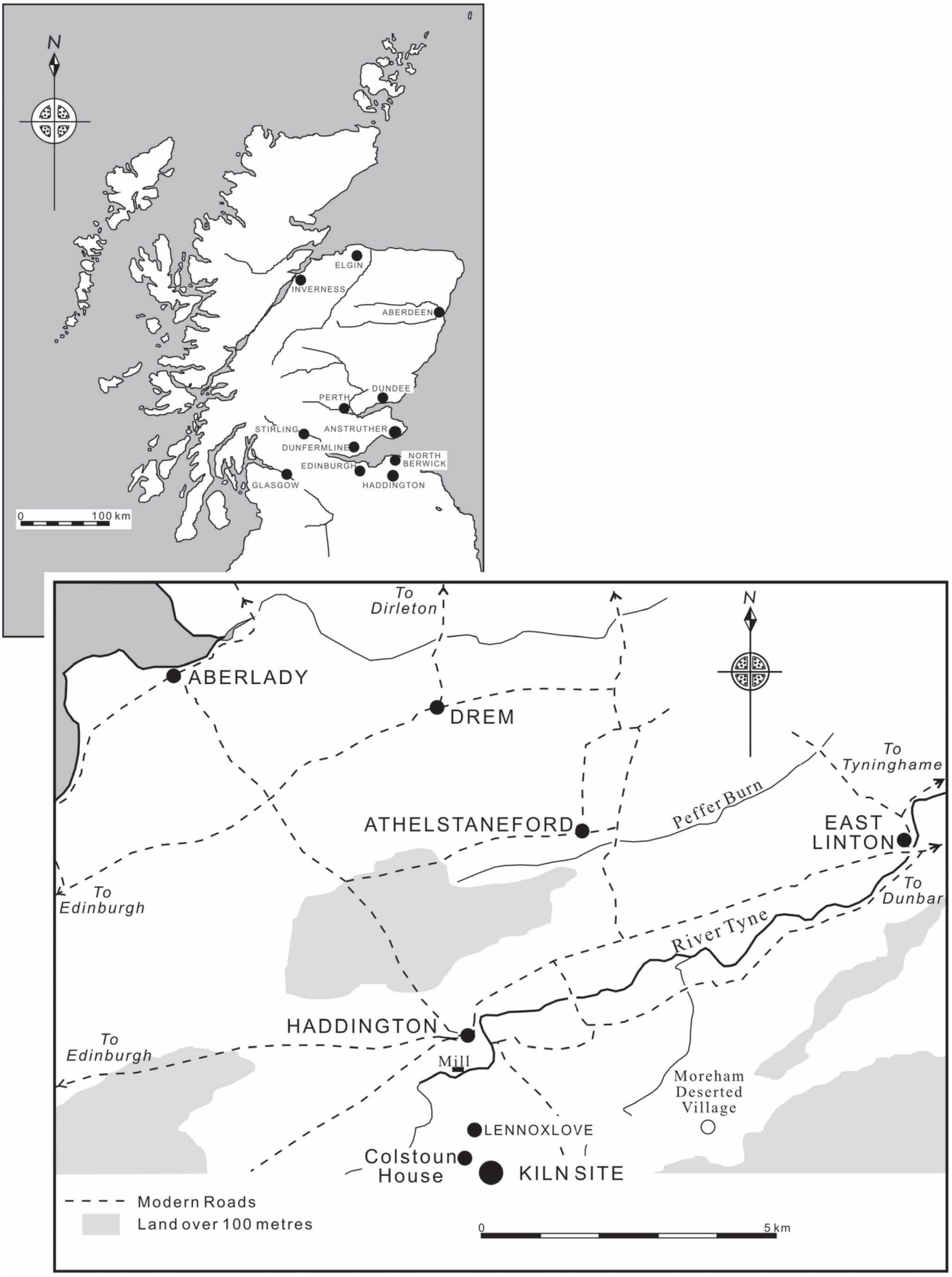

Figure 1
Location map of Colstoun.

Excavations at the pottery production centre of Colstoun, East Lothian 1939, 1969, 1971, 1977 and 1999/2000

Derek W Hall

Summary

The site at Colstoun in East Lothian is still the only excavated Scottish White Gritty Ware production site. This paper reviews all of the work that has taken place at this site from the discovery of the first kilns in 1939 through to the most recent work at the site in 2000 which included the first archaeomagnetic date for one of the kilns. Some consideration is given to what historical evidence exists regarding the site and the products and firing technology are discussed. In conclusion Colstoun's place in Scottish ceramic studies is discussed and future research priorities suggested.

Introduction (Figs 1 and 2)

The medieval pottery kilns at Colstoun, East Lothian have been the subject of at least four archaeological interventions; Lady Broun Lindsay in 1939, Ben Edwards in 1969, David Clarke in 1971 (Clarke 1971, 20) and Catherine Brooks in 1977 (Brooks 1977, 13). Only one of these has ever been published (Brooks 1981, 364–403). No information or detail has been written about the precise nature and function of the kilns, which are some of the few to be excavated in Scotland.

Recent work in Scottish pottery studies has highlighted the need for the proper evaluation and publication of the important work that has been undertaken at both Colstoun and the redware kilns at Stenhouse near Falkirk (Hall and Hunter 2001). SUAT Ltd was commissioned by Historic Scotland to write a report on the pottery from the 1969 excavations, re-evaluate the ceramic assemblage from the 1971 excavations, undertake some archaeomagnetic sampling of the kilns and to combine all previous work on this site into one report. In this report the kilns have been labelled as follows: the earliest kiln from Dr David Clarke's excavation is Kiln A; the other kiln from his excavations is Kiln B (originally found by Lady Broun Lindsay); and the kiln from Ben Edward's excavation of 1969 is Kiln C.

Historical background

The placename of Colstoun has been in use since at least 1513; before this the lands were variously known as Cumber-Colstoun, Cummer-Collystoun or Comer-Colston, but thereafter the prefix was dropped (Marshall 1884, 59). The Cumber element possibly means 'confluence of brooks' (Watson 1986, 243). It is possible that this prefix may have referred to the confluence of the Colstoun water and the stream that runs through the pottery production centre above which stands Colstoun House (Fig 2). However, it would be unusual to find a Gaelic word attached to an existing place name, particularly as Colstoun most likely derives from the Anglo-Scandanavian personal name *Kol(r)+ toun* meaning farm. If this is the case, it is unlikely to be any earlier than the late 11th or early 12th centuries. Alternatively, rather than a personal name 'Cumbra' (meaning Welshman or Cumbrian) we could be dealing with an original genitive plural of the same word thus giving us Colstoun of the Cumbrians. This would distinguish the place from other Colstouns/Coustons in the vicinity, which were not occupied by Cumbric speakers (pers comm S Taylor).

It is of interest that one 13th century charter that grants land in the barony of Cumbercollestoun to Holyrood Abbey states that this excludes land in the barony that belongs specifically to the Knights Templar (Colstoun Muniments No 1). This appears to be the lands of Sanderisdene (now Sandersdean) which are referred to in several 15th century charters and may finally have been given to the Brouns of Colstoun in 1520, although it is named Sandersdail in the charter (Colstoun Muniments no 4623). The fact that the Knights at Torphichen own land in the vicinity of a pottery production centre is of interest given the suggested links between them and the later production centre at Stenhouse in Falkirk (Hall and Hunter 2001). Given the nature of the white ware pottery that is produced at Colstoun it is also of interest that the former tenant of the lands is named in the same charter as William Whypot (Colstoun Muniments no 1).

The same charter also refers to permission being given for 'coals to be made and had there, if coals can be found there'. This part of East Lothian is the location of a sizeable seam of coal that outcrops near the surface and was exploited by the Monks of Newbattle Abbey from at least the 12th century (McNeill 1902, 11). It would seem likely that the potters at Colstoun may also have been exploiting this fuel

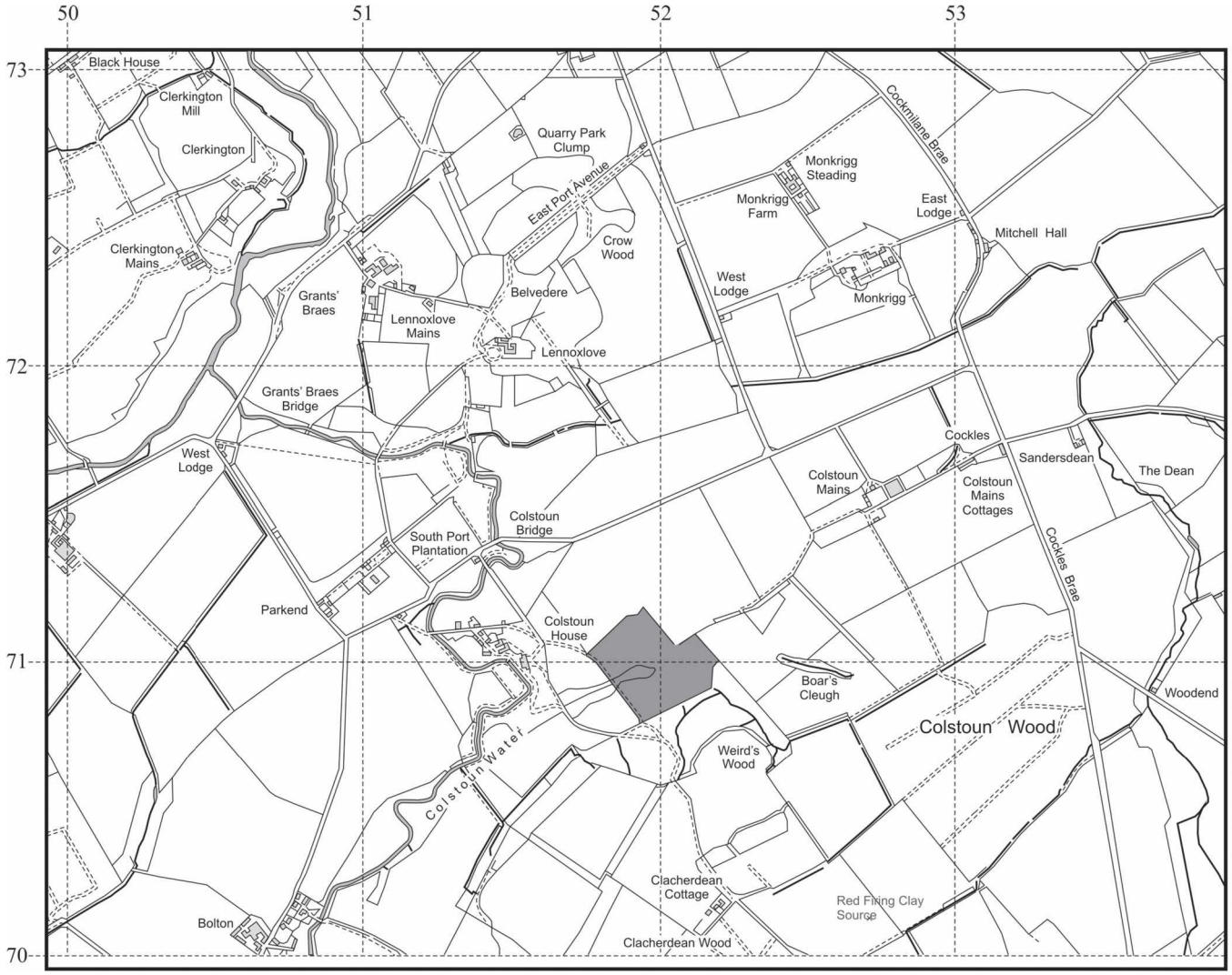

Figure 2
Location of scheduled area at Colstoun.

source although there is no documentary record for this. This charter is in the name of Sir David Broun, who is on record from at least 1270 as the owner of Colstoun House. By 1361 the possession of the lands of Cummyrcollystona has been passed onto his son John, although both David and his wife Agnes reserve the life-tenement of the land (Webster 1982, 198–9).

Kiln C, excavated by Ben Edwards in 1969, appeared to have been deliberately backfilled after its last firing. The fact that two kiln props were left in situ just inside the southern stoke-hole would seem to imply that the abandonment of this kiln was done in a hurry. Given the 14th century archaeomagnetic date for this action, it seems worth reviewing political events in Scotland around that time. This period post-Bannockburn was still very unstable and by the mid 1330's a second war between England and Scotland was underway (Lynch 1996, 130). As part of this, Edward III's army devastated the fertile plain of Lothian; is it possible that the hurried backfilling and disuse of Kiln C relates to the actions of the English army? From the limited excavations that have taken place on this site, the only indication that pottery production continued into the later medieval period is provided by the small group of Redware pottery from the site. As is the case with most previous attempts in Scotland to trace documentary evidence for pottery production, none is forthcoming (Broun Lindsay 1932; 1948; 1955).

Previous excavations (Fig 3)

The first dated reference to any work at Colstoun is on the back of an original site location plan drawn by J S Richardson in 1949 (NMS archive). A pencil-written note states that the first potsherds were recovered from the site in the spring of 1915 when No 5 platoon 8th Royal Scots Infantry were training in this area. These finds were passed on to Mrs Baird of Colstoun at that time.

The first pottery kiln on the site was found by Lady Elisabeth Broun Lindsay in 1939 (Kiln B); it had apparently been discovered when some new shooting butts were being built. It appears that some initial work on site was carried out by J S Richardson on behalf of the National Museum of Scotland, but the only record of

Figure 3
RAF aerial photograph of Colstoun 12th August 1947, Lady Broun Lindsay excavation visible as marked.

this is the pencil-drawn location plan referred to above. Unfortunately this plan lacks an adequate reference point and is virtually impossible to use on site. Apparently the part of the field that this kiln occupied was fenced off by the estate and remained as such until the later excavations of 1971. An RAF aerial photograph of this part of the estate taken in 1947 seems to show this fenced area (CPE/SCOT/UK/257 82 SQDN 12 AUG '47) (Fig 3).

Following a geophysical survey in 1967, another kiln was located and was then excavated by Ben Edwards in 1969 on behalf of the National Museums of Scotland (Kiln C). Lady Broun Lindsay's kiln was re-excavated by David Clarke in 1971 and he found another one cut by it (Kiln A). Catherine Brooks assessed plough damage to the site in 1976/77 and further geophysical survey was carried out by Roger Walker of Bradford University. Catherine Brooks published the pottery from Clarke's kilns and a selection of material in the possession of Lady Broun Lindsay in 1978–80 (Brooks 1981). Historic Scotland finally scheduled the site at Colstoun in March 1988.

The excavated kilns

The 1969 excavations (Fig 4)

Kiln C

The excavations by Ben Edwards for the National Museum of Scotland in 1969 located a Musty type 3 multi-flued kiln. The walls of this kiln survived to a height of c 0.30 m above a sand floor and were constructed of clay bonded courses of small stone blocks, its firing chamber had a diameter of c 3 m. Two kiln props were located in-situ inside the entrance of the southern stoke-hole. In 1999 during examination of the north wall of this kiln, it was noticed that a 3 cm thick layer of fired clay still survived on its inside face covering an area of c 0.50 m. A similar layer of clay was recorded in Kiln 2 at Rattray (Murray and Murray 1993, 145).

The 1971 excavations (Fig 5)

Kilns A and B

Dr David Clarke's excavations concentrated on relocating the kiln first discovered by Lady Broun Lindsay in 1939. This kiln is described by the excavator as being oval in plan, although one side was less curved, and built of locally derived, undressed stone blocks acting as a lining to a pit excavated in the clay subsoil. Its dimensions are given as 2.75 m by 1.4 m, with its wall

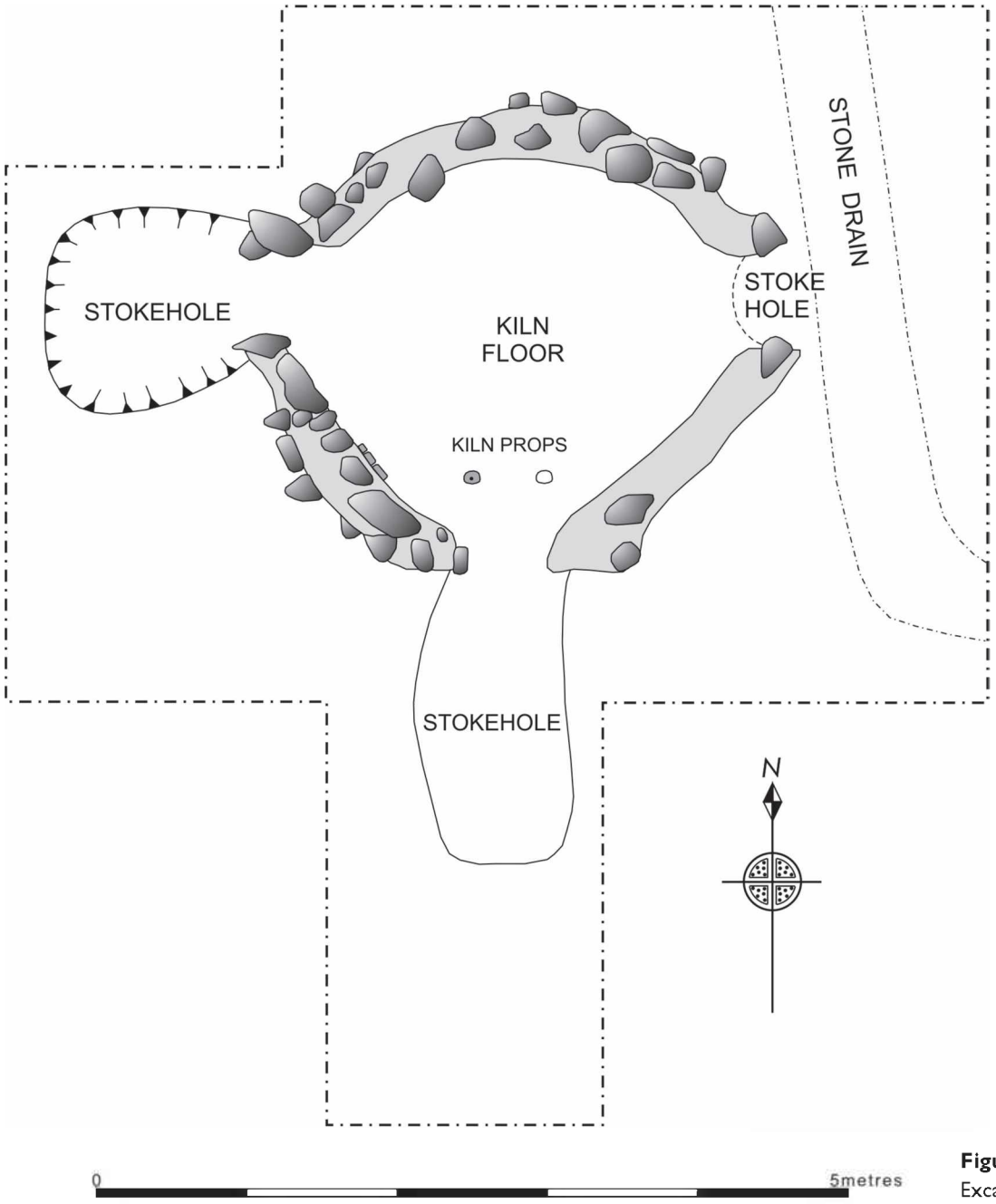

Figure 4
Excavated plan of Kiln C.

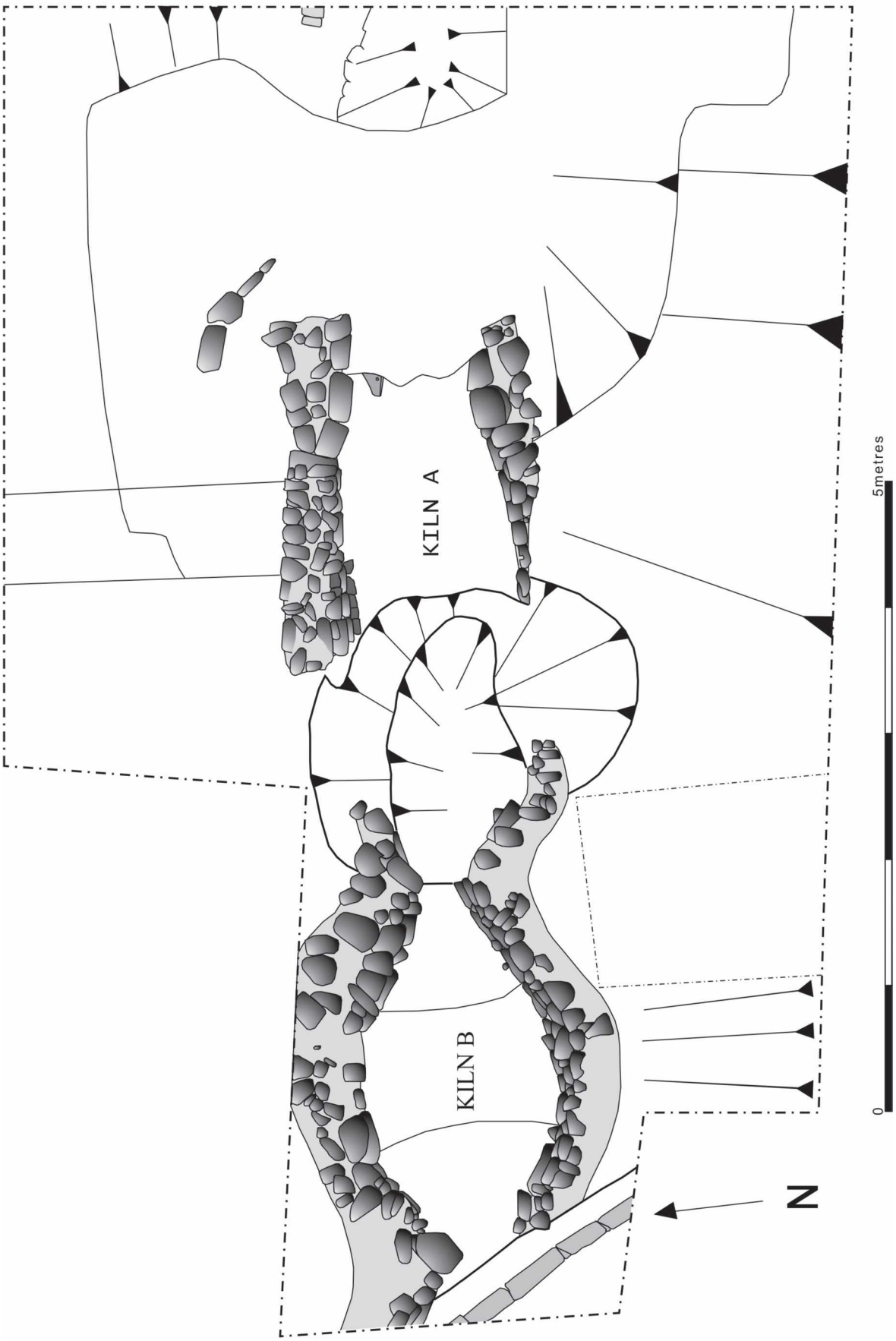

Figure 5
Excavated plans of Kilns A and B.

surviving to a height of 0.7 m on one side. A short expanded flue led to a stoke pit at its eastern end, but the other end had been destroyed by a 19th-century field drain. The construction of this kiln had removed part of an earlier funnel-shaped kiln that had apparently collapsed during the preliminary firings. The dimensions of this earlier kiln were 2.6 m by 1.2 m and its walls survived to a height of 0.45 m. The walls of this kiln demonstrated two methods of construction, courses of small stone blocks interspersed with courses of clay bricks appearing alongside a section of large stone blocks. In the make-up of the wall was a large part of a ceramic mortar with two identical stamps on the rim (Brooks 1981, Fig 13). A considerable quantity of pottery was found and published by Catherine Brooks in PSAS (ibid 364–403). From the existing plans and sections of this excavation it appears that several large, shallow interconnecting pits were also discovered beneath the later kiln, dug into the natural clay subsoil. These pits produced pottery which has been dated to the 13th and 14th centuries (Clarke 1972, 51).

Archaeomagnetic dating

Introduction

During the weeks of 15th to 19th November 1999 and 14th to 18th February 2000 a programme of fieldwork was carried out at Colstoun with the aim of relocating the three kilns previously excavated on the site in 1969 and 1971. It was the intention to take samples from these kilns to enable archaeomagnetic dating to be carried out by Geoquest Ltd.

Fieldwork (Fig 6–15)

The kiln excavated in 1969 by Ben Edwards (Kiln C) was fairly easily located due to the existence of black and white photographs of the excavation which located the kiln with reference to one of the trees still standing in the field. Five trial trenches were dug in this area and the kiln was located 35 m NNW of the tree (Fig 6). It was found to be sealed with black plastic sheeting which was removed from the circumference of the kiln structure to allow 18 archaeomagnetic samples to be taken.

The area indicated in the published report on Colstoun as being the site of Kilns A and B was test-pitted in an attempt to locate David Clarke's excavated trench (Brooks 1981, 393 Fig. 18). Twenty-six test pits were dug, but there was no sign of a previously excavated area in any of them. Twenty-one of these pits discovered undisturbed archaeological deposits, and 19 of them located deposits of kiln waste represented by lumps of burnt clay daub, charcoal and pot sherds. All the excavated trenches were located in the field using an EDM. A return to site in February 2000 involved an archaeomagnetic geophysical survey of an area 100 m by 40 m in order to target and trench any strong anomalies that might indicate Kilns A and B (Fig 7). The trenching of one such anomaly revealed it to be a concrete platform of 20th century date that may relate to army training in the area in 1915 (see previous work above). No sign of either of the two kilns was located.

The second phase of fieldwork at Colstoun took place after the field had been ploughed prior to be being sewn with barley. Due to the amount of pottery, kiln furniture and waste that had been exposed by the plough an area measuring 60 m E–W by 40 m N–S was fieldwalked in an attempt to see if the results might help to provide some further information regarding the location of the kilns. A total of 2,193 pieces of pottery, furniture and waste were recovered from this gridded area (Fig 8). It was very noticeable that the main focus of activity was in square A at the NE corner of the grid. Sherds from both jugs and jars were collected from the gridded area and several distinctive forms were present and have been illustrated (Cats 139–171).

Results of archaeomagnetic dating

Dr Mark Noel

Eighteen oriented archaeomagnetic samples were obtained from Kiln C. After drying and consolidation, 17 were of sufficient volume and quality for analysis. The specimens were found to contain a strong archaeomagnetism which has clearly been oriented by the earth's magnetic field. The geophysical data are therefore consistent with the acquisition of thermoremanent magnetism due to heating above 580° (the blocking temperature of titanomagnetite). Demagnetisation tests showed that the archaeomagnetism within the kiln fabric is moderately stable and hence the results can be relied upon to provide an accurate record of the earth's magnetic field direction. Comparison of the mean archaeomagnetic vector in the kiln with UK Master Curve suggests that the last firing (and remagnetisation) took place during the period 1320 AD to 1350 AD.

Results of geophysical survey (Fig 7)

Dr Mark Noel

A rectangular area measuring 140 m by 40 m was surveyed using a Geoscan FM36 fluxgate gradiometer, the resulting data was downloaded into an IBM thinkpad computer for processing on site. After processing a very intense magnetic dipole was located close to the convergence of the two streams in the field. It was initially expected that this might represent one of the kilns that was being looked for, but on excavation it proved to be a concrete pad that included dolerite gravel as an aggregate. The survey did locate an elongated zone of intense dipolar magnetisation close to the NE limit of the study area and 10 m NE of the concrete platform. The style of this anomaly is consistent with a deposit of high susceptibility material (possibly in a ditch) or a feature that has been fired in situ such as a kiln. The major geomagnetic feature

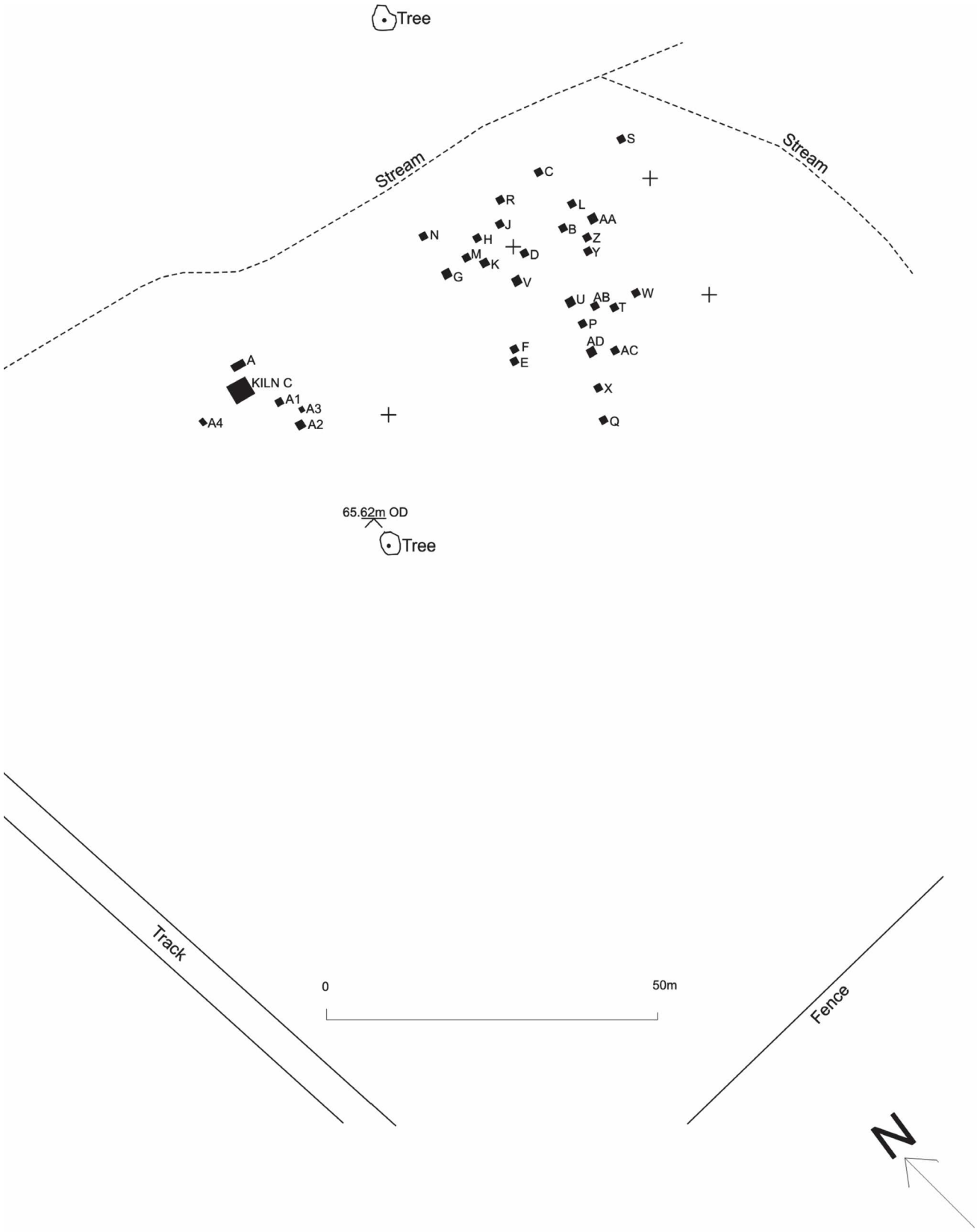

Figure 6
Location of trial trenches 1999.

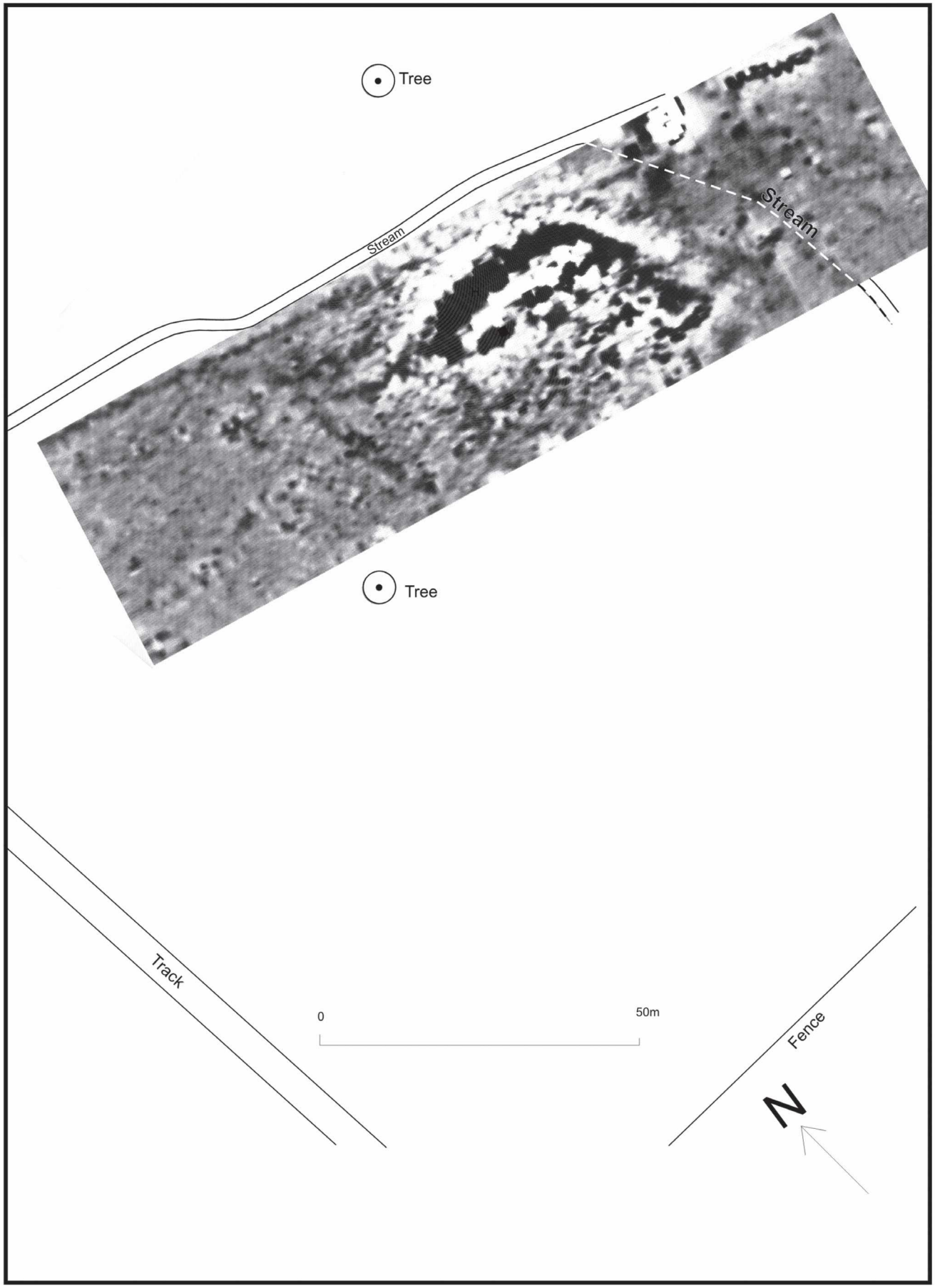

Figure 7
Plot of archaeomagnetic survey across site of Kiln C and published site of Kilns A and B.

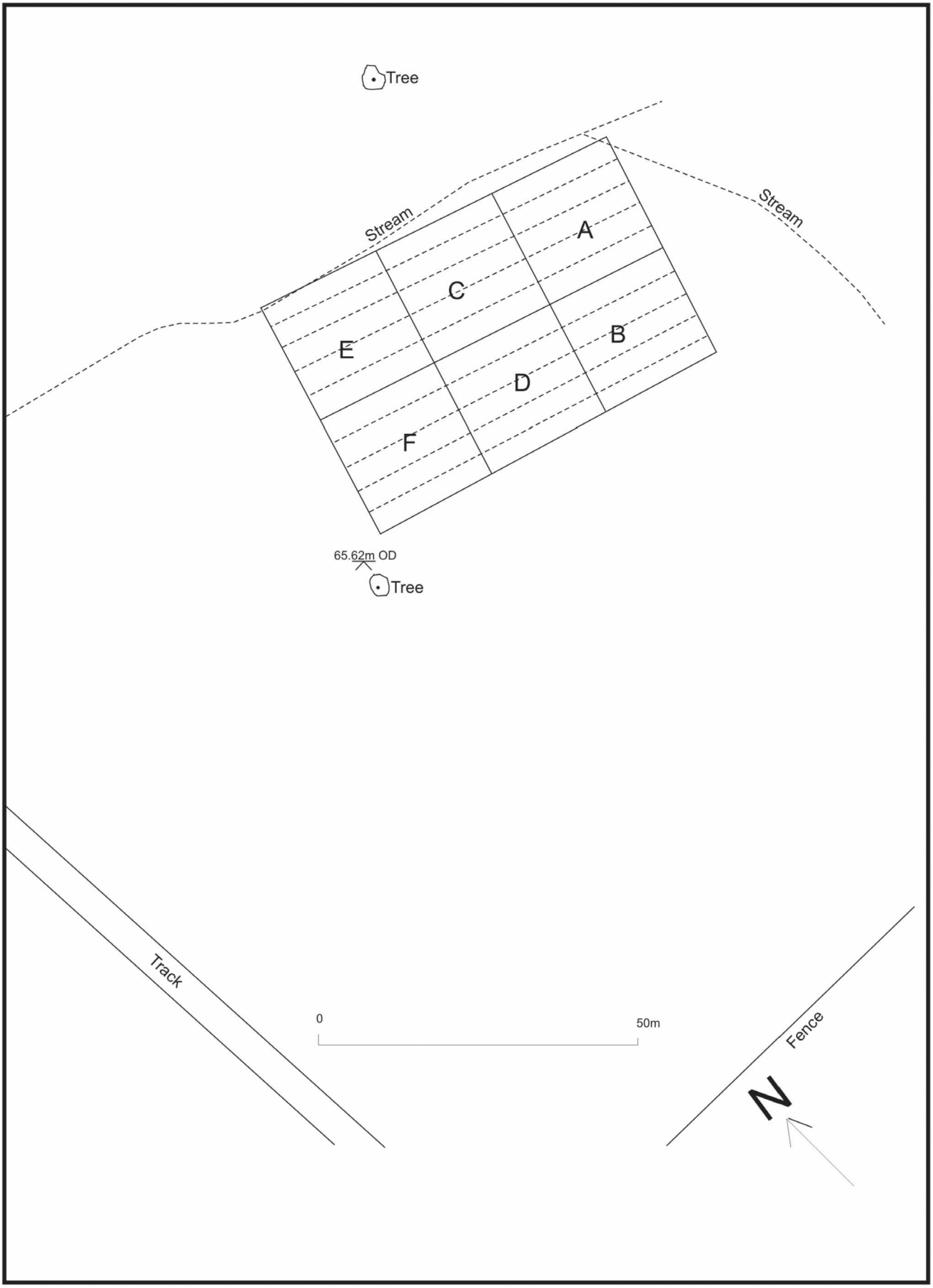

Figure 8
Location of fieldwalked grid 2000.

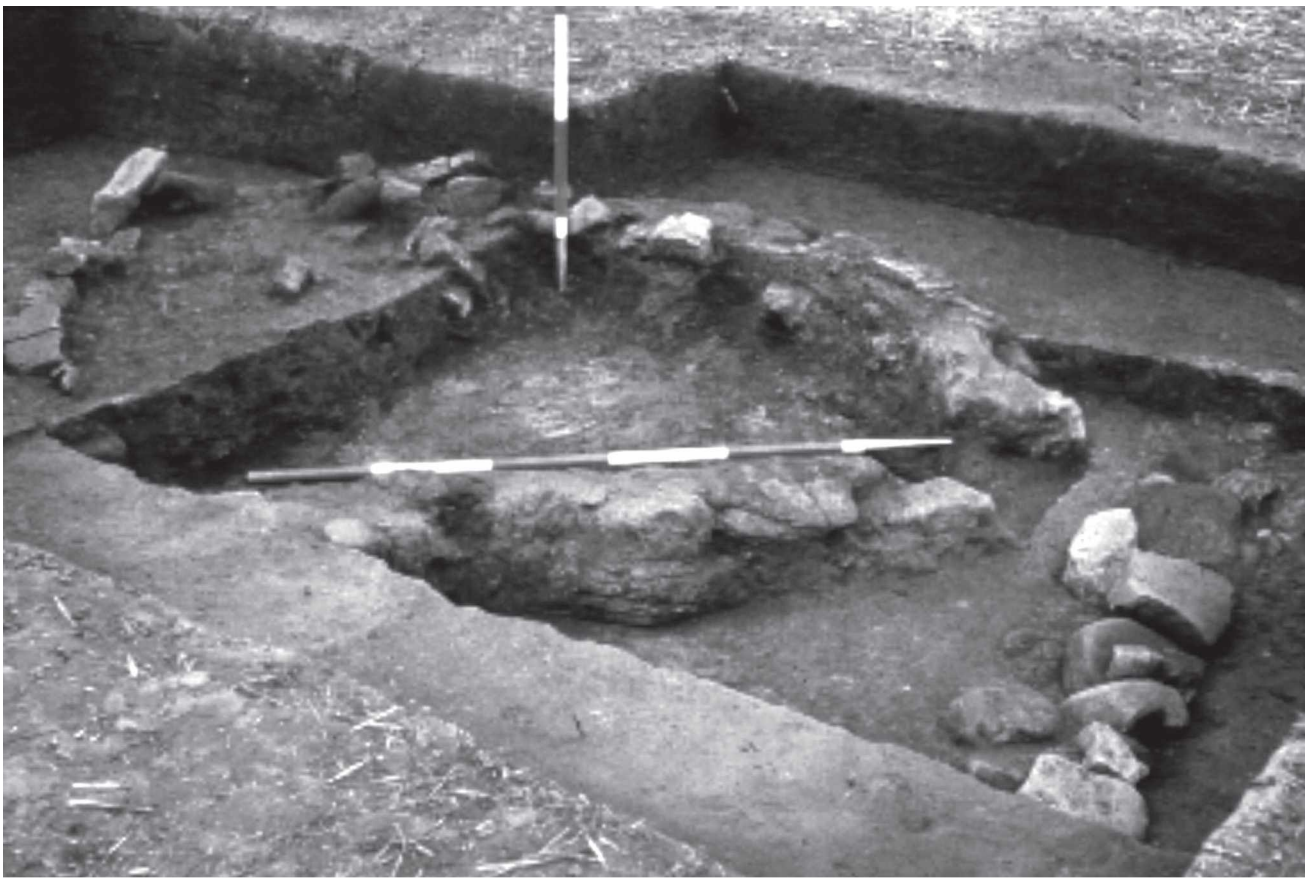

Figure 9
General view of Kiln C during excavation.

Figure 10
General view of Kiln C during excavation, showing kiln props in situ.

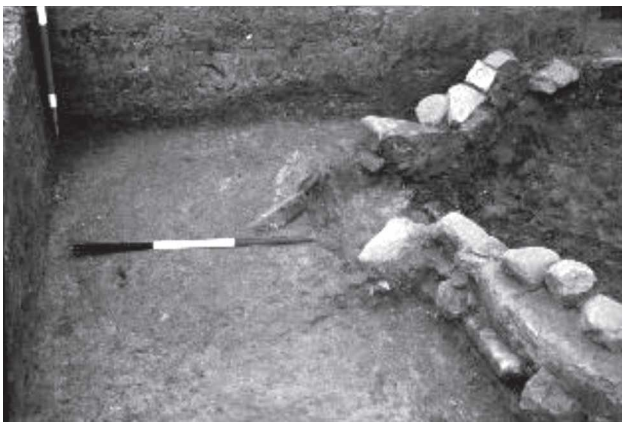

Figure 11
Detail of stokehole of Kiln C, pre-excavation.

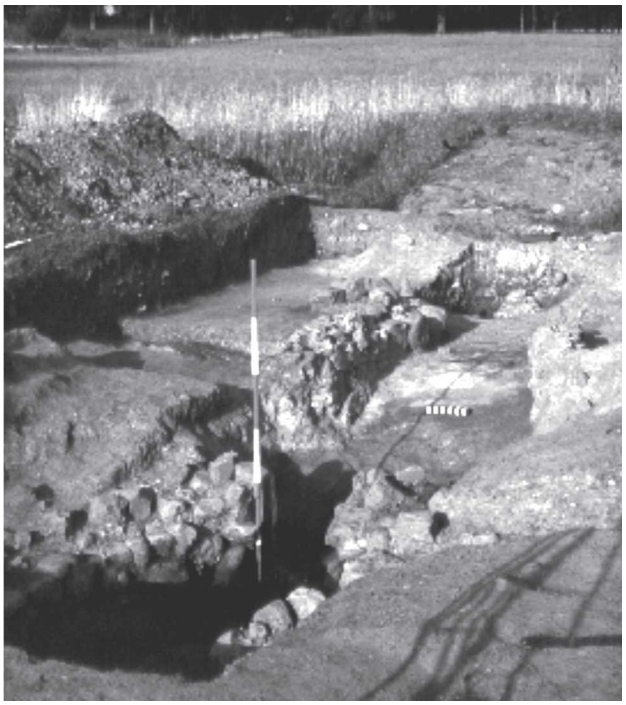

Figure 12
General view of Kilns A and B during excavation.

Figure 13
Detail view of Kiln A fully excavated.

Figure 14
Detail of kiln bricks in Kiln A.

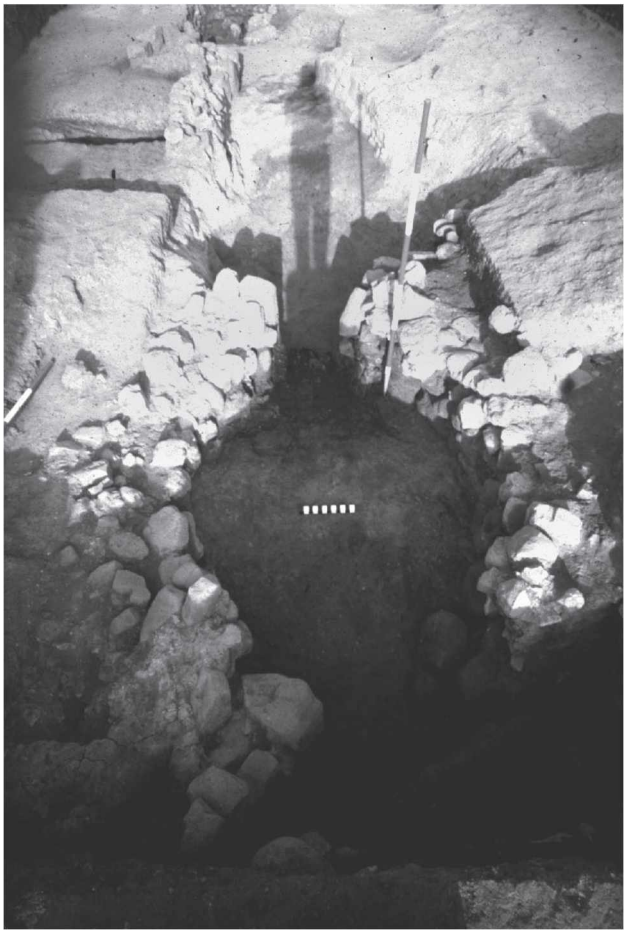

Figure 15
General view of Kiln B during excavation.

Figure 16
Detail of kiln props in situ in Kiln C.

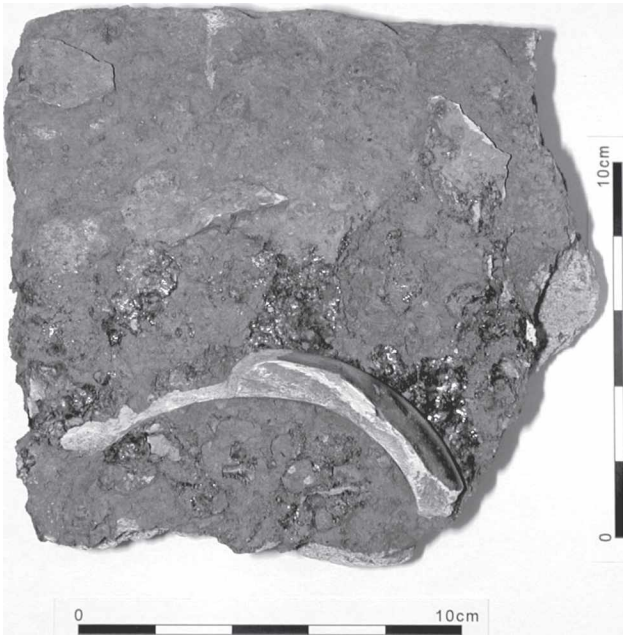

Figure 17
Kiln brick from Kiln A.

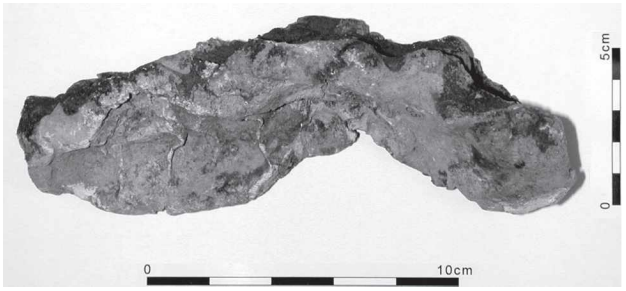

Figure 18
Fired clay support from either Kiln A or B.

Figure 19
Fired clay with impression of vessel rim from either Kiln A or B.

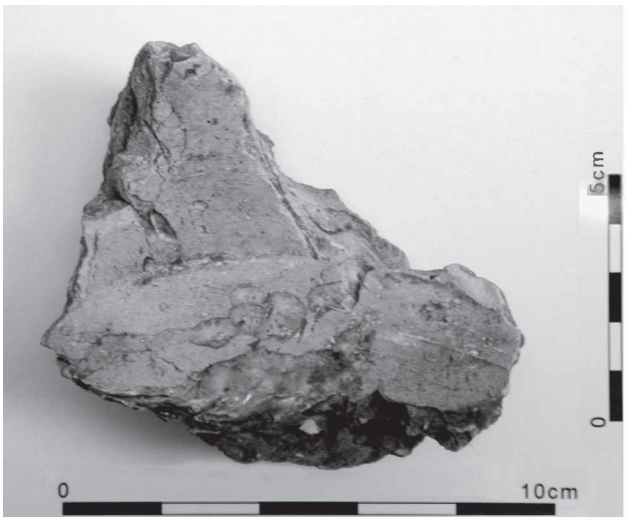

Figure 20
Fired clay with impression of basal angle from either Kiln A or B.

detected by the survey comprises an intense magnetic dipole (or chain of dipoles) that forms a distinctive arc through the central third of the study area, and which appears to enclose a further set of discrete magnetic dipoles. It seems probable that the geophysical anomalies reflect either a deposit of fired waste material or a cluster of kilns which survive in situ.

It is interesting to note that that the kiln excavated by Ben Edwards and archaeomagnetically dated by Geoquest is visible in the survey only as a weak, positive magnetic anomaly. The weakness of the anomaly is almost certainly due to the fact that the majority of the fired material (kiln collapse and potsherds) was removed during the original excavation.

Medieval pottery from Kiln C

Introduction

Ben Edwards' excavations of 1969 located a sizeable assemblage of ceramic material from the Musty type 3 multi-flued kiln. All this material has been kept in store by the National Museum of Scotland and has never been reported on. This report will concentrate on the fabrics present and the various vessel types represented.

The pottery assemblage

The 1969 excavations produced a total of 4,280 stratified sherds of pottery and kiln furniture. There is a further group of 3,212 sherds which is unmarked and uncoded, and this has been examined for unusual or different vessel forms that are worthy of illustration but has only been bulk catalogued. A minimum vessel count based on rims, handles and bases indicates that there are 3,712 jugs, 24 cooking pots and 29 other vessel forms in the stratified group of pottery.

The fabrics

The vast percentage of the vessels from this kiln is in a fabric that has long been identified as part of the Scottish White Gritty ware tradition (Haggarty et al 1984). This material is fired a hard white colour and contains visible amounts of quartz inclusions; occasionally pieces of red sandstone are also visible in the matrix. Three sherds from context BJ are in a very fine thin hard white fabric that is glazed a glossy purple brown colour. This is very high quality material but is only represented by these sherds. Aside from the sherds of White Gritty ware there are a small number of sherds which are in a pinkish red variant of this fabric with a blue grey core.

The vessel forms

Jugs (Figs 21–26)

It is very striking that 97% of the vessels from this kiln are glazed jugs. The most common form appears to be undecorated with a strap handle that has incised vertical lines (Cats 1–17). There are a few examples of slightly more complicated forms which have bridge spouts and three handles (Cats 39 and 40). A small number of the bodysherds (61) from these vessels exhibit some form of decoration. This includes lines incised into the body of the vessel, ring and dot decoration and a few examples of stamped decoration (Cats 44–71).

Jars (Figs 27 and 28)

Cooking pots are represented by only 23 sherds in the whole assemblage. In form most of the 11 rimsherds suggest that these vessels were of a globular shape similar to those excavated from Clarke's kilns (Brooks 1981). There are two rimsherds in this small group which are similar to those published as coming from the Fife kilns, a frilled rimsherd (Cat 109) and a handled rimsherd (Cat 108) (Hall 1997).

Open forms (Fig 28)

There is a rim to base profile from a dripping pan (Cat 112), these vessels are thought to be copies of redware vessels from the Low Countries which are common in Scotland from the mid 14th century (Cheer 1996, 753). An internally glazed bowl is present from an unstratified context (Cat 111). The other open vessel forms represented are skillets (Cats 115 and 116).

Kiln furniture (Figs 29 and 30)

There are 51 kiln stands present in the whole assemblage. They are all the common 'cooling tower' shape with holes pierced through one side and through the top. Two of these are recorded on a site plan as being found in situ just inside the southern flue. From a study of these objects it would appear that when they are being used as kiln props they are placed on the kiln floor with their wider ends upwards. This supposition is based on the few stacking scars which exist only on this end of the object. If they were being used as heat baffles then the position of the object would not seem to matter; this may explain why the two props that were found in situ inside the southern stakehole stood in different ways. Although these pieces of furniture are common finds from Scottish kiln sites, no one has ever attempted to explain how they would have been used. Such furniture has now been recovered from Rattray (Murray and Murray 1993), Stenhouse (Hall and Hunter 2001) and can be paralleled on English sites such as Potovens near Wakefield (Brears 1967, fig 13).

Medieval pottery from the excavations of Kilns A and B

Introduction

The assemblage of pottery, kiln furniture and kiln waste from these excavations was originally published by Catherine Brooks in 1976 (Brooks 1981, 363–403). Following the revaluation of the excavations at Colstoun and the onset of new chemical sourcing techniques Historic Scotland commissioned SUAT to undertake the re-analysis of this material. These excavations produced an assemblage of 10,808 sherds of pottery, 163 kiln props, 323 stacking or parting sherds and 13 kiln bricks. This material comes from both Kilns A and B and, with a few exceptions, it is no longer possible to assign sherds of pottery to a specific kiln. The vast percentage of the pottery is marked with

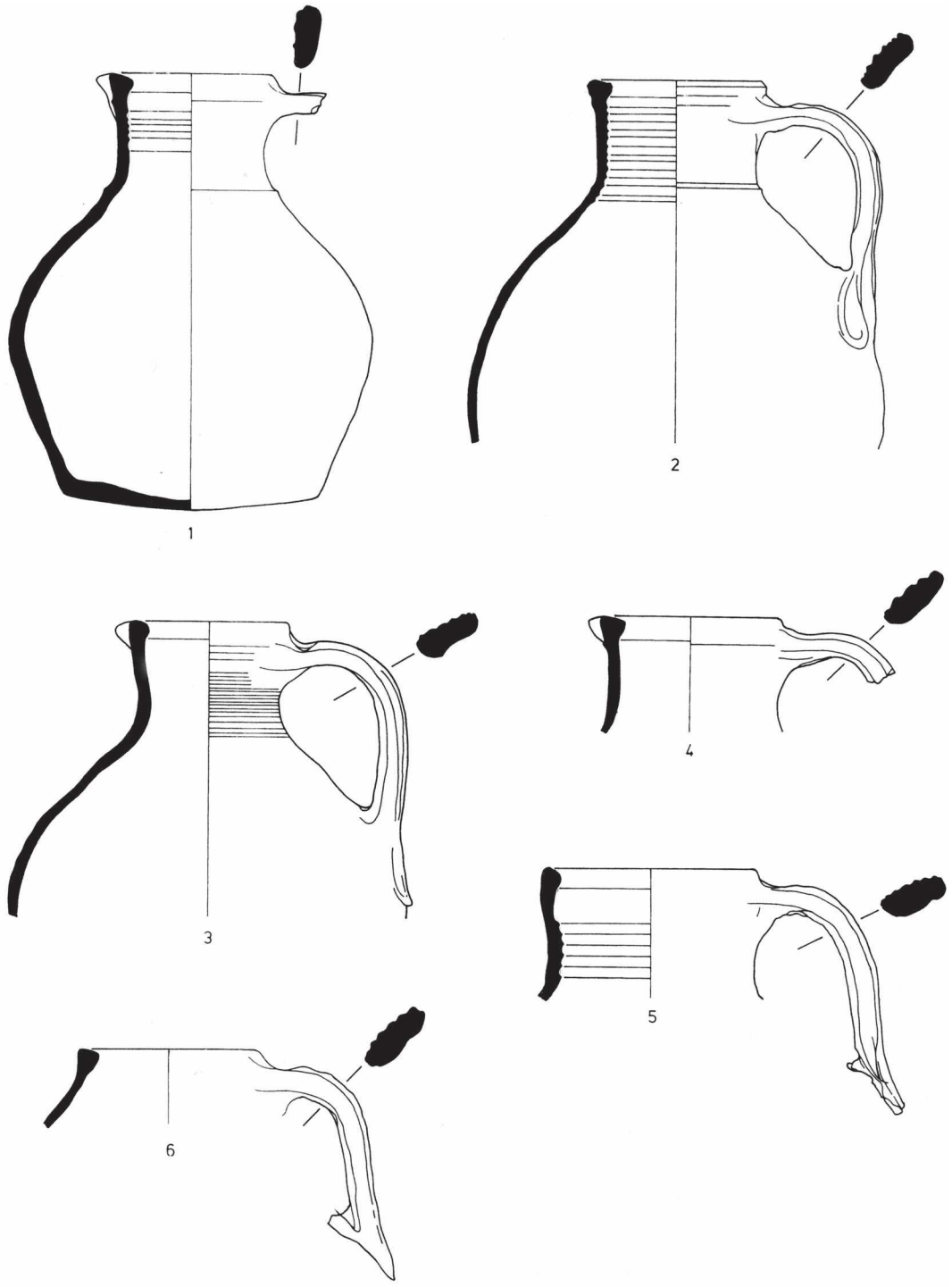

Figure 21
1–6 Jugs from Kiln C 1969
Scale 1/4

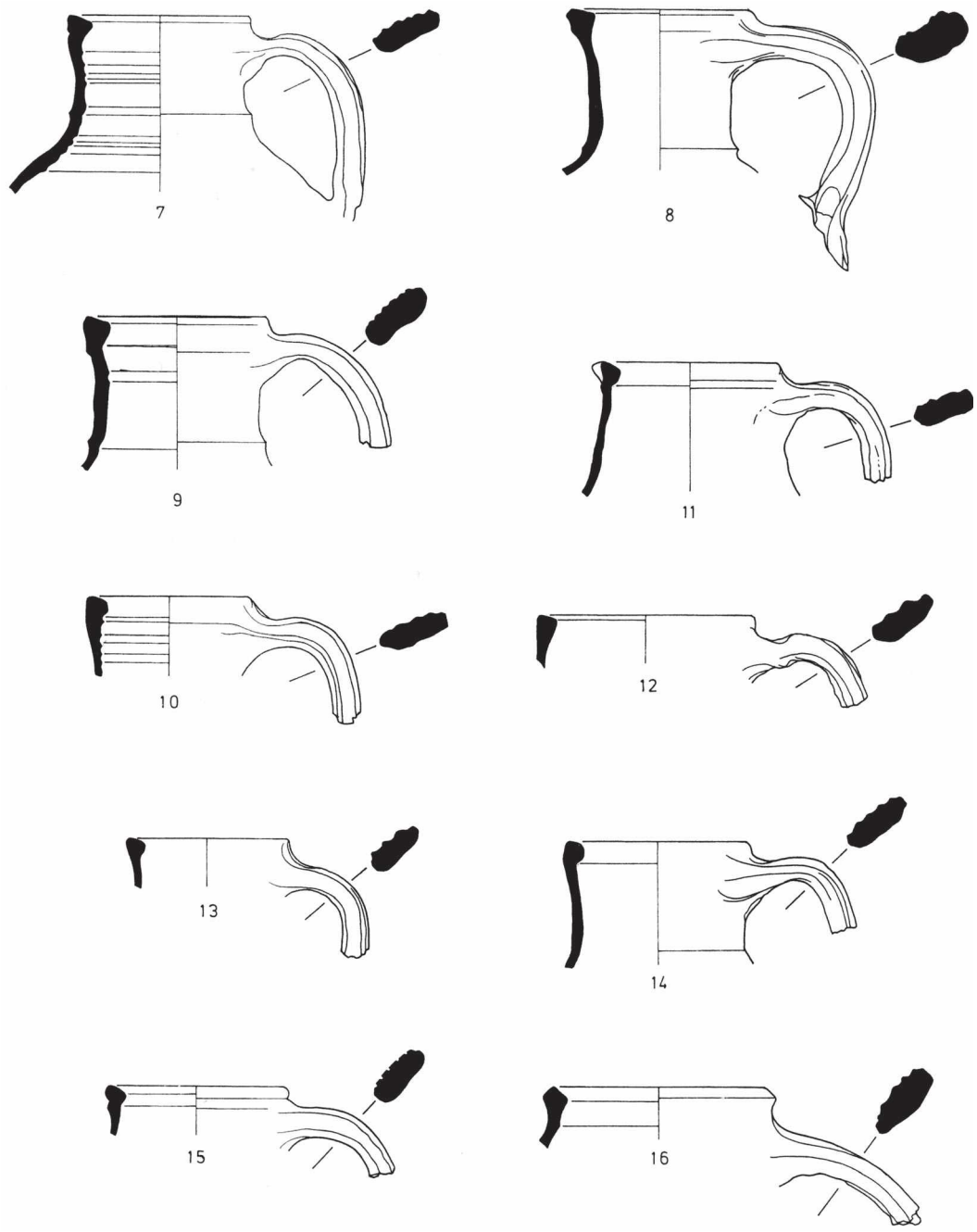

Figure 22
7–16 Jugs from Kiln C 1969
Scale 1/4

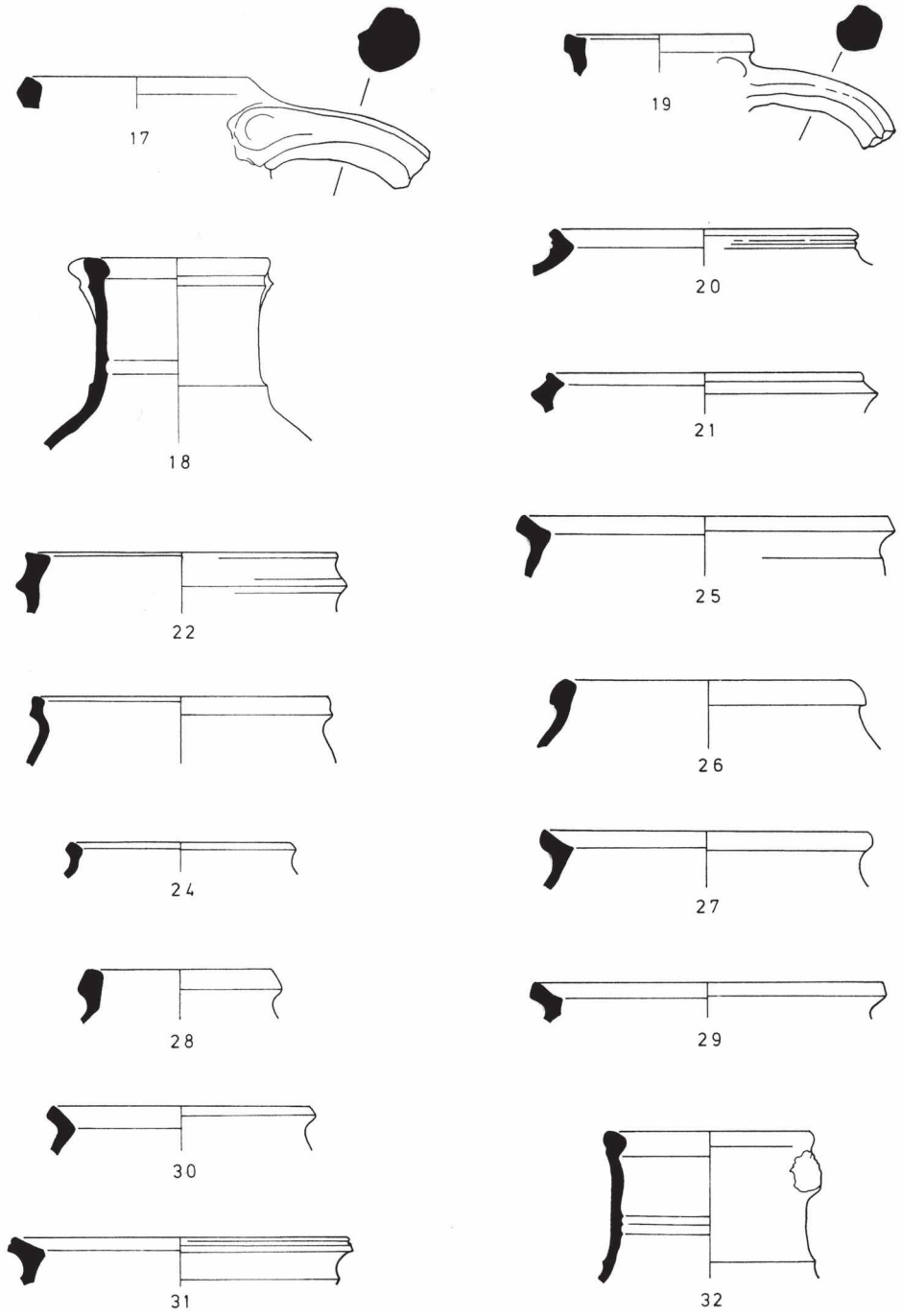

Figure 23
17–19, 32 Jugs from Kiln C 1969
20–31 Jars from Kiln C 1969
Scale 1/4

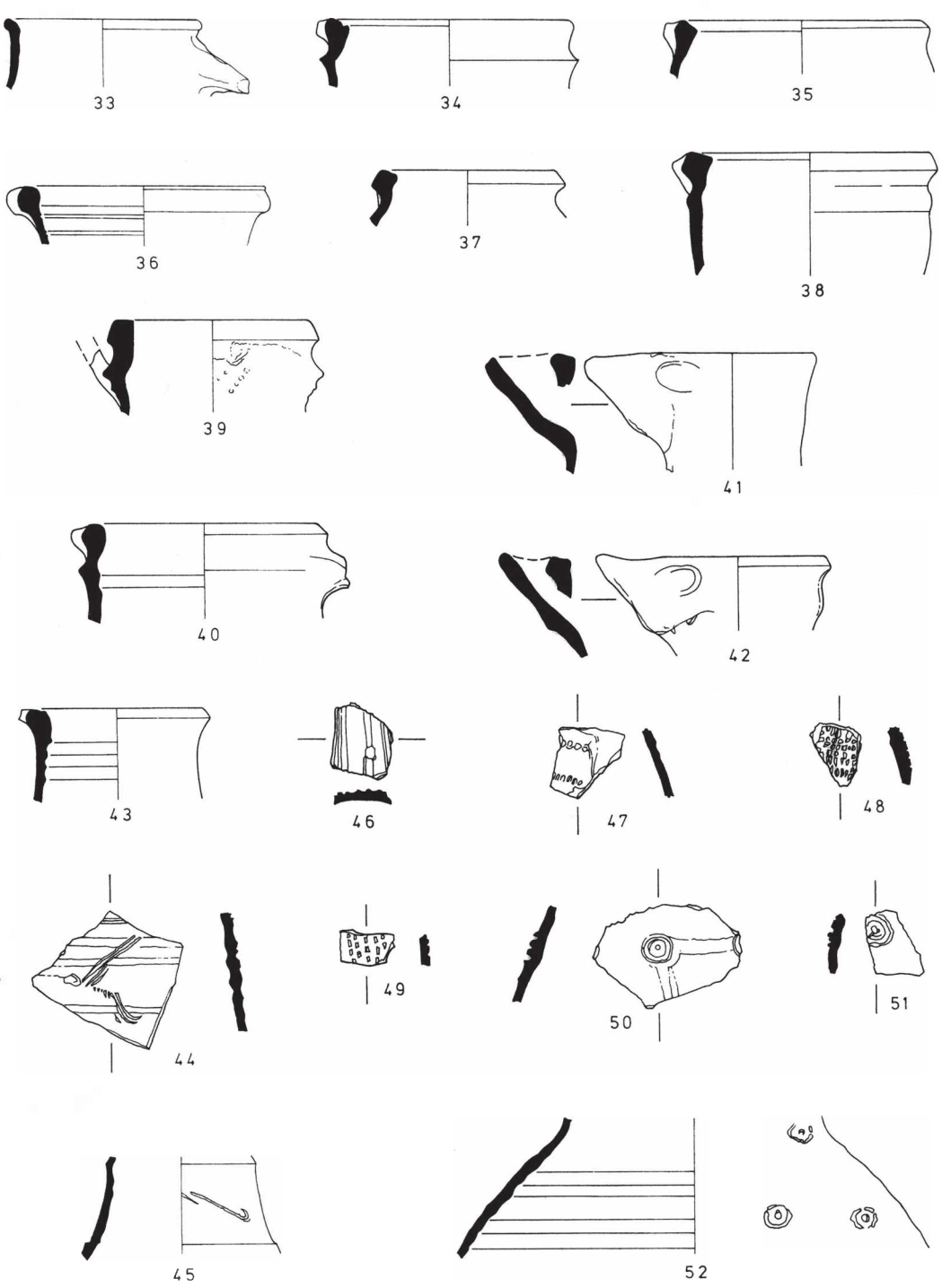

Figure 24
33–43 Jug rims from Kiln C 1969
44–52 Decorated bodysherds from jugs Kiln C 1969
Scale 1/4

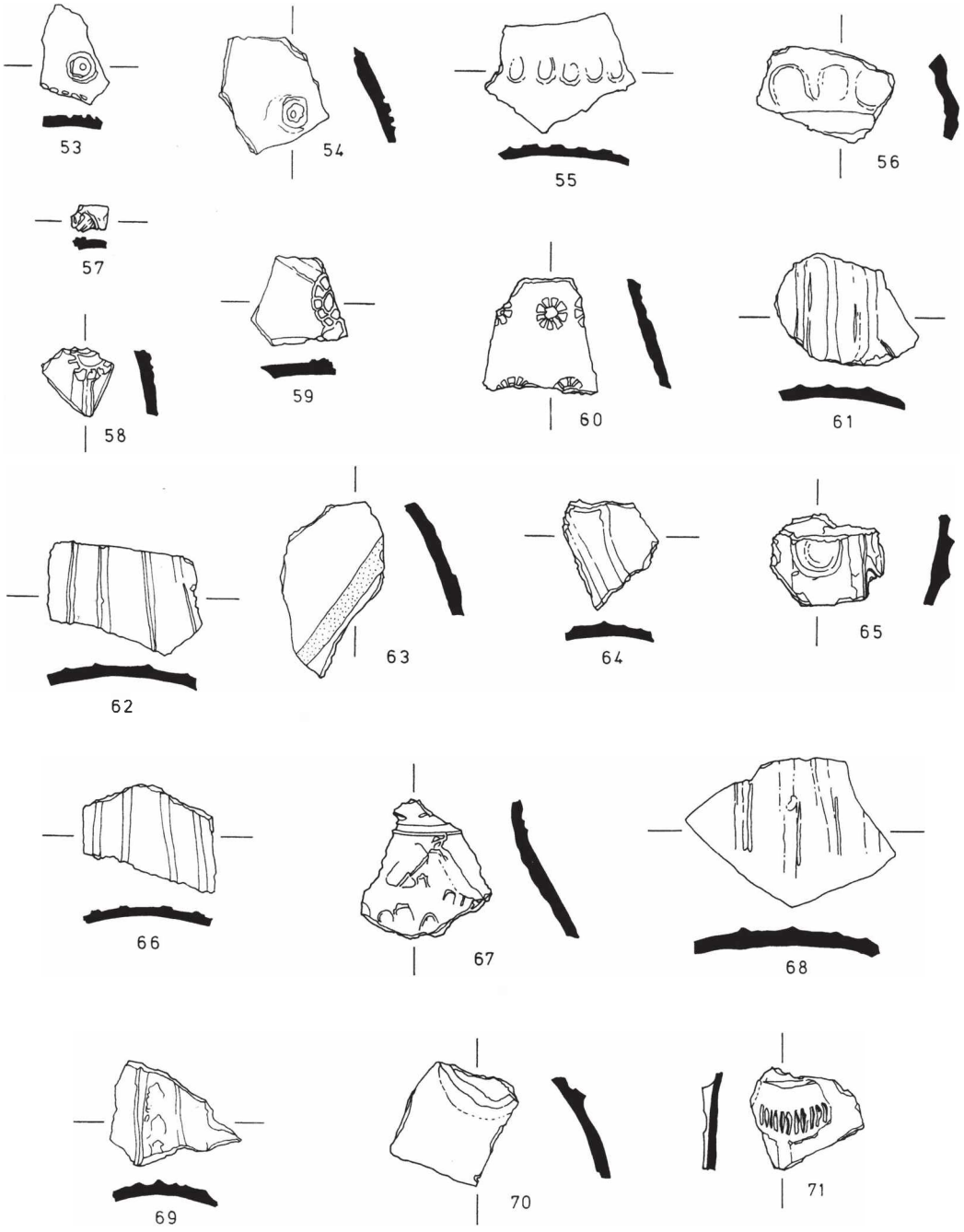

Figure 25
53–71 Decorated bodysherds from jugs Kiln C 1969
Scale 1/4

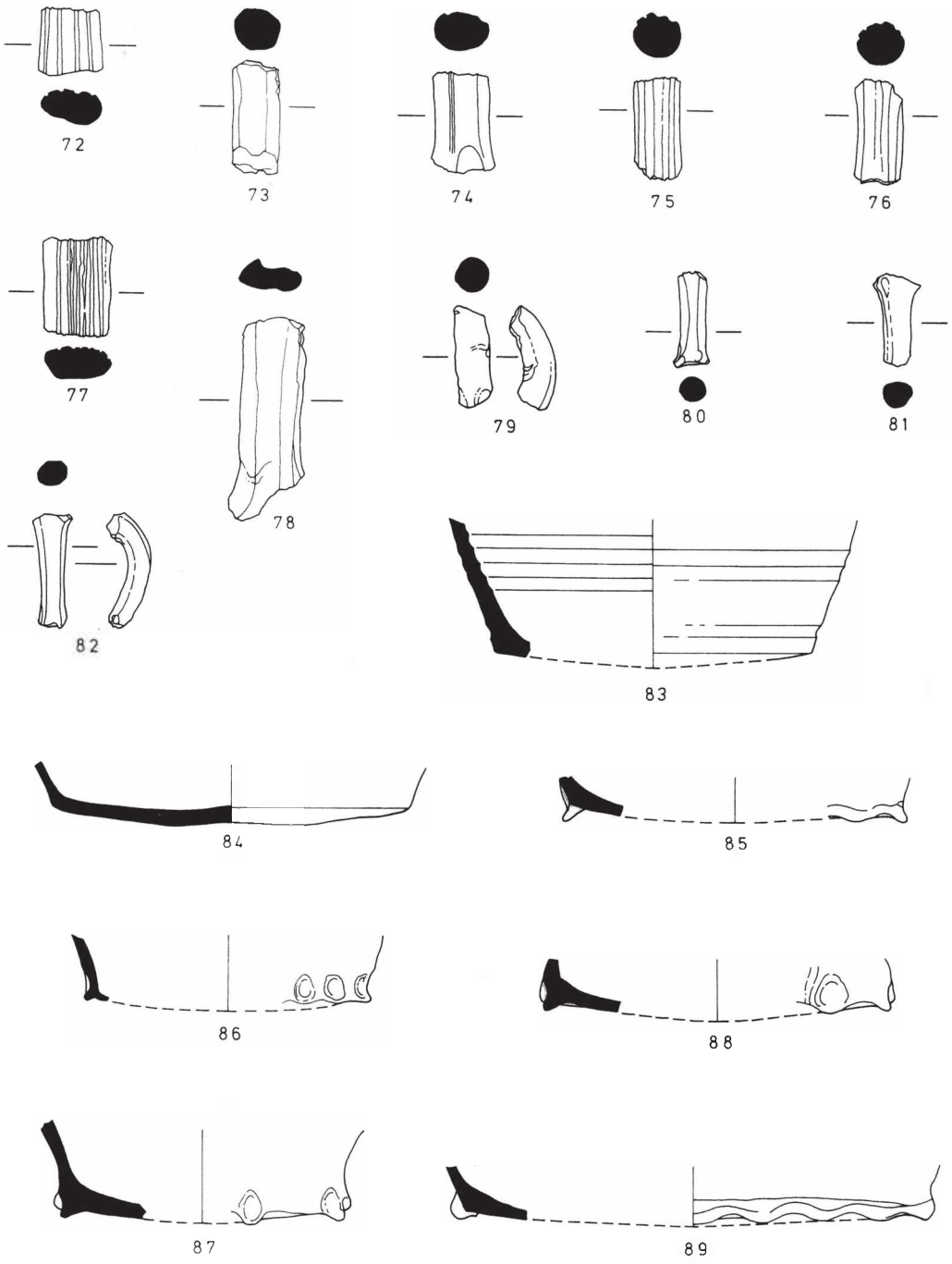

Figure 26
72–82 Rod handles from jugs Kiln C 1969
83–89 Basal angles from jugs Kiln C 1969
Scale 1/4

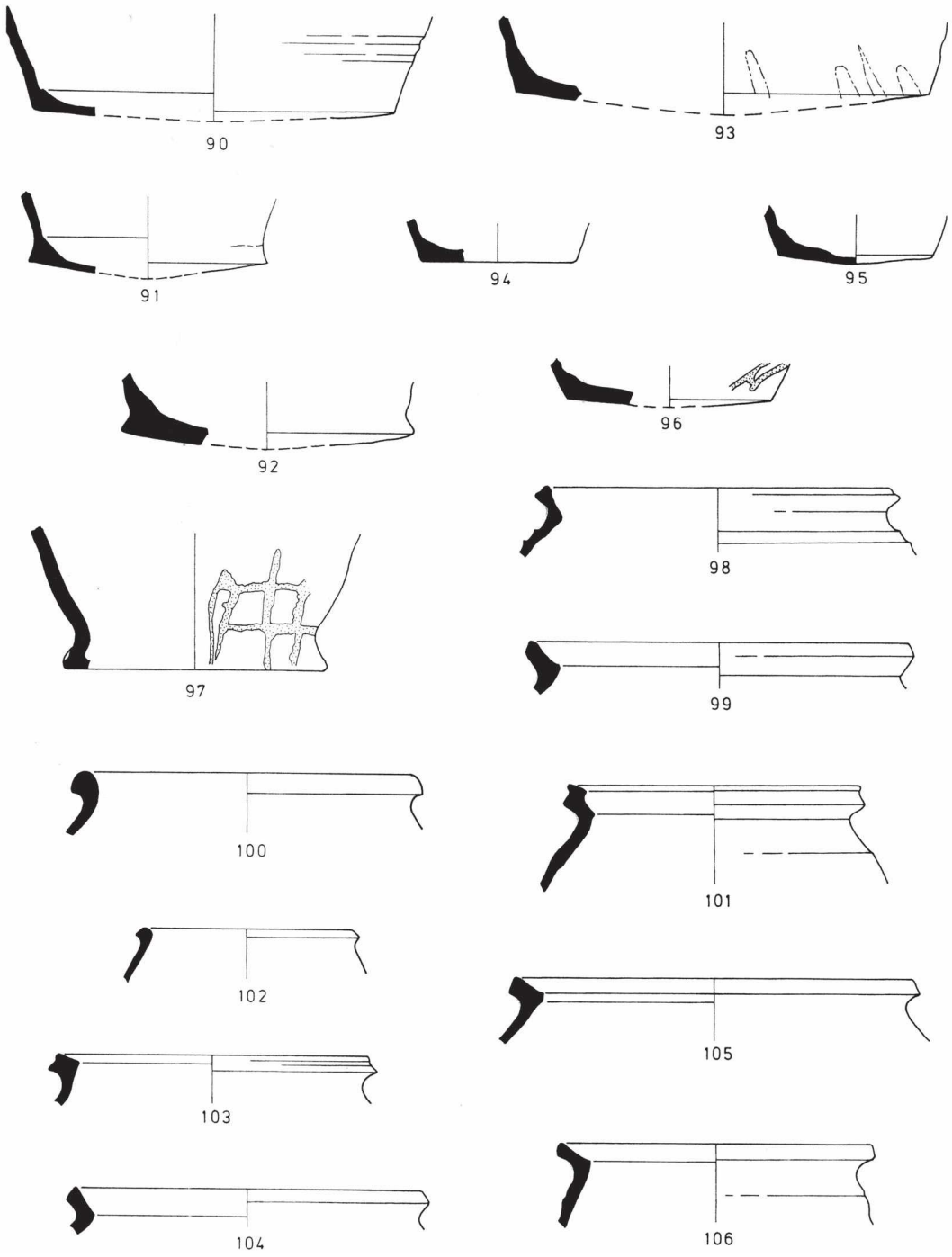

Figure 27
90–**97** Basal angles from jugs Kiln C 1969
98–**106** Jars Kiln C 1969
Scale 1/4

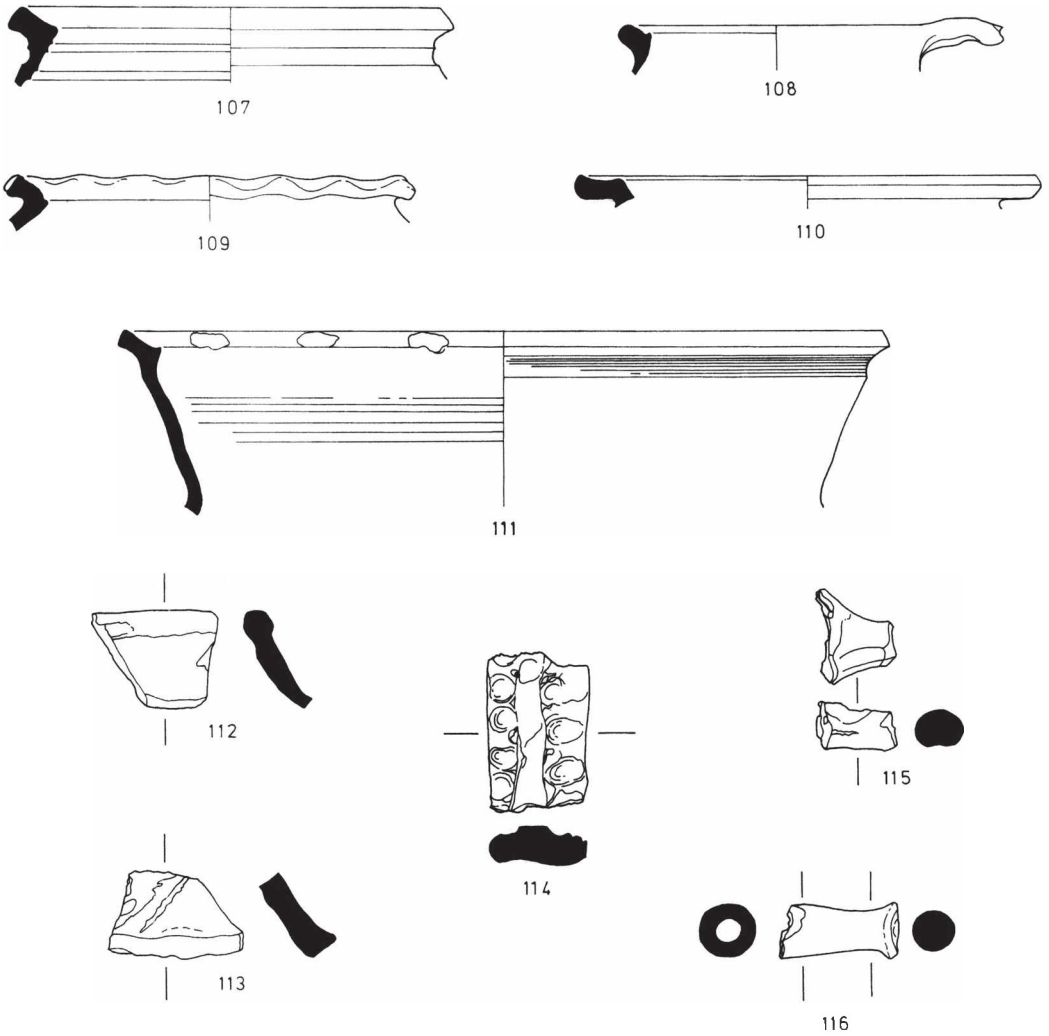

Figure 28
107–**110** Jars Kiln C 1969, **111**–**113** Bowls Kiln C 1969
114 Curfew handle Kiln C 1969
115–**116** Skillet handles Kiln C 1969
Scale 1/4

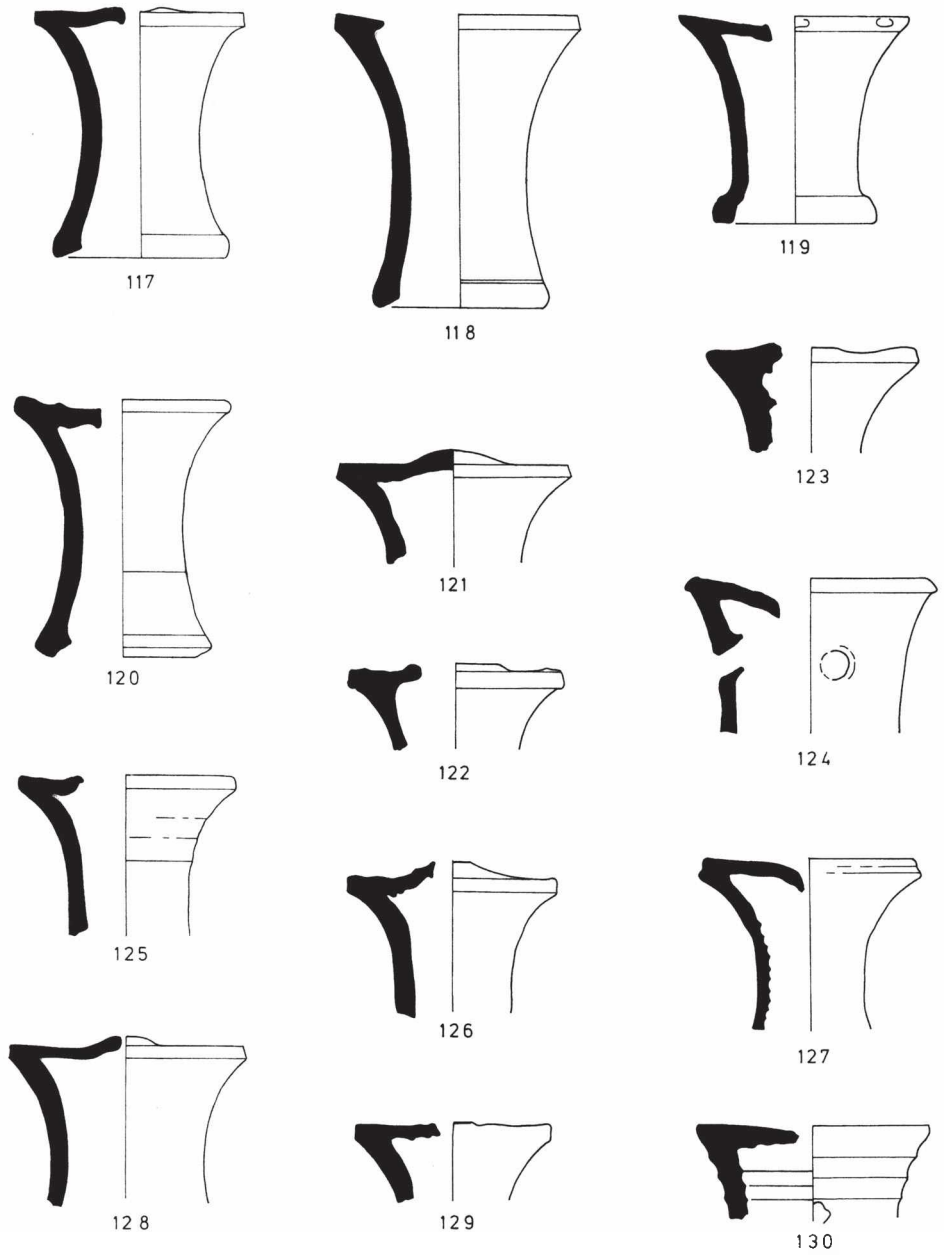

Figure 29
117– 130 Kiln Props Kiln C 1969
Scale 1/4

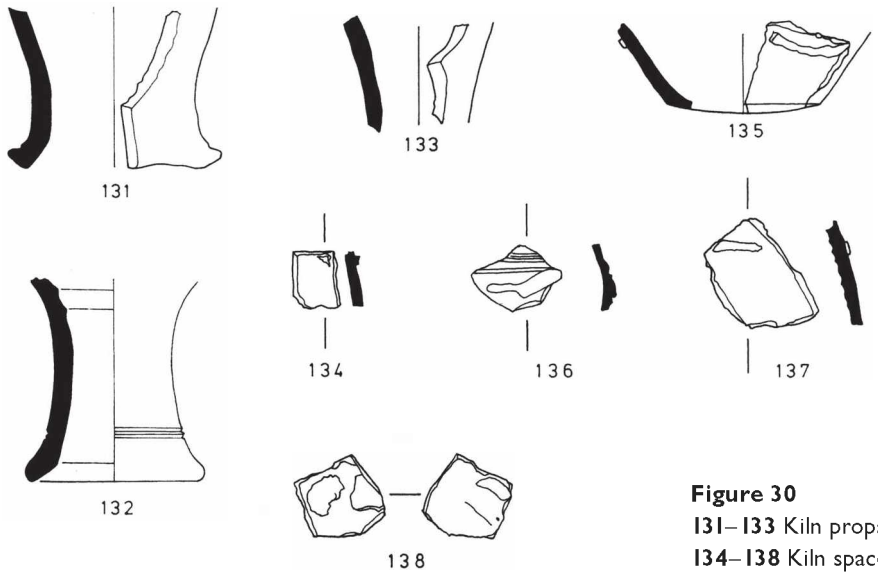

Figure 30
131–133 Kiln props Kiln C 1969
134–138 Kiln spacers Kiln C 1969
Scale 1/4

National Museum of Scotland accession numbers and not site context information.

The fabrics

There is considerable variation in the colour and matrix of the Scottish Gritty Wares from these excavations which can vary from a very fine white fabric with few inclusions through to a pinkish white fabric which will often contain fragments of red sandstone. Recent clay sourcing and firing as part of the White Gritty sourcing project would seem to suggest that the clays present in the burn which runs through the 'Pottery Field' are more likely to fire with a pinkish tinge (Jones et al 2006). There is also a small group of redware fabrics present in this assemblage which seem to have been made from the sizeable deposits of iron rich red firing clay which have been recently located on the ridge to the south of the production site (Fig. 2).

Scottish Gritty Wares

The vessel types

The 10,808 sherds of pottery from the 1971 excavations represent a minimum number of 7,473 jugs, 900 jars possibly used for cooking and 44 other vessel types.

Jars (Figs 31–33)

The jars from Colstoun are most commonly of a slightly globular shape with an everted rim and a cordon on the shoulder. Intriguingly there are also examples of vessel forms that are similar to those that have been given a Fife and Borders provenance (Haggarty et al 1984; Hall 1997). These are best represented by jars with frilled rims and jars that are straight-sided rather than globular (cats 1, 2, 5–11). There is a single example of squat jar which is straight-sided with a slightly frilled rim (cat 3). All these vessels are unglazed.

Jugs (Fig 33)

The jug forms from Colstoun are of a globular shape with flat bases which are occasionally thumbed. The rim forms from these excavations have a distinctive ridge below the neck where the strap handle is normally attached, the jugs from Kiln C do not possess this ridge. There is also good evidence for anthropomorphic jugs being made at Colstoun and in at least one case these vessels were double handled (cat 47). The face masks are very simple with eyes being represented by ring and dot decoration, noses being fairly small and beards are represented by small incised lines. Included amongst the anthropomorphic forms are four examples of beards formed of twisted clay rods (cats 50–53), these are very similar to forms of decoration identified at the redware production site of Stenhouse (Hall and Hunter 2001). Most of the jugs are glazed and exhibit a mixture of incised and applied decoration.

Other vessel forms

The other vessel types being produced by these kilns include the handled skillet, the tripod pipkin (cat 58) and there is evidence for at least one open vessel form.

Redwares (Fig 34)

There are 241 sherds in this very distinctive red fabric which contains occasional white inclusions. Virtually all these sherds are from splash glazed jugs with strap handles, apart from three externally smoke-blackened rimsherds that may be from a cooking vessel. Some of the sherds show definite traces of an external white slip, possibly indicating an attempt by the potters to make

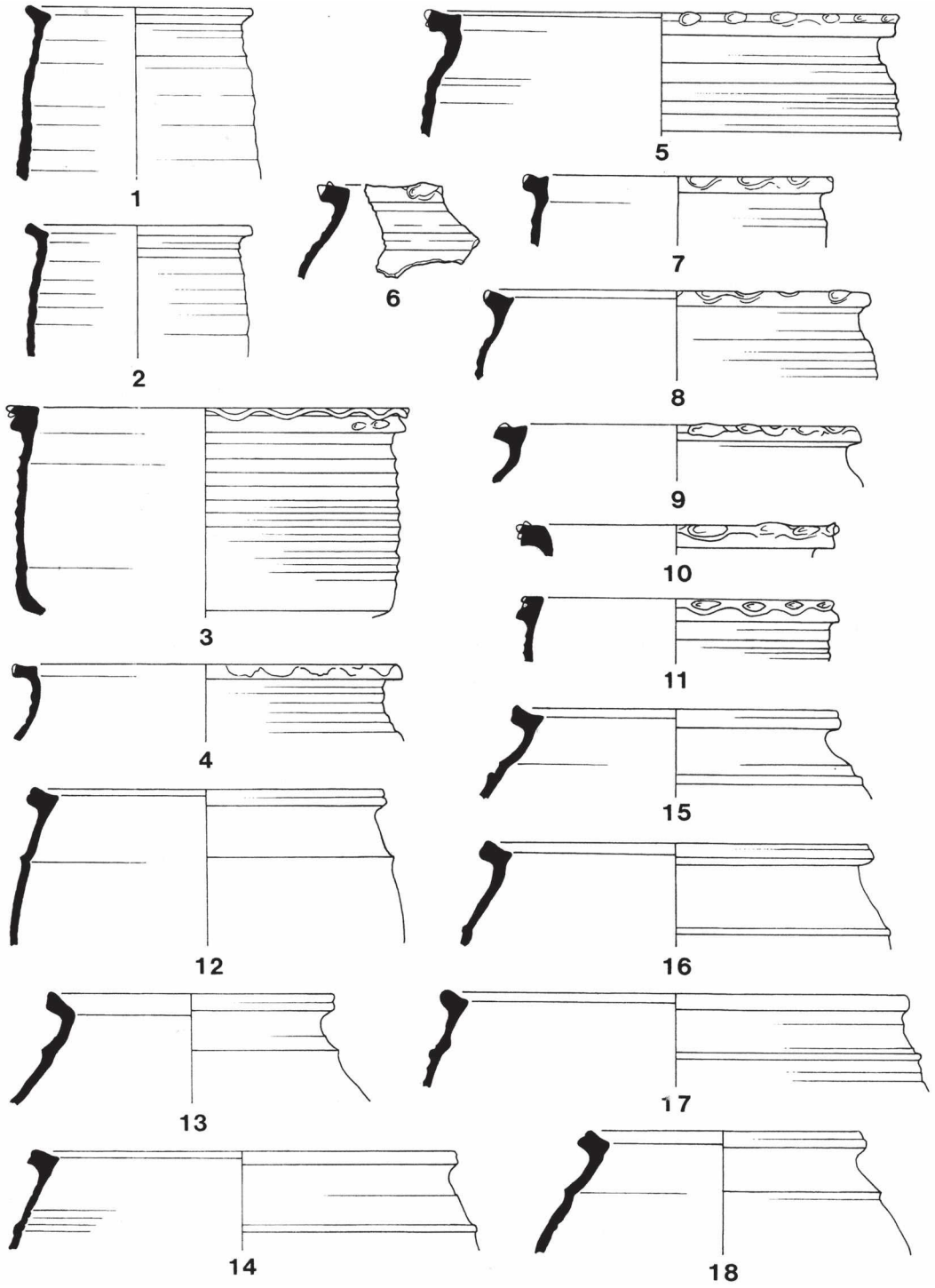

Figure 31
1– 18 Jars from Kiln A or B 1971
Scale 1/4

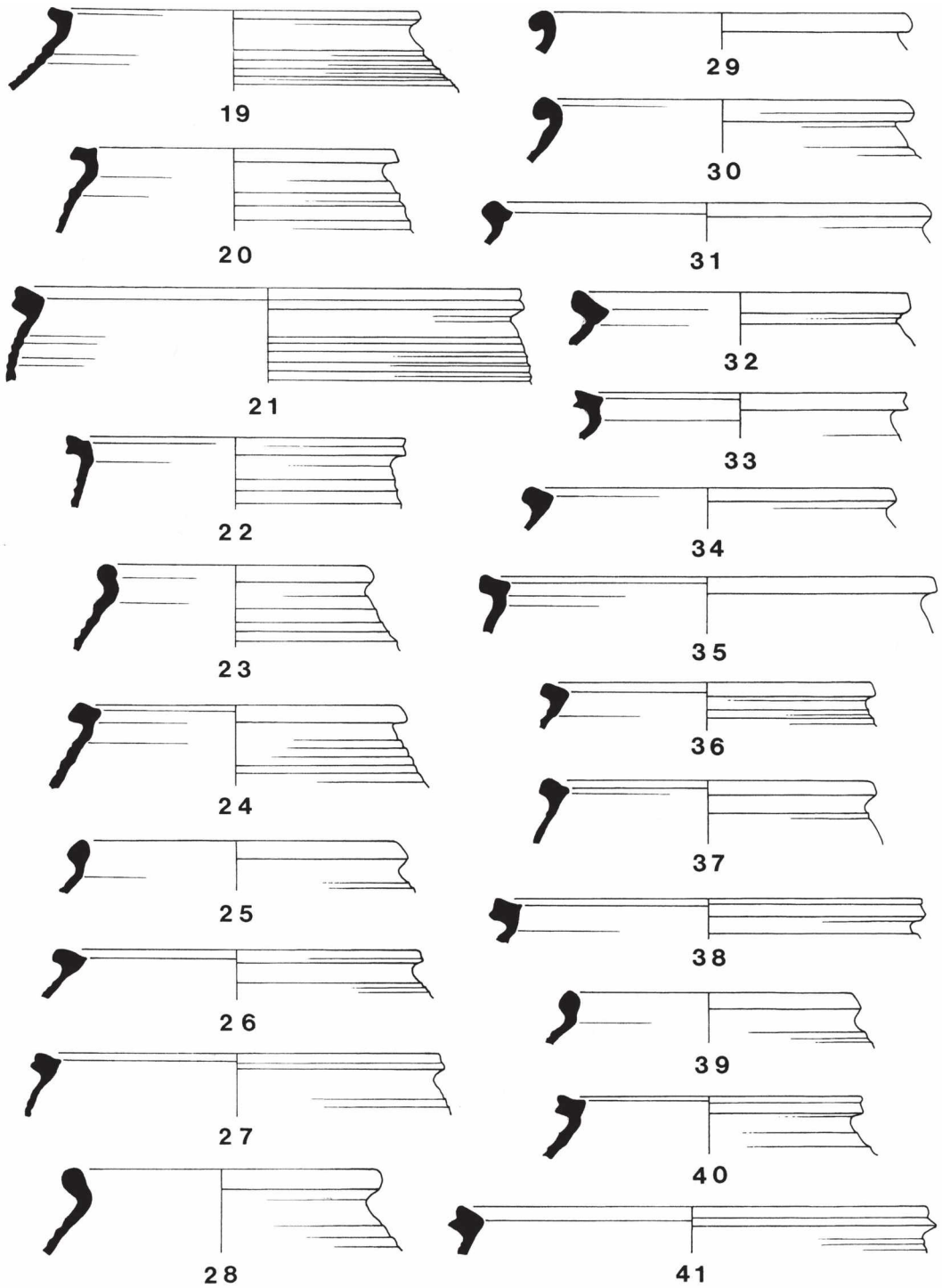

Figure 32
19–41 Jars from Kiln A or B 1971
Scale 1/4

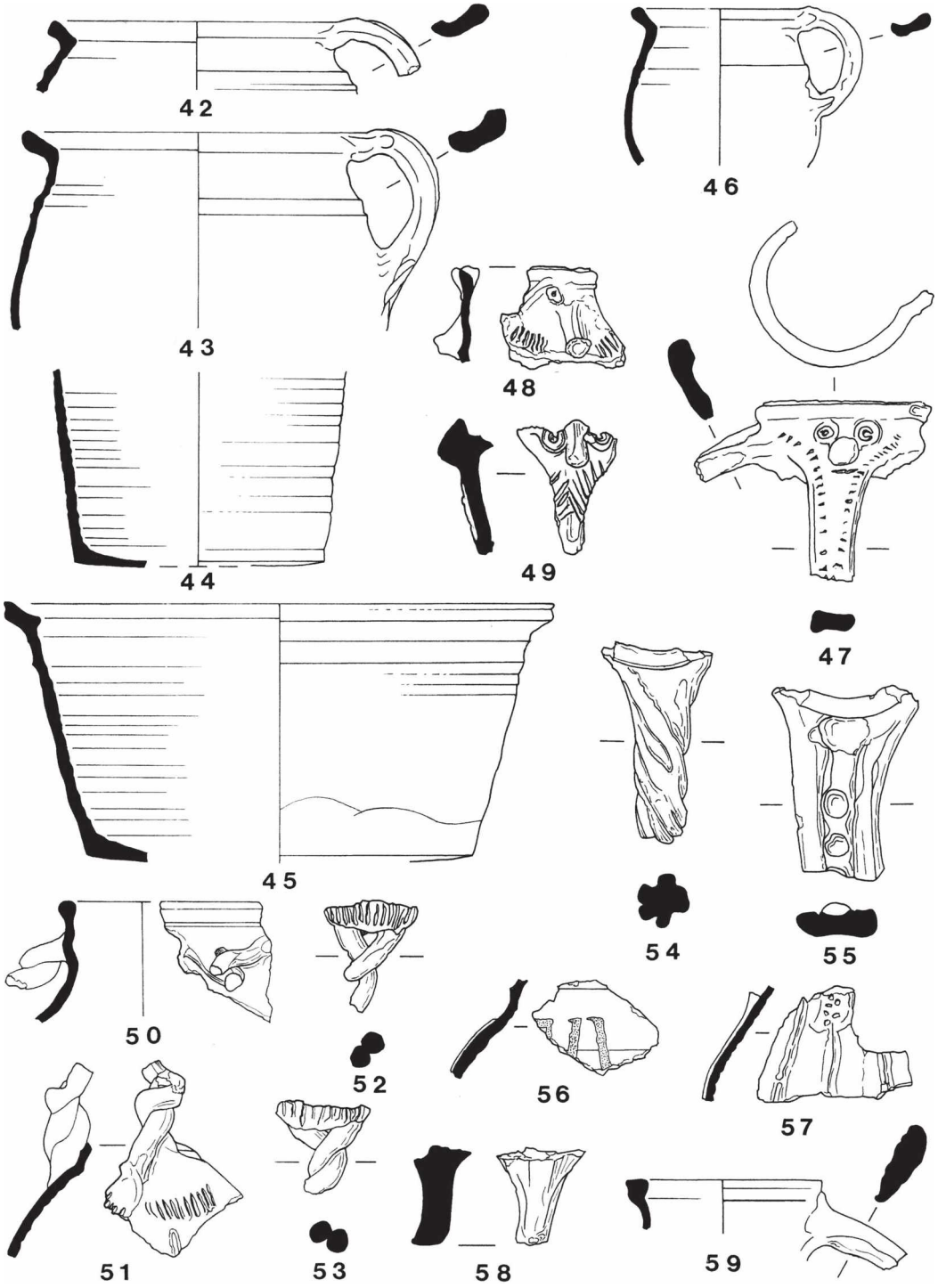

Figure 33
42, 43, 46 Handled Jars from Kiln A or B, basal angle from Jar Kiln A or B 1971
45 Bowl from Kiln A or B 1971
47, 48 Jug rims and handles from Kiln A or B
49 Facemask from kiln A or B
50–53 Twisted handles from Kilns A or B
54 Twisted rod handle from Kiln A or B
55 Decorated strap handle from Kiln A or B
56, 57 Decorated jug bodysherds from Kiln A or B
58 Leg from tripod pipkin
59 Rim and strap handle junction from jug
Scale 1/4

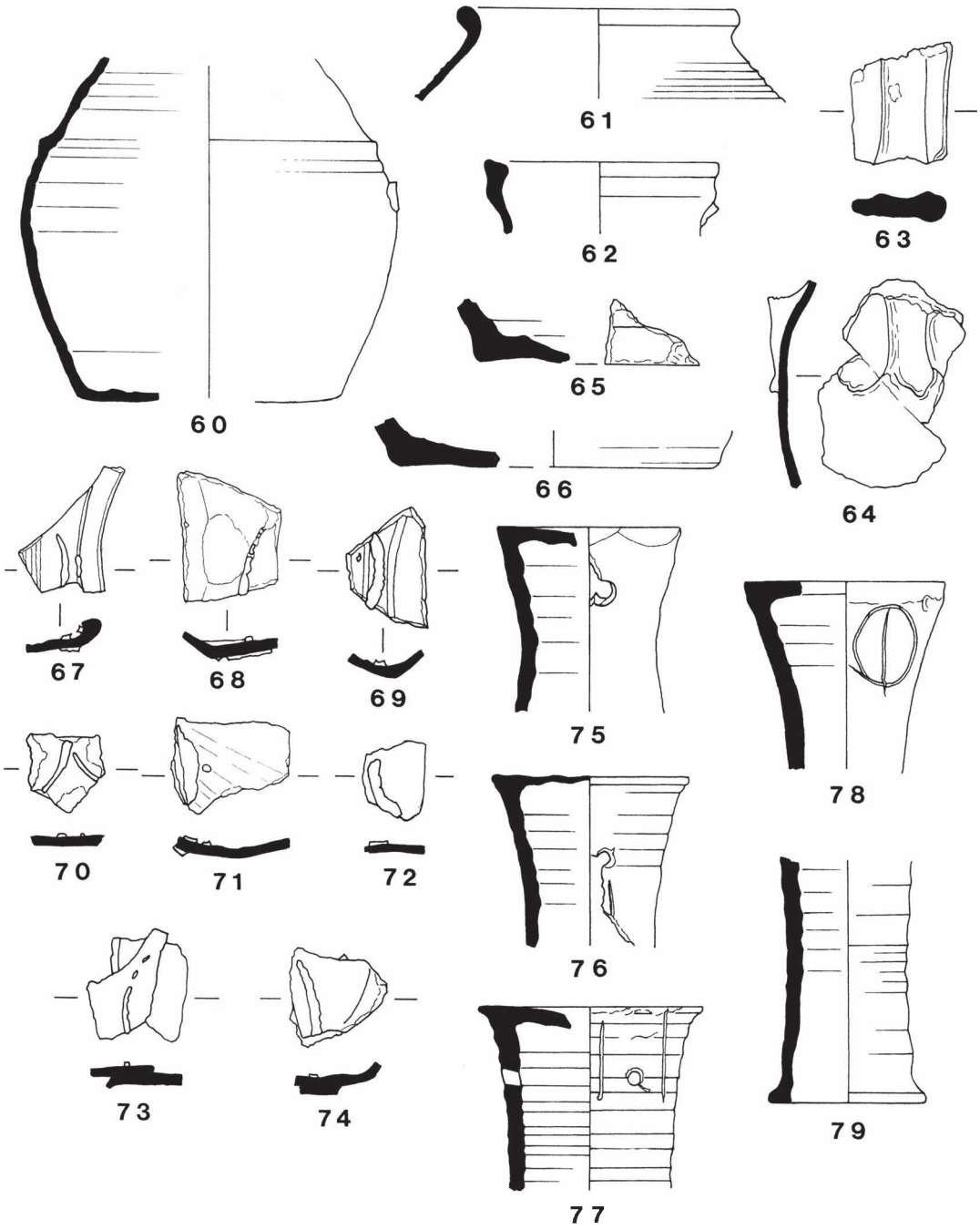

Figure 34
60 Basal angle and sidewalls from jug
61–66 Redware rimsherds, strap handle fragment, basal angles and handle junction from Kiln A or B
67–74 Parting sherds
75–79 Kiln props from Kiln A or B
Scale 1/4

this batch of redware look like whiteware? On the face of it, these vessels belong in the identified Scottish Redware tradition which is dated from the 13th to late 15th centuries (Hall 1998, 171). The style of these vessels suggests that they are from the later end of this date range.

Twenty-eight of these sherds are marked with the letters 'P', 'T' and 'CA' which may represent context designations, it is not known which excavation they relate to. The fact that similar letters are marked on some of the kiln props would seem to suggest that these redwares were found in the same deposits. This makes it all the more frustrating that it is no longer possible to identify either which phase of excavation this material relates to or what kiln, if any, they were found in.

Evidence for loading and packing (Fig 34)

Parting sherds

This assemblage includes rare examples of objects which give clues to the methods of stacking and packing of vessels used in the kilns on this site. There are 323 rim, base and body sherds which have been used to separate individual vessels in the kiln to prevent them being fused together. These are distinguished by vessel scars which are often visible on either side of the sherd and glaze which runs over the broken edges. There are several examples of small stacks of sherds which have become fused together which were presumably inserted into gaps in the load of vessels to keep them stable.

Fired clay supports (Figs 18–20)

Much harder to explain are the several examples of fired lumps of clay which have been pushed against either the tops or bottoms of vessels. There is one surviving example of a lump of fired clay which overlaps a rimsherd and several fired clay lumps which preserve either rim profiles or basal angles. These clay objects may represent attempts to plug gaps in the structure of the kiln although the fact they are completely fired must indicate that they were somewhere inside the kiln. It has been suggested to the author that these pieces of fired clay may represent attempts to keep the load of pots steady inside the kiln (pers comm John Hudson).

Kiln furniture (Fig 34)

There are 165 kiln props in this assemblage all of which are of the common 'mushroom' or 'cooling tower' shape which have also been found at the production sites of Rattray and Stenhouse (Hall, Haggarty and Murray 2003). These props are apparently manufactured from different clay sources, the most common one being an iron rich deposit which fires red, it is tempting to wonder whether the large deposits of red firing clay identified to the south of the production site were being used for the manufacture of these props.

Kiln structure (Fig 35 and 17)

The only part of this assemblage that it is still possible to definitely assign to a kiln are the 13 fired kiln bricks which, from the available photographic evidence, are all from Kiln A. Yet again, rather like some of the kiln props, these bricks are apparently made from the red firing clay source to the south of the production site.

Mortar (Fig 35)

One of the side walls of Kiln A had a reused pottery mortar built into it. This object was presumably used for grinding up the various ingredients for glazing some of the vessels and is paralleled from the excavations at Laverstock in Wiltshire (Musty 1969, 136; Fig 23). This vessel seems to have also been made from the red firing clays discussed above.

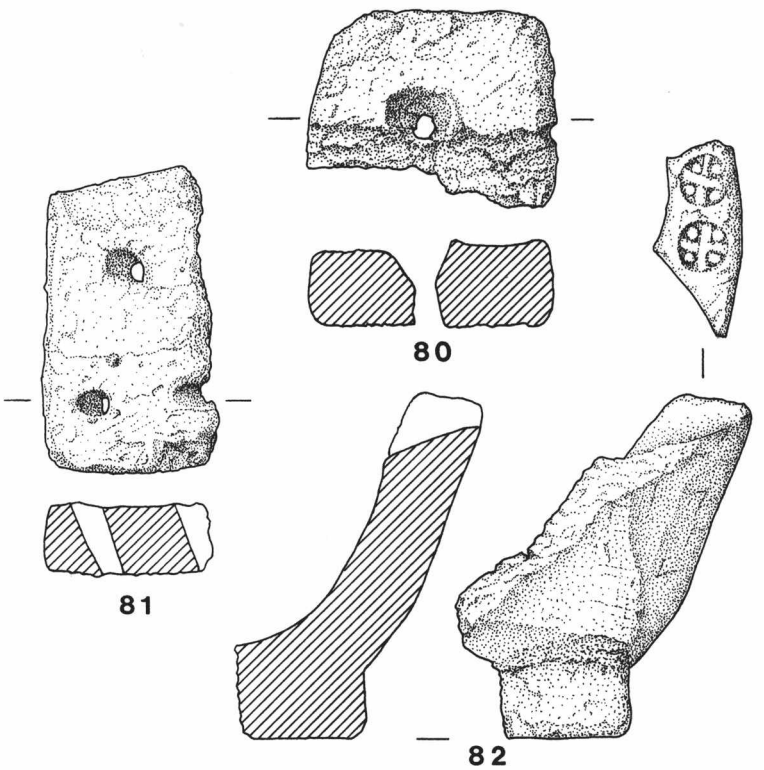

Figure 35
80–81 Kiln bricks from Kiln A
82 Mortar built into wall of Kiln A, pottery from 1969 excavations (Kiln C)
Scale 1/4

Conclusions

Technology and production

To date three kilns have been excavated at Colstoun. Two of these (A and B) had double flues, which according to Musty's published kiln chronology (1974, 44–46) are Type 2a. These are a broadly similar type to other published Scottish examples from the excavated production sites of Stenhouse near Falkirk and Rattray, Aberdeenshire (Hall and Hunter 2001; Murray and Murray 1993). The third kiln (C) excavated at Colstoun was a multi-flued, Musty Type 3, which has no parallels in Scotland.

The re-excavation of kiln (C) with its three stoke-holes, first excavated by Ben Edwards in 1969, proved to be a fairly simple exercise. This was aided by the existence of adequate trench location material and the sensible precaution by the excavator of sealing the kiln with black plastic. The top of the north wall of the kiln lay 0.38 m below modern ground level; its south wall lay at 0.46 m below. It was noticeable that the base of the plough had torn the top of part of the plastic sheet, which serves to reinforce the need to ensure that any change in the cultivation depth of the whole of this field is identified early on. It was clear from the 26 test pits dug in the other part of the field that undisturbed archaeological deposits exist at a depth of 0.20 m below modern ground level and would also be at risk from any change in the cultivation regime of this area.

The failure to find kilns (A and B), first excavated by David Clarke's in 1971, was extremely frustrating but it is of interest that the geophysical survey was not able to locate them. It has been suggested to the author that this may be because the stone that the kilns are built of does not hold a strong magnetic signal (pers comm Mark Noel). The fact that these kilns had already been excavated and had therefore lost any kiln waste or potsherds may also have been a contributory factor to the low magnetic signal (see above). Such an unexpected result from an archaeomagnetic survey of a pottery production centre may have implications for such surveys on other potential sites in Scotland, where negative results should perhaps be interpreted with caution.

The presence of kiln props, parting sherds and fired clay load supports allow for an attempt at reconstructing how the kilns functioned. It would appear that both the Type 2 kilns were either open-topped or possessed temporary clay domes but both certainly functioned on the vertical draught principle. They would have been loaded from the top and the 'green' pottery kept in place by a combination of props and fired clay supports. The experimental kiln firings at Barton on Humber was carried out in two Musty Type 2 kilns, both of which were smaller than the similar kiln (B) at Colstoun. It was estimated that the larger of the experimental kilns might hold 96 pots per firing and given that Kiln B at Colstoun is at least twice the size of the experimental example then we might expect a load of c 180 pots per firing (Bryant 1977, 112). Kiln C indicates a change in technology and may have been loaded thought the stoke-holes. It has a much larger available internal firing chamber and might potentially have held a load of c 240 pots per firing. Whether Kiln C had a temporary clay dome or given its diameter, a permanent covering, is still open to question. It has been argued that this type of kiln was certainly open-topped and probably permanently domed (Bryant 1977, 117). The presence of a reused pottery mortar in the structure of Kiln A (cat 82) is intriguing and if it does relates to the glazing process would seem to imply that glazed jugs were amongst the earliest products of the Colstoun kilns.

The question of influence on the type and nature of the Colstoun kilns also needs to be considered. Kiln A would seem to be a primitive and earlier version of the traditional Type 2 kiln being nothing more that a stone-lined rectangular pit with a stoke-hole at either end. Kiln B is a better example of the traditional Type 2 kiln being oval in shape with a stoke-hole at either end. The limited archaeological evidence to date suggests that Musty Type 2 kilns with all their minor variations are probably the norm in Scotland, however, the origins and development of this basic design in post-Roman Britain is as yet unknown. Kiln C is a multi-flued pottery kiln of similar type to those known to be popular in Yorkshire, Cheshire and Staffordshire from the 13th or 14th century (Musty 1974, 63, 64).

The ceramics

Colstoun is still the only Scottish Gritty Ware production site to be identified and as outlined above provides vital information about the technology and production of this industry. What do the actual vessels tell us? Intriguingly the mixture of forms and types present in the jars may suggest that the definition of regional forms in this fabric is not as cut and dried as previously thought. The scale of the problem is indicated by the discovery of apparently 12th century Scottish Gritty Ware vessels from excavations in the burgh of Haddington (c 3 km north of Colstoun) that do not seem to be products of the Colstoun kilns, they are more akin to forms identified as originating in the Scottish Borders (pers comm G Haggarty). This may suggest that the Colstoun industry does not start until the 13th or 14th centuries and that when it does it exhibits influences in its vessel forms from earlier industries in both the Scottish Borders and Fife. The small group of Redware fabrics present in the assemblage seems to suggest that production, in some shape or form, continued until the 14th or 15th centuries. It is intriguing that such a continuation or even a recommencement of pottery production did not use the white firing clays that the earlier industry had concentrated on, unless the source had been exhausted.

Future research

It seems unlikely that the 1971 kilns will ever be rediscovered as even a set of slides of the excavation which became available at a late date in the project do not provide enough information to enable the kilns to be located (Fig 9). This is unfortunate as archaeomagnetic dates for Kilns A and B would allow for a much better understanding of the origins of the industry at Colstoun.

What is still not clear is how the Type 2 and Type 3 kilns from Colstoun relate to each other, particularly whether both types were operating at the same time, and if so, whether different vessel types were being made in different kilns. This latter possibility may be the reason that the vessel forms from Kiln C are virtually all glazed jugs. From the analysis of the pottery from this kiln it appears that the potters may have been using two different clay sources, one a high quality white firing clay and another a low quality red firing clay. Different clay sources are known to exist on the Colstoun estate along the streambeds and on the ridge to the south of the pottery field where a brick and tile works was situated in the 19th century. Recent clay prospection has identified large deposits of iron rich clays along this ridge which are very close to modern ground level in the eastern corner of Clacherdean Wood (NT 5270 7005).

Following the second phase of fieldwork at Colstoun it was very noticeable that the plough was bringing up vast quantities of pottery, kiln waste and kiln furniture in the area of the field that contains the very large magnetic anomaly (Fig 7). It would seem that the best way forward on this important site might well be to excavate a new kiln from scratch and to examine some of the putative structures that appear on the geophysical survey. Of most interest from that survey is the very large crescent of magnetic material which may indicate dumped waste and pottery from several kilns. It is tempting to consider whether this anomaly represents a backfilled former watercourse from which the clay was being dug in order to make the pottery or possibly a levigation bed where the clay was being refined prior to potting (pers comm J Hudson). Such questions could only be answered by further targeted research excavation or given the continuing damage to the site, properly funded rescue excavation.

Acknowledgements

This project was entirely funded by Historic Scotland, and Derek Hall would like to thank Nick Bridgland and Olwyn Owen for their support and interest. Special thanks are due to the Broun Lindsay family of Colstoun House for their continuing interest in the fieldwork, and the support and goodwill of tenant farmer Andrew Stoddart is gratefully acknowledged. The author would also like to thank Drs David Clarke and David Caldwell of the National Museum of Scotland for their continuing interest in this project. Dr Simon Taylor is gratefully acknowledged for his views on the placenames of Colstoun and Rannildsrothir. Finally the author would like to thank George Haggarty, Alan Vince, Sarah Jennings and John Hudson for constructive discussion regarding the Colstoun kilns and their role in Scottish ceramic studies. Figures 31–5 are by the late Frank W Moran; all other drawings are by David Munro.

Catalogue

White Gritty ware

Jugs

1 Rim to base profile of green glazed jug with strap handle junction and slightly pulled spout BQ
2 Rim, neck and sidewalls of jug glazed dark green with complete ribbed strap handle and pinched spout AN
3 Rim, neck and sidewalls of jug glazed dark green with complete ribbed strap handle and pinched spout BU
4 Rim, neck and top half of ribbed strap handle with pinched spout AS
5 Rim, neck and complete ribbed strap handle from green glazed jug AT
6 Rimsherd and complete ribbed strap handle glazed dark green AV
7 Rim, neck and complete ribbed strap handle with traces of green brown glaze. Unstratified
8 Rim, neck and top half of ribbed strap handle from jug with patches of green glaze AU
9 Rim, neck and top half of ribbed strap handle from jug with patches of green glaze AV
10 Rim, neck and top half of ribbed strap handle from jug with patches of green glaze AV
11 Rim, neck and top half of ribbed strap handle BK
12 Rim and top half of ribbed strap handle AP
13 Rim and top half of ribbed strap handle AV
14 Rim and top half of ribbed strap handle AV
15 Rim and top half of ribbed strap handle BL
16 Rim and top half of ribbed strap handle BZ
17 Rim and top half of ribbed rod handle BL
18 Rim, neck and handle junction from jug glazed dark green. Unstratified
19 Rimsherd and top half of rod handle. Unstratified
20 Rimsherd from unglazed jug AE
21 Rimsherd from unglazed jug AE
22 Rimsherd from unglazed jug AK
23 Rimsherd from unglazed jug AK
24 Rimsherd from unglazed jug AK
25 Rimsherd from unglazed jug BB
26 Rimsherd from unglazed jug BJ
27 Rimsherds from unglazed jug BL
28 Rimsherd from unglazed jug CB
29 Rimsherd from unglazed jug CB
30 Rimsherd from unglazed jar CB
31 Rimsherd from jug glazed green CB

32 Rimsherd with handle junction from jug glazed green brown AP
33 Rimsherd from jug with lug handle? BZ
34 Rimsherd from jug with pinched spout and heavy cordon BZ
35 Rimsherd from jug with pinched spout and patch of green glaze CB
36 Rimsherd from jug with pinched spout CB
37 Rimsherd from jug with pinched spout and cordon CB
38 Rimsherd from jug with pinched spout. Unstratified
39 Rimsherd from multi-handled jug with bridge spout junction and remains of handle junction BZ
40 Rimsherd from multi-handled jug with remains of handle junction and pulled spout CB
41 Rimsherd with bridge spout from green glazed jug. Unstratified
42 Rimsherd with bridge spout from green glazed jug. Unstratified
43 Rimsherd from green glazed jug with bridge spout junction. Unstratified
44 Bodysherd from jug with incised decoration and heavy internal and external rilling AJ
45 Bodysherd from jug with incised line BL
46 Bodysherd from green glazed jug with vertical incised lines. Unstratified
47 Bodysherd with stabbed decoration from green glazed jug BG
48 Bodysherd from amber green glazed jug with stabbed decoration BZ
49 Bodysherd from green glazed jug with stabbed decoration CA
50 Bodysherd from green glazed jug decorated with ring and dot AO
51 Bodysherd decorated with ring and dot BL
52 Bodysherd decorated with ring and dot CB
53 Bodysherd decorated with ring and dot and stabbed decoration, possibly part of face mask? Unstratified
54 Bodysherd decorated with ring and dot from green glazed jug. Unstratified
55 Bodysherd from green glazed jug decorated with 'thumbed' marks AV
56 Bodysherd from green glazed jug decorated with 'thumbed' depressions. Unstratified
57 Bodysherd from jug decorated with stamped pad AD
58 Bodysherd from jug decorated with stamped decoration AL
59 Bodysherd from green glazed jug decorated with stamped pad AV
60 Bodysherd from green glazed jug decorated with stamped 'wheel' decoration BZ
61 Bodysherd from jug glazed green with raised vertical ridges BH
62 Bodysherd from green glazed jug with vertical applied strips BW
63 Bodysherd from green glazed jug with applied purple brown diagonal stripe BW
64 Bodysherd decorated with applied vertical strips glazed green brown CB
65 Bodysherd with handle junction and applied strips with traces of green glaze CB
66 Bodysherd with applied vertical strips glazed dark green CB
67 Bodysherd from green glazed jug with applied scales. Unstratified
68 Bodysherd from green glazed jug with applied brown vertical stripes. Unstratified
69 Bodysherd from green glazed jug decorated with scales and vertical applied lines glazed yellow green. Unstratified
70 Bodysherd with bottom of bridge spout junction. Unstratified
71 Bodysherd from green glazed jug with fragment of decorative handle junction. Unstratified
72 Rod handle with vertical incised lines BN
73 Rod handle with traces of green brown glaze BZ
74 Rod handle with vertical incised line CB
75 Rod handle with vertical incised lines glazed green. Unstratified
76 Rod handle with vertical incised lines and traces of green glaze. Unstratified
77 Strap handle with vertical incised lines. Unstratified
78 Narrow strap handle with central groove CB
79 Fragment from decorative rod handle AD
80 Decorative handle AE
81 Fragment of decorative handle CB
82 Fragment of decorative handle. Unstratified
83 Basal angle from jug with heavy internal and external rilling AK
84 Base from green glazed jug BV
85 Thumbed basesherd with patches of green glaze CB
86 Thumbed basesherd with patches of green glaze. Unstratified
87 Base with occasional thumbing and patches of green glaze AQ
88 Basesherd with occasional thumbing CB
89 Basesherd with thumbed applied strip AV
90 Basesherd from jug AQ/BG/BL
91 Flared basesherd with traces of applied strip around basal wall BZ
92 Flared basesherd with external line decoration CB
93 Knife trimmed basesherd from an unglazed jug AQ
94 Knife trimmed base from small unglazed vessel CB
95 Knife trimmed base from small unglazed vessel. Unstratified
96 Basesherd with traces of white line decoration. Unstratified
97 Basesherd with 'chequered' pattern formed of white lines. Unstratified.

Jars

98 Rimsherd from unglazed jar AD
99 Rimsherd from unglazed jar AE
100 Rimsherd from unglazed jar AK
101 Rimsherd from unglazed jar? AQ
102 Rimsherd from unglazed jar AQ
103 Rimsherd from unglazed jar AW
104 Rimsherd from unglazed jar CB
105 Rimsherd from unglazed jar. Unstratified
106 Slightly frilled rimsherd from unglazed jar. Unstratified

Cooking pots

107 Rimsherd and sidewall from cooking pot AQ
108 Rimsherd with handle junction from cooking pot BJ
109 Frilled cooking pot rim CB

Open vessel forms

110 Rimsherd from large open vessel form CB
111 Rim to base profile from bowl glazed green brown internally and externally with applied pads glazed purple brown on rim CT12
112 Rim to base profile from internally glazed dripping dish AP

Other vessel forms

113 Basal angle from curfew? with traces of external green glaze. Unstratified
114 Strap handle from curfew? decorated with applied pads and central strip. Unstratified

115 Skillet handle junction with traces of smoke blackening CB
116 Skillet? handle with traces of white slip on external surface. Unstratified

Kiln furniture

117 Virtually complete kiln stand with pierced hole in top and remains of stacking scar AO
118 Virtually complete kiln stand with patch of dark green glaze on side BV
119 Top to bottom profile of kiln stand with traces of pierced hole in the top AV
120 Top to bottom profile of kiln stand with traces of pierced hole in the top BU/BV
121 Top half of kiln stand AS
122 Top of kiln stand with hole pierced through it BF
123 Top half of kiln stand with traces of rim scar and spots of green glaze BF
124 Top half of kiln stand with hole pierced through the side and top BL
125 Top half of kiln stand with traces of hole pierced through it BQ
126 Top half of kiln stand with traces of green glaze and of a hole pierced through it BY
127 Top half of kiln stand with traces of hole pierced through it BY
128 Top half of kiln stand with traces of hole pierced through it BY
129 Top half of kiln stand with traces of hole pierced through it BY
130 Top of kiln stand with hole pierced through one side CB
131 Base and side of kiln stand with slightly flared edge AV
132 Base and side of kiln stand BQ
133 Bodysherd from kiln stand with one edge of a slot. Unstratified
134 Stacking sherd from green glazed jug AK
135 Stacking sherd with rim scar covered in green glaze. Unstratified
136 Stacking sherd with rim scar. Unstratified
137 Stacking sherd with rim scar. Unstratified
138 Stacking sherd with scars on both sides. Unstratified

Variant fabric

139 Rim and rod handle junction from jug in a grey fabric BZ
140 Rimsherd from jug in a pinkish red fabric AQ
141 Rimsherd with pulled spout in purple brown fabric. Unstratified
142 Basesherd from jug in a pinkish red fabric AQ
143 Thumbed basesherd in a pink fabric with traces of internal white slip AR
144 Slightly thumbed basesherd in a grey fabric with patches of dark green glaze BL
145 Slightly thumbed basesherd in a grey brown fabric with patches of dark green glaze CB
146 Strap handle fragment in pink fabric slipped white on its external surface AQ
147 Bottom half of ribbed strap handle and junction glazed green brown in a pink brown fabric BB
148 Rimsherd from jar in a pink white fabric AJ
149 Rimsherd from jar in pink brown fabric AQ
150 Rimsherd from jar in pink brown fabric AQ
151 End of skillet handle in pinkish red fabric CB
152 Rim to base profile of open vessel form with strap handle in a red fabric with a blue grey core BQ

Tile

153 Piece of green glazed floor tile. Unstratified
154 Piece of green glazed floor tile. Unstratified
155 Piece of green glazed roof tile. Unstratified

Kiln structure

156 Fragment

1971 excavations (Kilns A and B)

White Gritty Ware

1 Rimsherd and sidewalls from unglazed straight-sided jar with external rilling MED 262
2 Rimsherd and sidewalls from straight-sided jar MED 163
3 Rim to base profile from jar with frilled bifid rim and externally rilled surface MED 286 (Kiln B Lady Broun Lindsay)
4 Slightly frilled rimsherd with external rilling MED 408
5 Slightly frilled rimsherd MED 408
6 Slightly frilled rimsherd from jar with externally rilled surface and internal brown glaze splashes MED 408
7 Slightly frilled rimsherd unmarked
8 Slightly frilled rimsherd from unglazed jar MED 408
9 Slightly frilled rimsherd from unglazed jar unmarked
10 Frilled bifid rim from jar unmarked
11 Frilled bifid rimsherd from unglazed jar unmarked
12 Rimsherd and sidewalls from unglazed jar with single raised cordon MED 186
13 Rimsherd from unglazed jar with single raised cordon MED 408
14 Rimsherd from unglazed jar with external rilling MED 408
15 Rimsherd from unglazed jar with single raised cordon MED 408
16 Rimsherd from unglazed jar with single raised cordon unmarked
17 Rimsherd from unglazed jar with single raised cordon unmarked
18 Rimsherd from unglazed jar with single raised cordon, internally glazed brown over broken edges (Waster) MED 408
19 Rimsherd from unglazed jar with single raised cordon MED 408
20 Rimsherd from jar with heavy external rilling MED 408
21 Rimsherd from jar with slightly rilled outer surface MED 408
22 Rimsherd from jar unmarked
23 Rimsherd from unglazed jar with external rilling MED 408
24 Rimsherd and side walls from unglazed jar with rilled exterior surface MED 408
25 Rimsherd from unglazed jar MED 408
26 Rimsherd from unglazed jar unmarked
27 Rimsherds from unglazed jar MED 408
28 Rimsherd from unglazed jar MED 408
29 Rimsherd from unglazed jar unmarked
30 Rolled rimsherd from unglazed jar MED 408
31 Rimsherd from unglazed jar MED 408
32 Rimsherd from unglazed jar MED 408
33 Rimsherd from unglazed jar MED 408
34 Rimsherd from unglazed jar MED 408
35 Rimsherd from unglazed jar MED 408
36 Rimsherd from unglazed jar MED 408
37 Rimsherd from unglazed jar MED 408
38 Rimsherd from jar with green brown glaze over broken edge (waster) unmarked

39 Rimsherd from jar with splashes of green glaze on external and internal surface MED 408
40 Rimsherd from unglazed jar MED 408
41 Rimsherd from unglazed jar unmarked
42 Rimsherd and strap handle fragment from unglazed jar MED 408
43 Rimsherd and strap handle from unglazed jar (Kiln B Lady Broun Lindsay) MED 408
44 Sidewalls and basal angle from unglazed straight-sided jar MED 169
45 Rim to base profile from bowl with traces of green glaze on internal basal angle MED 220
46 Rim, sidewalls and strap handle from small unglazed vessel (Kiln B Lady Broun Lindsay) MED 408
47 Rim, strap handle junction and bearded facemask from unglazed anthropomorphic jug marked 46 C37
48 Rimsherd with spout and fragment of facemask marked 'P' MED 66
49 Fragment of anthropomorphic face mask glazed green NMAS 55-C43
50 Rimsherd and fragment of twisted rod decoration (Kiln B Lady Broun Lindsay) MED 399
51 Bodysherd with attached twisted rods and beard with applied strip decoration MED 291
52 Bottom fragment of beard from face mask with attached twisted rods, glazed green brown MED71
53 Bottom fragment of beard from face mask with attached twisted rods, unglazed MED 399
54 Rim and twisted rod handle from unglazed jug MED 400
55 Rim and strap handle decorated with applied thumbed strip glazed green brown (Kiln B Lady Broun Lindsay) MED 403
56 Bodysherd from jug glazed yellow brown with applied brown glazed stripes MED 74
57 Bodysherds from jug glazed speckled green with applied strips and junction from decorative handle MED 62
58 Leg from tripod pipkin glazed green brown, glaze runs over edges (waster)
59 Rim and strap handle junction from jug with traces of 'bubbled' green glaze MED 398
60 Neck to base profile from jug splash glazed dark green with external cordon MED 13

Redware

61 Rimsherds from a jar unmarked
62 Rimsherd from unglazed jug marked 'T'
63 Strap handle fragment from unglazed jug marked 'P'
64 Bodysherd with remains of strap handle junction from unglazed jug marked 'T'
65 Basal angle from unglazed jug marked 'T'
66 Basal angle from unglazed jug MED 411

Parting sherds

67 Rimsherd reused as parting sherd MED 243
68 Basal angle reused as parting sherd MED 412
69 Basal angle reused as parting sherd MED 244
70 Bodysherd reused as parting sherd MED 242
71 Bodysherd reused as parting sherd unmarked
72 Bodysherd reused as parting sherd MED 412
73 Bodysherds reused as parting sherds fused together unmarked
74 Bodysherd reused as parting shreds fused together unmarked

Kiln furniture

75 Virtually complete kiln prop with opposing vent holes and hole in top MED 251
76 Virtually complete and slightly warped kiln prop with single vent hole in one side with vessel scar on top surface MED 249
77 Fragment of kiln prop with vent hole in top and vent hole in one side defined by two vertical incised lines marked K.F. MED 254
78 Fragment of kiln prop with incised symbol on one side MED 255
79 Large fragment of central body of narrow kiln prop marked C.A. MED 252

Kiln structure

80 Fired clay brick with 'funnelled' central hole from side wall of Kiln A? MED 414
81 Fired clay brick with three drilled holes from side wall of Kiln A? MED 238

Potting equipment

82 Fragment of broken fired clay mortar with spout and two stamped circles with cross and pellets on top of rim from wall of Kiln A MED 240

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Chemical analysis of Scottish White Gritty Ware from Colstoun

Dr Simon Chenery

Introduction

Ten samples of pottery from excavations at Colstoun were supplied by Derek Hall of SUAT Ltd. It was hypothesised that if these sherds were coal-fired their surface would preferentially gain trace elements occurring in coal. A number of trace elements are known to commonly occur in coal at elevated levels with respect to mineral material. These samples were split into a surface and core sub-samples and analysed for a wide variety of elements by ICP-MS. The surface and core samples were then compared to each other.

Analytical methodology

Physical sample preparation

The surface of the pottery sherd was first carefully cleaned of adhering material by ultrasonication in MIlli-Q quality water and rubbing with a soft plastic brush. The surface was then lightly ground with a pure alumina grinding head to provide the surface sub-sample, any glaze was ground off separately and rejected. The sherd core was lightly crushed with a plastic coated hammer, then ground to less than 30 mm and homogenised, in an agate Tema mill.

Chemical Sample Preparation

For trace element determinations by inductively coupled plasma-mass spectrometry (ICP-MS) the samples need to be presented as aqueous solutions with a 1–5% nitric acid matrix. The pottery powders were dissolved as follows:

i Accurately weigh 0.1 g of powder into a PTFE test tube.
ii Add 1 ml of concentrated HF acid, 0.4 ml concentrated $HClO_4$ acid and 0.4 ml concentrated HNO_3 acid and allow the samples to sit in a hot aluminium block at 50 ∞C overnight.
iii Raise the temperature stepwise to 190°C and maintain at this temperature for six hours.
iv After cooling, dissolve the residual material in 10 mls of 5% HNO_3, and store in a clean HDPE bottle until the day of analysis. This method of preservation has been shown to be stable for a minimum of one year.

On the day of analysis the digested sample was further diluted by a factor of 40 and an internal standard element added.

Chemical analysis by ICP-MS

The ICP- mass spectrometer used at BGS is a VG PlasmaQuad 2+ ICP commissioned in 1990. The samples were analysed with the ICP-MS in scanning

mode. Calibration was performed using 50 ppb concentrations of four multi-element solutions obtained from Spex Industries Inc. These standards are traceable to NIST, USA.

Quality control

Quality control (QC) was achieved using reference materials and blank digestions. Each type of QC has a separate purpose and together they provide both statistical information on the analytical quality and batch rejection criteria. The QC results are reported in Appendix 2 and a synthesis relevant to this report is given below.

The certified reference material SCO-1 was digested and analysed in duplicate with the batch of pottery sherds. This reference material is from shale rock and should have a similar composition to pottery material. The measured concentrations were mainly within ± 20% of the certified values, which was considered acceptable. For SCO-1 the following failed to meet this criteria Y, Zr, Ag, Cd, Dy, Ho, Er, Tm and Hf failed this criterion. However, there was very good agreement with the values obtained in the previous Redware and Whiteware studies for this reference material. With only Ga, Cd and Hf being more than 20% different. The Ga difference being explained by correction this time for a spectral interference enhancing Ga previously and Cd by its very low abundance ie only marginally above detection limits. The difference for Hf is not explainable. Therefore ideally these elements should not be used in a comparison with previous data.

Results and discussion

The concentration of elements in the surface and core of the pot sherds is given in Appendix 1, Table 1a. The samples end-coded SU are surface samples and those end-coded CO are core samples.

The simplest method of comparison of the elemental concentrations in the surface layer of the pot sherd with the core is an elemental concentration ratio. These are given in Appendix 1, Table 1b. To identify significant surface enrichment, values greater than 2 are given in bold. The choice of a factor of 2 is purely arbitrary and chosen to avoid small random enrichments due to minor differences in composition within the pot or analytical variance. Elements showing this significant enrichment were: Pb, Sb, Sn, Cu, Ag, Zn, W and Ta, these are given in order of frequency. The important question is whether these elements result from the burning of coal or glazing.

The trace element enrichment in small coal seams has been summarised by Yudovich (1972) as follows:

i Enrichment in most cases: Ge, Mo, U, As, Sb, Zr, V, Cr, Ti, Ni, Co;
ii Frequent enrichment: REE, Sc, Ga, Sn, Cu, Pb, Zn, (Nb, In, Cd, Hg, Ag);
iii Rare enrichment, occasionally deficit: B, Ba, Sr, Be, Mn

Of elements enriched in the surface of pottery the only category *i* element was Sb. Five of the elements showing enrichment in pottery occurred in category *ii* and one Mn in category *iii*.

This could suggest that it was possible that coal firing accounted for the enrichment. However, a more careful consideration of the elemental associations both with typical pottery glazes and within the different coal minerals suggests otherwise.

Of the enriched trace elements in the pottery surface Pb and Sn are common glaze components with Mn, Cu and Zn all being used as colorants. While Sb and Ag are common trace elements found in galena the main Pb ore is mineral.

Coal is typically made up of both organic and mineral phases. The mineral phases consisting of mostly clay and sulphides, but also some more exotic detrital minerals. Trace elements will be predominantly associated with one or more of these phases. In the scenario envisaged in the hypothesis, elements associated with either the organic phase or the sulphide phase are of interest, as these are most likely to have been volatilised and incorporated into pot surfaces. Therefore the above categories can be split into those associated with the organic component (A) and those associated with the sulphide phase (B) (Bouska 1980 and reference within).

Category 1A Ge, Mo, U, Zr, V, Cr, Ti
Category 1B As, Sb, Ni, Co
Category 2A Sn, Zn
Category 2B Cu, Pb, Zn, In, Cd, Ag
Category 3A None
Category 3B None

Elements from the sulphide category are likely to be little help in studying the pottery enrichment as sulphide minerals are usually the main ore source for glazes. None of the trace elements most associated with the organic fraction of coal (category 1A) such as Mo, U, Zr, V, Cr, Ti, appear enriched in the surface of the pottery.

Summary

None of the trace elements most associated with the organic fraction of coal such as Mo, U, Zr, V, Cr, Ti, appear enriched in the surface of the pottery. Therefore it must be concluded we have no positive evidence that coal was used in firing the supplied pottery. However, this does not mean it was not fired with coal, simply we have no geochemical evidence for this. To pursue this in more detail two other lines of enquiry would need to be investigated. (i) analysis of the coal most likely used to fire the pottery (ii) experiments in which pottery of the same composition, without glaze, was fired with both coal and wood, and subsequently analysed to determine likely enrichment factors.

Samples submitted for chemical analysis to British Geological Survey

Appendix I

Table Ia

Concentration of elements in Colstoun pottery samples (mg/kg or ppm)

BGS lab no	Li	Be	Mg	Sc	Ti	V	Cr	Mn
6514-1CO	54	1.6	2303	14	6642	82	94	200
6514-1SU	35	2.0	2285	11	6192	71	82	280
6514-2CO	57	1.8	2722	15	6310	79	73	155
6514-2SU	91	1.6	2598	13	5938	78	77	511
6514-3CO	54	2.0	2450	12	7031	72	70	165
6514-3SU	56	2.0	2344	11	6438	68	72	237
6514-4CO	46	1.5	2088	10	5077	100	74	84
6514-4SU	49	1.5	2064	10	4716	96	77	177
6514-5CO	58	1.9	2557	13	6436	85	64	156
6514-5SU	72	1.6	2659	11	5624	84	66	602
6514-6CO	46	1.9	1358	14	5677	78	87	69
6514-6SU	42	1.6	1180	13	5440	75	89	107
6514-7CO	159	2.9	4395	19	6009	149	117	148
6514-7SU	201	2.6	4047	17	5768	136	116	441
6514-8CO	61	1.6	2801	12	5714	96	56	217
6514-8SU	76	1.3	2341	10	4740	87	81	629
6514-9CO	117	2.4	4665	16	5276	110	105	435
6514-9SU	162	2.2	5448	15	5115	118	104	555
6514-10CO	327	6.8	16506	41	12182	386	283	539
6514-10SU	335	7.0	10911	51	19151	353	445	728

BGS lab no	Y	Zr	Nb	Mo	Ag	Cd	Sn	Sb
6514-1CO	18	98	24	0.8	0.3	0.1	3.2	0.6
6514-1SU	18	87	21	0.9	0.5	0.2	4.0	1.0
6514-2CO	17	75	22	0.6	0.4	0.1	3.9	0.7
6514-2SU	17	77	20	0.8	2.7	0.2	68	13.1
6514-3CO	18	94	26	0.6	0.3	0.1	3.8	0.8
6514-3SU	16	86	23	0.5	0.9	0.2	15	2.0
6514-4CO	13	62	18	0.4	0.3	0.1	2.9	0.6
6514-4SU	13	62	17	0.4	0.8	0.1	27	2.7
6514-5CO	19	88	23	0.8	0.3	0.1	4.0	0.7
6514-5SU	16	75	20	0.7	0.6	0.1	228	4.1
6514-6CO	19	109	21	0.6	0.6	0.1	3.2	0.9
6514-6SU	19	105	20	0.6	2.9	0.2	45	3.1
6514-7CO	30	147	20	0.3	0.6	0.1	4.0	0.5
6514-7SU	24	111	19	0.3	1.0	0.1	3.5	1.2
6514-8CO	17	83	15	0.7	0.4	0.1	5.8	0.7
6514-8SU	16	95	18	1.1	0.7	0.2	53	2.0
6514-9CO	21	97	19	0.3	0.4	0.2	3.8	0.6
6514-9SU	19	76	18	0.3	0.5	0.2	4.0	2.9
6514-10CO	50	234	46	3.6	1.2	0.3	9.0	1.4
6514-10SU	69	252	71	1.7	1.3	0.3	17	2.8

BGS lab no	Co	Ni	Cu	Zn	Ga	As	Rb	Sr
6514-1CO	7.0	35	19	47	24	2.7	65	106
6514-1SU	7.7	43	368	76	24	2.2	51	84
6514-2CO	8.9	36	17	34	23	2.9	49	121
6514-2SU	10	36	45	72	21	3.5	55	101
6514-3CO	10	32	16	33	23	3.9	56	108
6514-3SU	11	33	144	59	21	3.5	50	96
6514-4CO	5.9	32	20	26	20	1.7	64	92
6514-4SU	6.1	30	22	41	18	0.7	63	107
6514-5CO	9.0	31	16	32	22	1.3	63	127
6514-5SU	8.5	32	33	69	19	1.7	73	110
6514-6CO	7.1	39	30	36	20	6.9	47	39
6514-6SU	5.9	41	32	63	19	3.7	43	46
6514-7CO	23	89	103	40	34	2.2	116	135
6514-7SU	26	91	101	69	32	1.5	111	115
6514-8CO	7.5	32	15	32	24	3.6	60	127
6514-8SU	9.3	55	19	141	19	1.4	56	100
6514-9CO	15	42	27	158	29	4.9	130	75
6514-9SU	14	46	42	177	28	6.0	140	95
6514-10CO	30	176	65	170	72	8.5	302	280
6514-10SU	34	300	150	2070	91	7.4	237	399

BGS lab no	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu
6514-1CO	5.4	194	40	71	8.1	29	4.8	1.1
6514-1SU	4.4	174	39	71	8.0	28	4.7	1.1
6514-2CO	5.1	249	47	89	10	37	6.5	1.5
6514-2SU	4.2	222	43	83	10	35	6.1	1.3
6514-3CO	5.5	186	40	71	8.1	28	4.7	1.1
6514-3SU	4.7	175	35	64	7.3	25	4.1	1.0
6514-4CO	5.2	188	40	81	10	35	6.1	1.4
6514-4SU	4.7	180	41	81	9.4	34	6.0	1.3
6514-5CO	5.8	206	46	85	10	34	5.7	1.3
6514-5SU	5.1	198	38	70	7.9	29	4.6	1.1
6514-6CO	4.9	278	21	50	5.8	23	4.7	1.2
6514-6SU	4.2	421	33	67	8.4	30	5.9	1.4
6514-7CO	11	335	67	129	15	56	10	2.2
6514-7SU	9.5	306	60	118	14	51	9.0	1.9
6514-8CO	6.0	203	41	74	8.5	30	5.3	1.2
6514-8SU	4.6	191	34	65	7.3	26	4.3	1.0
6514-9CO	9.0	376	60	119	14	52	8.7	1.9
6514-9SU	8.7	409	61	122	14	53	8.9	1.9
6514-10CO	23	1092	125	249	31	118	23	5.0
6514-10SU	21	936	184	354	43	163	31	6.5

Table 1b
Enrichment/depletion factors as Expressed by surface/core concentration ratio. Enrichment ratios greater than 2 in bold.

BGS lab no	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
6514-1CO	4.9	0.6	3.3	0.6	1.8	0.2	1.5	0.2
6514-1SU	4.7	0.6	3.2	0.6	1.8	0.3	1.6	0.2
6514-2CO	6.1	0.8	3.5	0.6	1.7	0.2	1.3	0.2
6514-2SU	5.9	0.7	3.3	0.6	1.6	0.2	1.3	0.2
6514-3CO	4.7	0.7	3.4	0.6	1.8	0.3	1.6	0.2
6514-3SU	4.2	0.6	2.9	0.6	1.6	0.2	1.4	0.2
6514-4CO	5.7	0.6	2.8	0.5	1.2	0.2	1.0	0.1
6514-4SU	5.4	0.6	2.8	0.5	1.2	0.2	1.0	0.1
6514-5CO	5.5	0.7	3.7	0.7	1.8	0.2	1.7	0.2
6514-5SU	4.7	0.6	3.1	0.6	1.5	0.2	1.4	0.2
6514-6CO	4.5	0.7	3.5	0.7	2.0	0.3	2.0	0.3
6514-6SU	5.5	0.7	3.8	0.7	2.0	0.3	1.8	0.3
6514-7CO	9.3	1.2	6.4	1.2	3.5	0.5	3.8	0.5
6514-7SU	8.3	1.0	5.5	1.0	3.1	0.4	2.7	0.5
6514-8CO	4.8	0.6	3.2	0.6	1.7	0.2	1.5	0.2
6514-8SU	4.3	0.6	3.2	0.6	1.6	0.2	1.4	0.2
6514-9CO	7.8	0.9	4.5	0.8	2.6	0.3	2.4	0.4
6514-9SU	7.9	0.9	4.3	0.8	2.1	0.3	1.9	0.2
6514-10CO	20	2.2	11.1	2.1	5.8	0.8	5.5	0.8
6514-10SU	27	3.2	15.2	2.7	7.0	1.0	6.1	0.8

BGS lab no	Hf	Ta	W	Tl	Pb	Th	U
6514-1CO	2.2	1.5	1.4	0.5	239	10	3.0
6514-1SU	2.2	1.4	1.4	0.3	355	5.9	1.6
6514-2CO	1.9	1.4	1.3	0.5	673	10	3.7
6514-2SU	1.7	1.2	1.2	0.6	9589	9.2	3.0
6514-3CO	2.3	1.7	1.5	0.5	511	9.5	3.6
6514-3SU	2.2	1.4	1.3	0.5	4545	7.5	2.7
6514-4CO	1.6	1.2	0.9	0.5	408	8.9	2.4
6514-4SU	1.6	1.1	0.8	0.5	8146	8.7	2.3
6514-5CO	2.4	1.6	1.4	0.6	536	9.3	3.6
6514-5SU	1.8	1.3	1.2	0.4	11271	7.8	2.9
6514-6CO	2.8	1.4	1.3	0.5	3063	12	3.2
6514-6SU	2.8	1.3	1.2	0.4	9703	11	3.1
6514-7CO	4.1	1.5	1.4	0.9	290	19	6.8
6514-7SU	3.5	1.3	1.3	0.7	2695	16	5.4
6514-8CO	2.0	0.4	0.4	0.5	243	9.5	3.4
6514-8SU	2.3	1.2	1.1	0.4	2949	8.6	3.3
6514-9CO	2.6	1.3	1.4	0.9	538	15	4.1
6514-9SU	2.1	1.2	1.4	0.6	4885	14	4.3
6514-10CO	6.2	3.1	3.4	2.3	1248	37	8.6
6514-10SU	6.6	4.7	5.1	1.8	2556	37	12

BGS lab no	Li	Be	Mg	Sc	Ti	V	Cr	Mn
6514-1	0.6	1.3	1.0	0.8	0.9	0.9	0.9	1.4
6514-2	1.6	0.9	1.0	0.9	0.9	1.0	1.0	**3.3**
6514-3	1.0	1.0	1.0	0.9	0.9	0.9	1.0	1.4
6514-4	1.1	1.0	1.0	0.9	0.9	1.0	1.0	**2.1**
6514-5	1.2	0.9	1.0	0.9	0.9	1.0	1.0	**3.9**
6514-6	0.9	0.8	0.9	0.9	1.0	1.0	1.0	1.5
6514-7	1.3	0.9	0.9	0.9	1.0	0.9	1.0	**3.0**
6514-8	1.3	0.9	0.8	0.8	0.8	0.9	1.4	**2.9**
6514-9	1.4	0.9	1.2	1.0	1.0	1.1	1.0	1.3
6514-10	1.0	1.0	0.7	1.2	1.6	0.9	1.6	1.4

BGS lab no	Co	Ni	Cu	Zn	Ga	As	Rb	Sr
6514-1	1.1	1.2	**19.4**	1.6	1.0	0.8	0.8	0.8
6514-2	1.1	1.0	**2.6**	**2.1**	0.9	1.2	1.1	0.8
6514-3	1.1	1.0	**9.1**	1.8	0.9	0.9	0.9	0.9
6514-4	1.0	0.9	1.1	1.6	0.9	0.4	1.0	1.2
6514-5	1.0	1.0	**2.1**	**2.1**	0.9	1.3	1.2	0.9
6514-6	0.8	1.1	1.1	1.7	0.9	0.5	0.9	1.2
6514-7	1.1	1.0	1.0	1.7	0.9	0.7	1.0	0.9
6514-8	1.2	1.8	1.2	**4.4**	0.8	0.4	0.9	0.8
6514-9	1.0	1.1	1.6	1.1	1.0	1.2	1.1	1.3
6514-10	1.1	1.7	**2.3**	**12.2**	1.3	0.9	0.8	1.4

BGS lab no	Y	Zr	Nb	Mo	Ag	Cd	Sn	Sb
6514-1	1.0	0.9	0.9	1.2	1.6	**2.1**	1.2	1.7
6514-2	1.0	1.0	0.9	1.2	**6.8**	1.3	**17.7**	**19.5**
6514-3	0.9	0.9	0.9	0.9	**2.6**	1.7	**3.9**	**2.6**
6514-4	1.0	1.0	0.9	1.0	**3.0**	1.1	**9.6**	**4.2**
6514-5	0.9	0.8	0.8	0.9	2.0	1.2	**57.3**	**5.7**
6514-6	1.0	1.0	1.0	1.0	**4.7**	1.2	**13.8**	**3.6**
6514-7	0.8	0.8	1.0	0.8	1.8	1.1	0.9	**2.3**
6514-8	1.0	1.1	1.2	1.6	1.8	1.2	**9.2**	**3.1**
6514-9	0.9	0.8	1.0	1.0	1.3	1.2	1.1	**5.0**
6514-10	1.4	1.1	1.5	0.5	1.1	1.2	1.9	2.0

BGS lab no	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu
6514-1	0.8	0.9	1.0	1.0	1.0	1.0	1.0	0.9
6514-2	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9
6514-3	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
6514-4	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9
6514-5	0.9	1.0	0.8	0.8	0.8	0.8	0.8	0.8
6514-6	0.9	1.5	1.6	1.3	1.4	1.3	1.3	1.2
6514-7	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
6514-8	0.8	0.9	0.8	0.9	0.9	0.9	0.8	0.8
6514-9	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0
6514-10	0.9	0.9	1.5	1.4	1.4	1.4	1.4	1.3

BGS lab no	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
6514-11	1.0	1.0	1.0	1.0	1.0	1.1	1.1	0.9
6514-12	1.0	0.9	0.9	0.9	1.0	1.0	0.9	1.0
6514-13	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
6514-14	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
6514-15	0.9	0.9	0.8	0.8	0.9	0.9	0.8	0.8
6514-16	1.2	1.1	1.1	1.0	1.0	1.0	0.9	1.1
6514-17	0.9	0.9	0.9	0.8	0.9	0.8	0.7	0.9
6514-18	0.9	0.9	1.0	1.0	1.0	0.9	1.0	1.0
6514-19	1.0	1.0	1.0	1.0	0.8	0.8	0.8	0.6
6514-110	1.3	1.4	1.4	1.3	1.2	1.2	1.1	1.0

BGS lab no	Hf	Ta	W	Tl	Pb	Th	U
6514-1	1.0	0.9	1.0	0.7	1.5	0.6	0.5
6514-2	0.9	0.9	0.9	1.1	**14.3**	1.0	0.8
6514-3	0.9	0.9	0.9	1.0	**8.9**	0.8	0.8
6514-4	1.0	1.0	0.9	0.9	**20.0**	1.0	0.9
6514-5	0.7	0.8	0.8	0.7	**21.0**	0.8	0.8
6514-6	1.0	1.0	1.0	0.8	**3.2**	0.9	1.0
6514-7	0.8	0.9	1.0	0.8	**9.3**	0.9	0.8
6514-8	1.1	**2.9**	**2.8**	0.7	**12.1**	0.9	1.0
6514-9	0.8	1.0	1.0	0.6	**9.1**	0.9	1.1
6514-10	1.1	1.5	1.5	0.8	2.0	1.0	1.4

Appendix 2

Concentration of elements in reference Material SCo-1 (mg/kg or ppm).

	Li	Be	Sc	Ti	V	Cr	Co	Ni
6514-SCO1A	40	1.7	13	3231	132	59	11	28
6514-SCO1B	43	1.7	12	3019	132	58	11	26
mean this batch	41	2	12	3125	132	58	11	27
previous mean	47	1.8	13	3495	145	66	12	28
% difference	-12	-5	-2	-11	-9	-12	-6	-5
literature value	45	1.8	11	3768	131	68	11	27
% difference	-8	-6	13	-17	1	-14	6	0

	Cu	Zn	Ga	As	Se	Rb	Sr	Y
6514-SCO1A	33	102	17	13	<2	104	157	17
6514-SCO1B	33	105	16	12	<2	105	160	17
mean this batch	33	103	17	12		104	158	17
previous mean	34	108	38	14		111	166	18
% difference	-2	-4	-57	-13		-6	-5	-5
literature value	29	103	15	12		112	174	26
% difference	15	0	11	-1		-7	-9	-33

	Zr	Nb	Mo	Ag	Cd	Sn	Sb	Cs
6514-SCO1A	94	11	1.3	0.4	0.3	3.7	2.6	7.4
6514-SCO1B	91	11	1.1	0.4	0.2	3.3	2.6	7.7
mean this batch	93	11	1.2	0.4	0.2	3.5	2.6	8
previous mean	107	12	1.3	0.5	0.3	4.1	2.9	8.0
% difference	-13	-7	-11	-11	-28	-14	-11	-6
literature value	160	11	1.4	0.13	0.14	3.7	2.5	8
% difference	-42	1	-15	218	59	-6	3	-4

	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd
6514-SCO1A	541	29	55	6.7	24	4.7	1.1	4.8
6514-SCO1B	552	28	54	6.7	25	5.0	1.2	4.8
mean this batch	547	28	54	7	24	5	1	5
previous mean	601	30	60	7.0	27	5.1	1.2	4.9
% difference	-9	-5	-9	-4	-9	-5	-4	-3
literature value	570	30	62	6.6	26	5.3	1.2	4.6
% difference	-4	-4	-12	1	-6	-9	-3	4

	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf
6514-SCO1A	0.6	3.1	0.6	1.9	0.3	1.8	0.3	2.6
6514-SCO1B	0.6	3.3	0.7	2.0	0.3	1.9	0.3	2.6
mean this batch	1	3	1	2	0	2	0	3
previous mean	0.7	3.7	0.7	2.1	0.3	2.1	0.3	3.9
% difference	-6	-13	-7	-9	-16	-11	-8	-33
literature value	0.7	4.2	1.0	2.5	0.4	2.3	0.3	4.6
% difference	-12	-23	-32	-24	-36	-18	-20	-44

	Ta	W	Tl	Pb	Th	U
6514-SCO1A	0.8	1.6	0.6	40	8.9	2.6
6514-SCO1B	0.8	1.6	0.6	29	9.1	2.6
mean this batch	1	2	1	34	9	3
previous mean	0.8	1.4	0.6	31	10	2.8
% difference	3	13	14	10	-7	-7
literature value	0.9	1.4	0.7	31	9.7	3.0
% difference	-14	14	-12	10	-7	-13

Résumé

Le site à Colstoun en East Lothian reste à ce jour le seul centre de production de poterie de type Scottish White Gritty Ware qui a été fouillé. Cet article passe en revue tous les travaux entrepris à Colstoun de la dÈcouverte des premiers fours en 1939 jusqu'aux recherches les plus rÈcentes sur le site en 2000. Ces derniËres ont fourni la premiËre date archéo-magnétique pour l'un des fours. L'article examine l'existence possible de données historiques quant aux activitÈs sur le site et les produits et techniques de cuisson sont discutés. En conclusion le rôle de Colstoun dans les eetudes céramologiques écossaises est examiné et les priorités pour les recherches futures sont suggérées.

Zusammenfassung

Die Stätte in Colstoun, East Lothian, bleibt immer noch die einzige Ausgrabung einer schottischen Sandweißwaren–Herstellung. Der Bericht umfaßt alle Arbeiten, die in Colstoun stattfanden, von der Entdeckung der ersten Brennöfen 1939 bis zu jüngsten Arbeiten dort im Jahre 2000, die auch eine erste archäomagnetische Datierung für einen der Öfen enthält. Auch wird einiger Raum den historischen Fakten der dortigen Aktivitäten gewidmet, sowie die Erzeugnisse und ihre Brenn-Technologie diskutiert. Zum Schluß wird Colstouns Platz in den schottischen Keramikstudien bestimmt und Prioritäten für künftige Forschungen gesetzt.