322; Schmidt/Burgess 1981: no. 296, pl. 24). Typologically, the matrices on Mains of Corsegight 1 and 2 indicate casting of 'near-Migdale' axeheads and consequently inclusion in the Culbin-Walleybourne series of moulds (Needham 2004: 223–224). The mould from East Cruchie also has a matrix for a 'near Migdale' axehead, rather than the 'classic form' more typical of the northeast products, but it is also unusual in that the parent block consists of a re-used saddle quern with the matrix occupying a relatively small area in proportion to the surface area of the stone. Such disregard for spacing is rare among the stone moulds from Britain and Ireland but finds a parallel in the moulds from Cambo, Northumberland (Schmidt/Burgess 1981: no. 309), and from the Lledr Valley, Betws-y-Coed, Caernarfonshire (Britton 1963: 268 fig. 8, 321). These currently appear to stand in marked contrast to the majority of the known Early Bronze Age moulds, which generally appear to have been coarsely dressed to reduce their bulk, and in some cases carefully shaped to facilitate handling and to provide flat surfaces for the reception of the matrices.

Discounting the unusual carved stone from Ledmore, whose significance remains uncertain (Sherriff 1997; see above), the previously unpublished mould from Easter Clunie represents the first from eastern Scotland and is the most significant of the artefacts described here. The original overall shape is uncertain due to breakage in the past (possibly in antiquity) but in order to allow space for the two sizeable matrices indicated on the upper face, the stone must have been almost as large again and consequently there may well have been space around the margins for further matrices of small objects. This must clearly have been a sizeable mould – with estimated original dimensions which place it among the largest multiple-matrix moulds recorded from Britain. The *surviving* portion bears six matrices carved into the upper and lower surfaces – two of them for flat axeheads; one possibly for a large blade; one for a small axehead or chisel, and two for bars. Among the Scottish finds, similar combinations occur on the Burreldale Moss and Foudland moulds in Aberdeenshire and Glenrinn House in Moray, all on considerably smaller and more neatly shaped blocks of stone (Britton 1963:

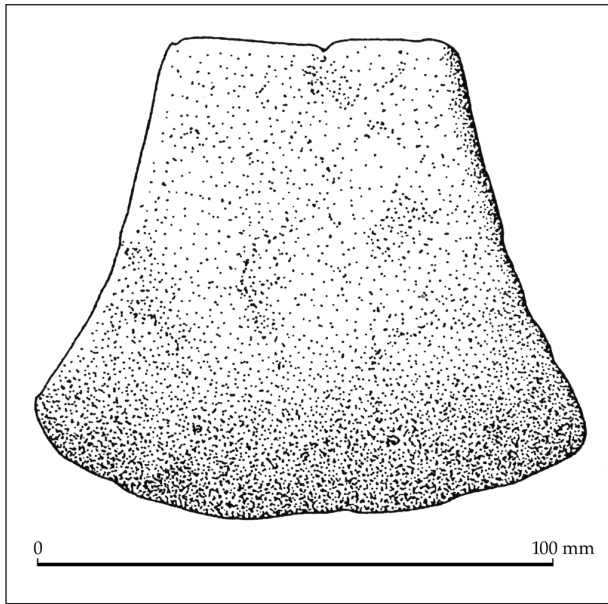


Fig. 9: Axehead from Abernethy, Perthshire (after Schmidt/Burgess 1981: no 277): although incomplete the size of this axehead corresponds closely to that of the large matrix on the mould from Easter Clunie found in the same locality.

321–323; Schmidt/Burgess 1981: nos. 295, 296 and 299). The matrix for the possible blade on the upper face (Face A, no. 2) is surprisingly deeply cut, with a depth of nearly 25 mm making it the deepest recorded on Scottish moulds; among moulds from Britain it is seemingly surpassed only by the axe mould from Altarnun, Bodmin, Cornwall at 29 mm (Britton 1963: 319, fig. 6).

The width of the ‘cutting edge’ and implied form of the larger axehead matrix on the upper face (Face A, no. 1) of the Easter Clunie mould are also noteworthy. In Scotland, among both axehead matrices and surviving axes (cf. Schmidt/Burgess 1981: 33, fig. 3), blades with a cutting edge more than 100 mm in width are extremely rare. It is unfortunate that the overall shape of the Easter Clunie casting is uncertain owing to the breakage of the mould. While some unusually large Migdale type axeheads are known with correspondingly broad edges (e.g. *ibid.*: no. 102, Upper Towie, no. 103, Glencarse), blades of this width are more characteristic of Killaha type axeheads (*ibid.*: 33–35; Barrett/Gourlay 1999: 179–181) – and although these are predominantly Irish and rare in Scotland, Easter Clunie does raise the possibility of local production of Killaha-related forms. If so, Easter Clunie may tentatively be attributed to Needham’s (2004: 224) Ballyglisheen series moulds, represented in England and Wales by the pair from Hurbuck, Co. Durham (Schmidt/Burgess 1981: nos. 307–308; Needham 2004: 224, fig. 19.8) and the mould from Betws-y-Coed, Caernarfonshire (Britton 1963: 321, no. 7; Needham 2004: fig. 19.8); for details of related moulds in Ireland see Eogan (1993: 93–94, 105–106).

Perceptively, Needham has remarked upon the mutual exclusivity of the Ballyglisheen and Bur-reldale series – the latter almost wholly confined to northeast Scotland. While it would be rash to make too much of a single new find, the location of the mould from Easter Clunie may reinforce this suggestion; it is tempting to wonder if this exclusivity may also be reflected in the distribution of Migdale axes, which appears to show a regional boundary of some kind along the opposite, northern side of the River Tay (O’Connor 2004). While caveats apply regarding the accuracy of matching moulds and their possible products, it is also of interest that among the few examples of blades which fit the matrix reasonably well is a large axehead from nearby Abernethy – but this also unfortunately incomplete and therefore unclassifiable to type (Schmidt/Burgess 1981: no. 277; reproduced here as our fig. 9).

The find from Glenhead Farm, near Denny in Stirlingshire is of interest in that it represents the first Early Bronze Age mould from central Scotland (see Cowie 2000 for full discussion). It is possible that this mould was never used: the apparently freshly pecked condition of the base of the matrix tends to suggest that the mould may never have been filled with metal, with damage to the edge of the matrix possibly having been the immediate cause for its discard or deposition. These observations would be in keeping with the analytical results, which revealed no metallic traces, although their absence is not conclusive. Stone moulds were probably pre-heated to reduce thermal shock and prolong working life: if the matrix on the Glenhead mould was rendered unserviceable by damage incurred at this stage, this would provide one possible explanation for the discard of an otherwise near-complete though unused matrix. Even so, it raises the possibility of production and exploitation of local mineral resources. Intriguingly, no recorded examples of actual Migdale type axeheads are known from Stirlingshire (cf. *ibid.* 1981: pl. 115) so that the mould in fact represents the first evidence for their possible production and circulation in the immediate region.

While the fine mould allegedly from Rubers Law or the Dunion in Roxburghshire represents the first from southern Scotland, it does augment the group of finds from northern England (Cambo, Northumberland, and Hurbuck 1 and 2, Durham). Tool marks on the floor of the matrix on the underside of this mould suggest that this matrix had not been used.

Products: axeheads and small tools

As previous writers have noted, the range of objects cast in the moulds known from Britain and Ireland would have included axes of several sizes, knife blades, rings (for armlets), awls and bars which are likely to have been the starting point for other objects. Britton (1963: 278) has suggested that some

of the smaller matrices may have been used to cast slabs of metal for hammering into sheet bronze. As has long been recognised the castings would have required considerable subsequent work once removed from the mould. In the case of the moulds discussed in this paper, the distinctive shape of the matrices shows that the flat axeheads cast from these moulds would have belonged to both the 'classic Migdale' and the 'near-Migdale' forms distinguished by Needham (2004: 220), the former associated with his Burreldale series moulds (as at Glenhead) and the latter with his Culbin-Walleybourne series (Mains of Corsegight 1 and 2, East Cruchie and Rubers Law/Dunion) (ibid: 223–226). As discussed above, the broad-edged form of the castings from the largest of the Easter Clunie matrices mould raises the possibility of Killaha type axes. Other castings included a possible dagger blade, small axes or chisels (as on the Easter Clunie and Rubers Law/Dunion moulds), while the former also had matrices for ingots of differing size and form. As we noted above in our review of previous work, there is a marked absence of stone moulds with matrices that could have produced flat axeheads of forms known

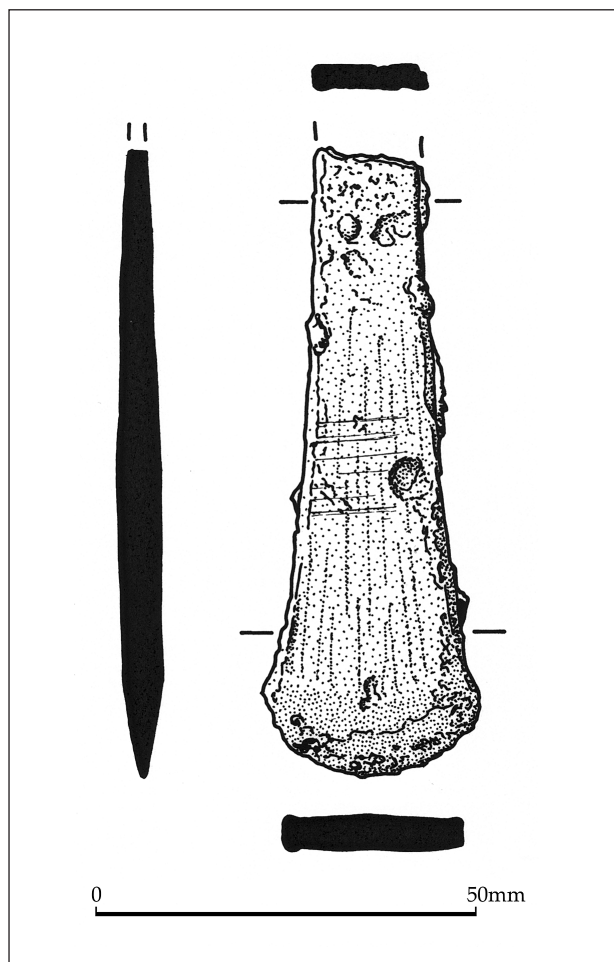
solely in copper. This may be an indication that the introduction of bronze coincided with a change in casting technology; if so, it is tempting to wonder whether such a change was accompanied by a concomitant elaboration of the range of products.

Needham (ibid: 223) has rightly noted that it is only the axe matrices which offer real scope for discerning typological and chronological differences across the range of stone moulds series as a whole. However, the significant sideways light that the various matrices for castings other than axeheads shed on the composition of contemporary toolkits should not be overlooked. The matrices for diminutive axes and chisels have attracted attention since the initial publication of the Foudland mould by Callander (1904: 497–500); other British moulds with this combination include New Deer and Kintore, Aberdeenshire; Ferintosh, Ross-shire; Dunion/Rubers Law, Roxburghshire, and Cambo, Northumberland. Recognising that these represent castings for types under-represented among the surviving population of artefacts, Callander and later writers have drawn particular attention to the graduated range of small axeheads and chisels in the well-known hoard from 'The Maidens', Port Murray, Ayrshire (ibid: 499–500; Britton 1963: 313, no. 10; Schmidt/Burgess 1981: 53). Subsequent discoveries have done little to add to the overall numbers of examples of small axes, and in view of their rarity this paper offers an opportunity to illustrate a recent chance find from Broomhill, Penicuik, Midlothian (Cowie 2004; this paper fig. 10). The actual products may be under-represented in the archaeological record because they were not selected for deliberate deposition in the same way as the larger axes, and were more regularly recycled as scrap metal. The moulds are therefore a salutary reminder that certain types that made up the Early Bronze Age woodworker's toolkit may have a largely invisible presence, although reconstruction of the Dover Boat from the end of the Early Bronze Age indicates that sophisticated woodworking could be achieved with a relatively small range of tools (Goodburn 2004: 131–134).

Conclusion

Viewed in the wider context of Early Bronze Age metalworking in Britain and Ireland, these are all important additions to the overall inventory of finds, for as well as augmenting the concentration of discoveries long known from northeast Scotland, they expand the distribution of stone moulds southwards into eastern and central Scotland and into the Scottish Borders. Even discounting the find from Ledmore, they thus go some way to filling the yawning gap that previously existed between Aberdeenshire and Northumberland (compare Schmidt/Burgess 1981: pl. 115 with Need-

Fig. 10: Small axehead or chisel, Broomhill, Penicuik (© NMS; drawing by Alan Braby). Although castings for diminutive tools like this are present on the moulds, they are very rare among extant metalwork.



ham 2004: fig. 19.8). However the new finds inevitably raise as many questions as they answer, inviting further research into topics ranging from the technology of the moulds, for example the stone types used and their metalworking properties, or the function and significance of the range of smaller matrices, through to wider issues such as production and distribution processes.

Acknowledgements

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