Reindeer hunters at Howburn Farm, South Lanarkshire

A Late Hamburgian settlement in southern Scotland – its lithic artefacts and natural environment

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Cover: A herd of reindeer crossing the Cairngorms (photo: Cairngorm Reindeer Centre)

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In memory of Alan Saville

31 December 1946 – 19 June 2016

(Photo: Tam Ward)

Contents

List of Figures

List of Tables

List of Plates

Summary

In 2006 and 2009, excavations were carried out at Howburn Farm near Biggar, South Lanarkshire. A total of 5,070 lithic artefacts were recovered, including 2,091 pieces of flint, 2,906 pieces of chert, 33 pieces of pitchstone, as well as small numbers of other lithic raw materials. As in this part of Scotland chert usually relates to Mesolithic, Early Neolithic and Early Bronze Age industries (Paterson and Ward 2013), and as it is well known that much flint was imported into southern Scotland from north-east England during the later Neolithic (Ballin 2011b), the various elements of the assemblage were first thought to date to these periods. However, close inspection of the finds, and the identification of diagnostic types and technological attributes of pre-Mesolithic character, showed that probably almost all the flints date to the Late Upper Palaeolithic period (Ballin *et al.* 2010). It is estimated that approximately half of the lithic artefacts date to the Palaeolithic, and most of the remainder to the Late Mesolithic – Early Neolithic period, supplemented by a small number of later Neolithic and Early Bronze Age pieces.

Diagnostic elements suggest that the Late Upper Palaeolithic finds date predominantly to the Late Hamburgian (the centuries just prior to 12,000 cal BC; Grimm and Weber 2008), with some probably representing visits to the site by slightly later *Federmesser-Gruppen* hunter-gatherers (cf. Saville and Ballin 2009). It was decided in this volume to focus on the site's Hamburgian sub-assemblage, as this industry almost exclusively used exotic flint and to a lesser extent exotic chert. This made it easy to distinguish the Hamburgian material from the site's post-Palaeolithic artefacts, and it was possible to define a full Hamburgian typo-technological 'package' including the industry's operational schema, whereas the blanks and typologically undiagnostic tools of the chert-dominated *Federmesser-Gruppen* settlers are difficult to distinguish from the site's post-Palaeolithic objects.

As the Hamburgian represents a techno-complex centred on northern Germany and southern Denmark (Weber 2012), it is more likely that the industry's flint was procured from sources on Doggerland (Ballin 2016c), when the Howburn settlers passed those in connection with their stalking of reindeer herds through the landscape, than that the flint was procured from sources in the greater Yorkshire area, from which area similar flint was imported into Scotland in the later Neolithic.

Late Upper Palaeolithic finds were recovered throughout the site, but particularly from a number of more or less discrete concentrations. Some of these concentrations appear almost devoid of later elements, such as the southern concentration in Trench I (2009) – possibly the footprint of a tent-like structure – and, slightly less so, the main concentration in Trench II (Block 2). The site's Late Hamburgian (Havelte) type spectrum and technological approaches are characterized primarily on the basis of these two concentrations. Finds probably dating to the *Federmesser-Gruppen* period are found throughout the location, but they seem to be most prolific in Trench II (Blocks 3-4), which formed the basis of the type spectrum and technological profile suggested for this sub-assemblage.

The raw material preference of the Havelte settlers is best characterized by the finds from Trench I (2009) which included 70% flint, with the exclusively Hamburgian finds from the lowest levels ('the subsoil') including 98% flint. The flint was reduced following a well-defined operational schema which embraced careful decortication and cresting, and large blades were detached mainly from opposed-platform cores by the application of soft percussion *en éperon* technique.

The tools include some common types, such as plain end-scrapers, but they are first and foremost characterized by numerous diagnostic pieces. The latter include 29 tanged points of Havelte Type; many elegant blade-scrapers and double-scrapers, as well as large flake scrapers, mostly with acute edge-angles; numerous burins, many of which are based on truncated blanks; and small numbers of *Zinken* and *becs*.

The raw material preference of the *Federmesser-Gruppen* settlers is best defined by the sub-assemblage from Trench II (Blocks 3-4), which has a flint ratio of only 14%, with most of the remaining 86% being chert. Although most of this chert is local, a considerable number of artefacts are in exotic orange chert. Although it is difficult to distinguish the concentration's Palaeolithic local chert from later finds based on this raw material, *Federmesser-Gruppen* broadblade tool blanks appear to have been produced by the application of soft percussion opposed-platform technique, but possibly without the use of platform-faceting.

The general assemblage includes 71 backed points, including fragments, and although it can not be ruled out that some of those date to other Late Upper Palaeolithic periods, it is most likely that the majority are of *Federmesser-Gruppen* affinity (cf. Saville and Ballin 2009). The backed points include angle-backed and curve-backed pieces, but

most are straight-backed specimens. It is uncertain exactly which of the chert implements from Trench II (Blocks 3-4) are contemporary with the backed pieces, but the exotic orange chert includes, *inter alia*, a blade-scraper, two short end-scrapers, and one plain burin.

Unfortunately, it was not possible to obtain any absolute dates for the Late Upper Palaeolithic material.

The Palaeo-environmental work at Howburn focused on one specific question, namely whether there was a small lake ('Loch Howburn') in front of the terrace on which the camp was situated, thus mirroring the settlement locations of contemporary hunter-gatherer camps in north-west Europe (e.g. Slotseng and Jels in southern Denmark; Holm 1991; Holm and Rieck 1992). Following coring and additional analyses, it was concluded that there was indeed a lake in front of the site during the Late Glacial period, but it was neither contemporary with the Hamburgian, nor the *Federmesser-Gruppen* settlement. Most likely, 'Loch Howburn' dates to the Loch Lomond stadial.

Following the discovery of the Howburn site, other Late Upper Palaeolithic lithic discoveries have been made in Scotland, either in connection with excavations or as stray finds, or in connection with the re-examination of old 'backlog assemblages' or museum collections. Together, these lithic artefacts state 'beyond reasonable doubt' that Scotland had indeed a Late Upper Palaeolithic period, and that it includes a number of material cultures known from the European Continent or Scandinavia. They include the Late Hamburgian; the *Federmesser-Gruppen* complex; the Ahrensburgian; and the Fosna-Hensbacka complex (Ballin 2017a).

The Late Upper Palaeolithic finds from Howburn, as well as from Scotland at large, shed light on several important general trends, such as the 'acclimatization' of pioneer settlers, as well as the development of regional differences following the initial Late Glacial recolonization.

In Scotland, the Late Glacial settlers initially favoured flint, which they brought with them on their journeys through the landscape. It is thought that at this time flint was mainly procured from sources on Doggerland, where outcrops of Cretaceous flint would have been plentiful (Harker 2002). Later groups, such as *Federmesser-Gruppen* hunter-gatherers, seem to have become accustomed to their new setting and its locally available raw materials, and at Howburn chert was now favoured, and at Kilmelfort Cave on the west-coast (Saville and Ballin 2009) quartz was widely used. This scenario mirrors the recolonization of Late Glacial western Norway, where assemblages were initially totally dominated by flint, and where local raw materials with time became more and more heavily exploited (Bruen Olsen 1992, 84).

As shown in Ballin (2016a), the flooding of Doggerland caused geographically extensive material cultures to fragment, leading to the development of smaller, local material cultures. However, even before the disappearance of this landmass, a techno-complex as physically extensive as the Hamburgian, stretching from Poland to Scotland, is likely to have included local groups which, although sharing the same basic tool-kit and technological approaches, would also have been characterized by subtle differences in terms of implement style, specific technological approaches, and assemblage composition, with the differences probably representing what Madden (1983) referred to as 'differentiation due to distance'.

The most significant difference between Howburn's Havelte sub-assemblage and the assemblages of contemporary sites in Continental north-west Europe is the general composition of the tools. Where the Continental assemblages (Grimm and Weber 2008) are characterized by many Havelte points, scrapers, burins and *Zinken*, with the latter being a key diagnostic element, Howburn only includes a handful of these implements (1-3% against the 24-46% of Continental sites) (this volume's Tables 18-19). It is uncertain whether this reflects different subsistence strategies, or whether the discovery of new Hamburgian sites in Scotland may show that Howburn is an exception, with new Scottish assemblages from this period including the tool forms commonly found on Continental sites.

Another significant difference is the common occurrence at Howburn of *en éperon* blades, where these blades are less common, and frequently absent, in Continental Hamburgian assemblages (Weber *et al.* 2010, 18). It is possible that the use of the *en éperon* technique at Howburn reflects the fact that the Scottish Hamburgian territory bordered the Creswellian techno-complex towards the south, where the *en éperon* technique (as amongst Magdalenian groups in general) was an integral part of the operational schema associated with Creswellian blade production (Jacobi 2004). The absence of small tanged Wehlen scrapers (Holm 1991, 14) at Howburn – a scraper form associated with Late Havelte and early *Federmesser-Gruppen* assemblages on the Continent – may either indicate that the Palaeolithic sub-assemblages from Howburn do not date to this transitional phase, or the absence of these scrapers may represent yet another regional difference.

However, many of the conclusions made need corroboration, and at this moment in time we must bear in mind that Howburn is presently Scotland's (and Britain's) only Hamburgian settlement site. The main sub-assemblage from Howburn is of indisputable Havelte character, and the combination of its blank, core and tool types, its technological approaches, and its raw material preferences, is a clear pre Mesolithic trait. Key questions Scottish Upper Palaeolithic research needs to focus on now include: 1) What went before Howburn (is there a Scottish Classic Hamburgian or Creswellian stage); 2) are assemblages from other (as yet undiscovered) Scottish Havelte sites composed in the same manner and reflecting the same economical strategy, or does Howburn represent a 'niche' in a broader economical approach; 3) how does Howburn's raw material preferences, type spectrum and technological approaches compare with other Late Upper Palaeolithic industries represented in Scotland; 4) are there within Late Upper Palaeolithic Scotland internal regional differences, for example representing differences in terms of raw material availability and adaptation to these differing resources (e.g., differences between the Scottish east and west, as seen during the Scottish Mesolithic); 5) what happened in Scotland at the Upper Palaeolithic/ Mesolithic transition, and how is this transition defined in terms of material culture changes; 6) which role did the constantly changing natural environment (climate, vegetation, fauna, etc.) play in the transformation of one Palaeolithic material culture into another, including their economical strategies, mobility and settlement patterns, and lifeways in general; and 7) how did Doggerland change over time, affecting cross-Doggerland cultural networks and,not least, where exactly was the northern shoreline of this landmass at any one time?

Although the discovery of Howburn was hugely important in terms of research into Scotland's earliest prehistory, we need more Late Upper Palaeolithic sites in general, and more Hamburgian sites specifically, to deal with these new questions, and absolute dates are essential.

Acknowledgements

The Howburn Project has been a complex undertaking, and it took 15 years to bring this project on Scotland's Late Upper Palaeolithic (LUP) beginnings from initial fieldwalking to final publication. Briefly summarized, the project involved a fieldwalking phase (2003-2005); excavation of Trench I (2006); processing of the finds from 2006, and production of several papers on our findings (2007-2010); excavation of Trench I extension and Trench II (2009); processing of the finds from 2006, and production of a first draft manuscript on the full assemblage from the two excavations (2010); production of a publishable manuscript (this volume; 2010-2018); other tasks, such as illustration of artefacts, production of maps and plans, etc.; and palaeo-environmental work relating to the question of the nature and date of 'Loch Howburn' was carried out parallel to the archaeological investigations.

Like all complex and temporally extensive archaeological projects, the Howburn Project involved contributions from a large number of people and institutions. The work could not have been undertaken without the funding offered by Historic Scotland/HS (now Historic Environment Scotland/HES), the Society of Antiquaries of Scotland, and the Robert Kiln Trust, and we are truly grateful. We would like to specifically thank Noel Fojut, Rod McCullagh, and Kirsty Owen from HS/HES for their advice and support along the way.

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In 2014, Alan Saville unexpectedly became seriously ill, and in 2016 he sadly passed away. The entire project team would like to thank Alan for his contributions over the years, and not least for our many engaged discussions of the Scottish Late Upper Palaeolithic period in all its aspects. We dedicate this monograph to the memory of Alan Saville. Finally, the team would like to thank Alan's wife, Annette Carruthers, for access to Alan's files on Howburn, including the original artefact drawings

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Preface

The Howburn Project has had a long and complex 'life', involving dedicated work by many volunteers, archaeologists and scientists. In a sense, the project reflects general developments in Scottish early prehistoric archaeology during this period, not least in terms of how we perceive the earliest part of Scottish prehistory, and the site and its assemblage has had to be reinterpreted along the way.

Biggar Archaeology Group (BAG), led by Tam Ward (TW), began surveying the fields around Howburn Farm in 2003, and due to the presence of several notable concentrations of lithic finds, they carried out an excavation at the location in 2006. The group subsequently produced a report on their work (Dudds *et al.* 2006), and in this report it was suggested that the assemblage included Mesolithic, Neolithic and Early Bronze Age objects, due to the presence of well-known diagnostic implement forms in flint and chert, as well as some diagnostic pottery.

The flint, however, presented an interesting problem, as it was considerably more abundant, and the individual pieces larger, than one would have expected from this chert-dominated part of Scotland. As later Neolithic lithics, such as chisel-shaped arrowheads, and pottery had been recovered from neighbouring fields (Dudds *et al.* 2006), and as it is consensus that large nodules and implements of flint were imported into Scotland from north-east England during the Middle and Late Neolithic periods (Ballin 2011b), it was assumed that the collection's flint component dated mainly to the later Neolithic.

As at the time one of the authors (Torben Ballin; University of Bradford) was carrying out work on Scotland's later Neolithic industries, he borrowed the finds from Howburn for this work, kindly made available by the BAG. It was thought that the Howburn assemblage would provide comparative material for the discussion of Scottish later Neolithic flintwork, but unexpected diagnostic pieces soon made it clear that the finds represented something considerably more interesting, namely a Late Upper Palaeolithic assemblage, pre-dating other lithic finds from Scotland by several millennia. At this time, only a small number of stray Upper Palaeolithic lithics had been recovered from locations in western and northern Scotland (Ballin and Saville 2003; Ballin and Bjerck 2016), and only one other Late Upper Palaeolithic settlement assemblage was known, also from western Scotland (Kilmelfort Cave; Saville and Ballin 2009).

The finds from the 2006 excavation, as well as those from the fieldwalking campaign, were examined and discussed by TB and Alan Saville (National Museums Scotland), and it was agreed to jointly carry out a project, the purpose of which was to investigate and publish the lithic objects. As part of this work, a first paper was produced (Saville *et al.* 2008) in which the finds were characterized as 'very old', but without the authors being overly specific about the objects' true date. The date of the lithic objects only became obvious in connection with the subsequent detailed characterization and cataloguing of the assemblage, where two fragments were conjoined to form one intact tanged point (Pitts 2009), and several typical *en éperon* blades were identified. *En éperon* blades are generally only found in connection with Hamburgian, Creswellian and late Magdalenian assemblages, and broadly dating to the period 13,000-12,000 BC.

As the distribution maps of the finds from the 2006 investigation suggested that the prehistoric site had only been partially excavated (Ballin *et al.* 2010), it was agreed to carry out further work at the site to secure more datable material. Tam Ward and the BAG therefore began their second excavation at Howburn in 2009, increasing the total number of lithic artefacts from 1099 to 5070 pieces, and the number of tanged arrowheads from four to 29. On the basis of the tanged points and their diagnostic attributes, it was now possible to say with confidence that most of the Late Upper Palaeolithic finds dated to the Hamburgian Havelte phase (the centuries just prior to 12,000 cal BC; Grimm and Weber 2008), with some probably representing visits to the site by slightly later *Federmesser-Gruppen* hunter-gatherers.

In popular terms, Hamburgian hunter-gatherers are referred to as reindeer hunters, and it was assumed that the Late Upper Palaeolithic groups visiting the site were following reindeer on their trek across the landscape (e.g., Vang Petersen and Johansen 1996). The well-known camps of north-west European reindeer hunters, such as those in the tunnel-valleys of northern Germany, as well as the Danish sites of Jels and Slotseng, are all situated in similar locations in the landscape, such as terraces facing a lake, providing drinking water for game. It was therefore suggested that the same could have been the case at Howburn, and that a small lake – 'Loch Howburn' – could have existed in the valley immediately north of the site. To investigate this question, environmental scientist Richard

Tipping (University of Stirling) was invited to join the team, hoping that he could shed light on this question. Following coring in the valley floor by Tipping, analysis of the sediments by Clare Wilson (University of Stirling), and dating of the sediments by tephra-analysis by Rupert Housley (Royal Holloway, University of London) and his team (Lucy Verrill and Matthew Bradley [University of Stirling]; Paul Lincoln [University of Portsmouth]; and Alison MacLeod [University of Reading]), it was determined that a loch might indeed have existed at some stage below the settled terrace, but not during the Hamburgian or *Federmesser-Gruppen* periods.

Investigation of the finds continued after the second excavation (2009), but during the following years our colleague Alan Saville became seriously ill, and he sadly passed away in 2016 (Ballin 2016a). We have chosen to dedicate this volume to Alan.

In 2017, a grant was offered by Historic Environment Scotland for the final publication of the finds from this interesting and – in a Scottish context – unique assemblage, presenting the finds from both excavations, as well as a discussion of their importance to Scottish and north-west European early prehistory. Howburn does, after all, represent the north-western frontier of a techno-complex or material culture, which stretched from Poland in the east to the Atlantic seaboard in the west.

At the beginning of the project, only a few stray Late Upper Palaeolithic finds (Livens 1956) and one settlement site (Saville and Ballin 2009) were known from Scotland, and although these finds clearly suggested that the country had been visited during the Late Glacial period, it was still uncertain whether the finds represented 'scouting parties' or pioneering settlement. This explains the caution shown by the authors in the project's first publication (Saville *et al.* 2008) in terms of what the assemblage from Howburn might represent.

As the general understanding of Scottish Late Upper Palaeolithic types, technological approaches, and raw material preferences expanded – partially as a 'spin-off' from the work of the Howburn Project – more finds were being made, partly in connection with the processing of old 'back-log' assemblages, but also in connection with new research and rescue excavations. The old mainly Mesolithic assemblage from Shieldaig, Highland (Ballin 2014c), yielded an Ahrensburgian arrowhead, formally related to the well-known piece from Tiree (Livens 1956; Ballin and Saville 2003), and the processing of the finds from Nethermills Farm, Aberdeenshire, led to the identification of a number of almost certain Upper Palaeolithic flint implements, although it has not been possible to date these within this general period (Ballin and Wickham-Jones 2017). Re-examination of the assemblage from Lunanhead, Angus, has prompted reinterpretation of this flint collection (initially thought to be later Neolithic), with its large broad blades, a blade-scraper, and several burins indicating an Upper Palaeolithic date (Ballin 2017a).

A string of rescue excavations in Aberdeenshire has brought about several likely Upper Palaeolithic pieces, mostly representing residuality in assemblages dominated by later finds. This group includes objects from for example Blackdog and Wester Clerkhill (Ballin *et al.* 2017; Cameron and Ballin forthcoming). However, a relatively numerous scatter at Milltimber, west of Aberdeen, included a sub-assemblage of impressively large blades, preparation flakes and cores (Ballin forthcoming), which have allowed a Late Upper Palaeolithic operational schema to be defined (Ballin 2017a), which may allow Scottish assemblages from this period without diagnostic tools to be recognized. Finally, research projects on Orkney and Islay have resulted in the recovery of flints of Scandinavian Fosna-Hensbacka (Lee and Woodward forthcoming) and Continental Ahrensburgian (Mithen *et al.* 2015) affinities. At present, these projects are either ongoing or being prepared for final publication.

In all these cases, the finds or assemblages represent well-known Scandinavian (Fosna-Hensbacka) or Continental European (Hamburgian, *Federmesser-Gruppen*, or Ahrensburgian) industries or techno-complexes, with Scotland being a form of *Ultima Thule* on the north-western edge of the European continent of the day. The existence of Doggerland is therefore essential to our understanding of this period, and of how Scotland was settled after the retreat of the glaciers by *c*. 13,600 BC.

During the years of the Howburn Project, the understanding of Doggerland – its extent, development and finally flooding – increased manyfold, as did our understanding of how the presence of Doggerland allowed Scotland to become settled, and how the flooding of this land-mass severed existing cultural networks, and caused old material cultures to fragment (Ballin 2016c). There is still a degree of uncertainty regarding the shape and precise position of Doggerland's northernmost shores at any given point of time during the Upper Palaeolithic, but in this unusual case, archaeology may inform science – where the roles are usually reversed – as the presence in Scotland of diagnostic pieces and technological practices of north-west European affinity clearly proves that contact, even if indirect, was possible across Doggerland.

Summing up the progress made in recent years – in terms of research into Scotland's earliest prehistory and into the environment the first Scottish settlers inhabited – the discovery and investigation of the Howburn site and its lithic assemblage has clearly played an important role. However, the work has only just started, and many questions relating to the Scottish Late Upper Palaeolithic period remain, such as – might there be sites 'out there' in the Scottish landscape dating to times before Howburn? It may be possible, in time, to find camps relating to the first pioneering 'scouting parties', defined by artefacts of for example Classic Hamburgian or Creswellian affinity.

Good hunting!

Introduction

Background

As part of its '*Prehistory North of Biggar Project*', Biggar Archaeology Group (BAG) investigated an arable field at Howburn Farm, Elsrickle, South Lanarkshire, in southern Scotland (Figure 1). The field was walked by BAG on four occasions between 2003–2005, producing a range of prehistoric lithic artefacts and potsherds, mainly from the upper eastern part of the field, close to a small watercourse. Thousands of lithic artefacts were recovered, mostly of flint and chert, with occasional flakes and blades of Arran pitchstone and Cumbrian tuff. Diagnostic types and attributes suggested that the fieldwalked chert artefacts were mainly Later Mesolithic in date, the pitchstone and polished axeheads Early Neolithic, and most of the flint was thought to date to the Neolithic or Early Bronze Age periods. These typo-chronological estimates seemed supported in part by the recovery of Neolithic and Early Bronze Age pottery (sherds of plain vessels of the Carinated Bowl Tradition, as well as Impressed Ware, Grooved Ware, and Beaker sherds) in and near the field.

In 2005, fieldwalking located a previously unnoticed concentration of flint and chert artefacts in an area approximately 40 m in diameter on the eastern side of the field. This concentration, marked especially by a higher presence and larger size of artefacts of flint than elsewhere in the field, was assumed to have been brought to the surface by recent ploughing. Accordingly, an exploratory excavation was undertaken by BAG in December 2005 and January 2006 (in this volume generally referred to as the 2006 excavation) to test for the presence of any remaining archaeological deposits. Six small pit-like features were observed in the subsoil. The fills of these features were sampled for sieving and flotation, producing charcoal but no diagnostic artefacts. A piece of *Betula* (birch) charcoal from Pit 3 provided a radiocarbon date (SUERC-17872/GU-16472: 1855±35 BP or cal AD 70–240), indicating a brief visit to the site in the Roman Iron Age, and it was assumed that the other small pits dated to the same period.

The fieldwork by BAG was recorded in an interim note and report (Dudds *et al.* 2006) and the lithic finds

Figure 1. The winter before the beginning of the second field season in 2009. View from the site towards the Pentland Hills north of Biggar, with the valley floor and the How Burn stream in the centre (photo: Tam Ward).

were stored at Biggar's Moat Park Heritage Centre as primarily representing the residues of Mesolithic and later Neolithic activity. In the course of research by one of us (TB) into later Neolithic flintwork in southern Scotland, attention was drawn (by TW) to the Howburn assemblage, and its contrast with other assemblages from the area was noted. Subsequent loan of part of this assemblage (to TB) allowed it to be examined more closely (by TB and AS) and it was at this stage that the unusual and potentially very important character of some of the artefacts began to be recognized. Whilst the majority of the chert artefacts fitted what was known of later Mesolithic lithic traditions in this region, most of the flint artefacts represented a different kind of industry, focused on the production of very large and broad blades, and with a tool-kit including end-of blade scrapers and burins. This led to an initial note in which this part of the Howburn assemblage was tentatively assigned to the early Holocene and analogies drawn with artefacts of Star Carr type, although the presence of *en éperon* blades (Plates 1-2) suggested the presence of even earlier material (Saville *et al*. 2008).

In view of the rarity of such early lithic assemblages in Scotland, Historic Scotland (now Historic Environment Scotland) agreed to fund a more detailed study (by TB with AS) of the Howburn finds, involving all of the material recovered by BAG to date. It was at this stage, that TB and AS became aware of the range of implements in the collection, and the technological details of manufacture, and it was realized that a Late Upper Palaeolithic date of the majority of the finds would be more appropriate. This was confirmed when refitting by TB revealed that a piece previously classified as an obliquely blunted microlith fragment (Saville *et al.* 2008: Figure 2.5) was actually the tip of a tanged point (Plate 5.765/1084).

This was the background to the media announcements in 2009 of the discovery of evidence for Scotland's first settlers and the realization that during the Late Upper Palaeolithic, Scotland was not isolated from the Upper Palaeolithic world at large (e.g., Pitts 2009). A first publication of the Late Upper Palaeolithic finds from Howburn was presented by the authors in 2010 (Ballin *et al.* 2010), in which the lithic artefacts from the 2006 excavation were presented and discussed.

Although the results of this analysis were exciting, diagnostic tools, such as tanged points, *Zinken*, and burins were relatively rare, and datable features and charcoal absent. For these reasons, it was agreed that further investigations at the location would be desirable. BAG therefore carried out additional excavations on the site during the summer of 2009. Two trenches were opened, both in areas in which fieldwalking suggested excavation might prove fruitful. Trench I (2009) formed an extension to the excavation of 2006 (below referred to as Trench I [2006]), and it was situated immediately south of, and joining, the initial trench. Trench II was opened east of Trench I, along and west of the A702, the road linking Biggar with Edinburgh towards the north-east.

Historic Scotland (now Historic Environment Scotland or HES) and the Society of Antiquaries of Scotland jointly offered to fund an investigation of the new finds and other information gained during the new excavation, as well as of the production of the present monograph on the findings from both excavations (2006 and 2009). Additional funding was kindly offered by the Robert Kiln Trust. As shown below, the 2009 excavation resulted in the recovery of substantial additions to the Late Upper Palaeolithic assemblage from 2006, with the number of tanged points rising from four (including a fragment recognized in 2010) to 29; *Zinken* from one to three; and burins from three to 34! An additional premium was the recognition of a likely concentration (Trench II [Block 3-4]) dating to the *Federmesser-Gruppen* period, in many respects similar to the assemblage from Kilmelfort Cave near Oban (Saville and Ballin 2009). A selection of Late Upper Palaeolithic finds from Howburn are illustrated as Plates 1-16.

The evaluation of the lithic material is based upon a detailed catalogue of all the lithic finds from the Howburn site, and in the present report the artefacts are referred to by their number (CAT no.) in this catalogue.

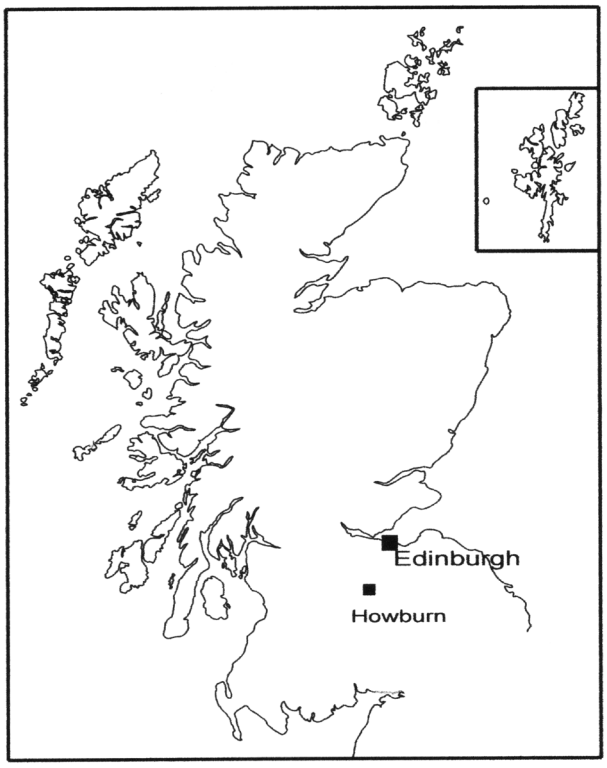


Figure 2. The location of the Howburn site in Scotland.

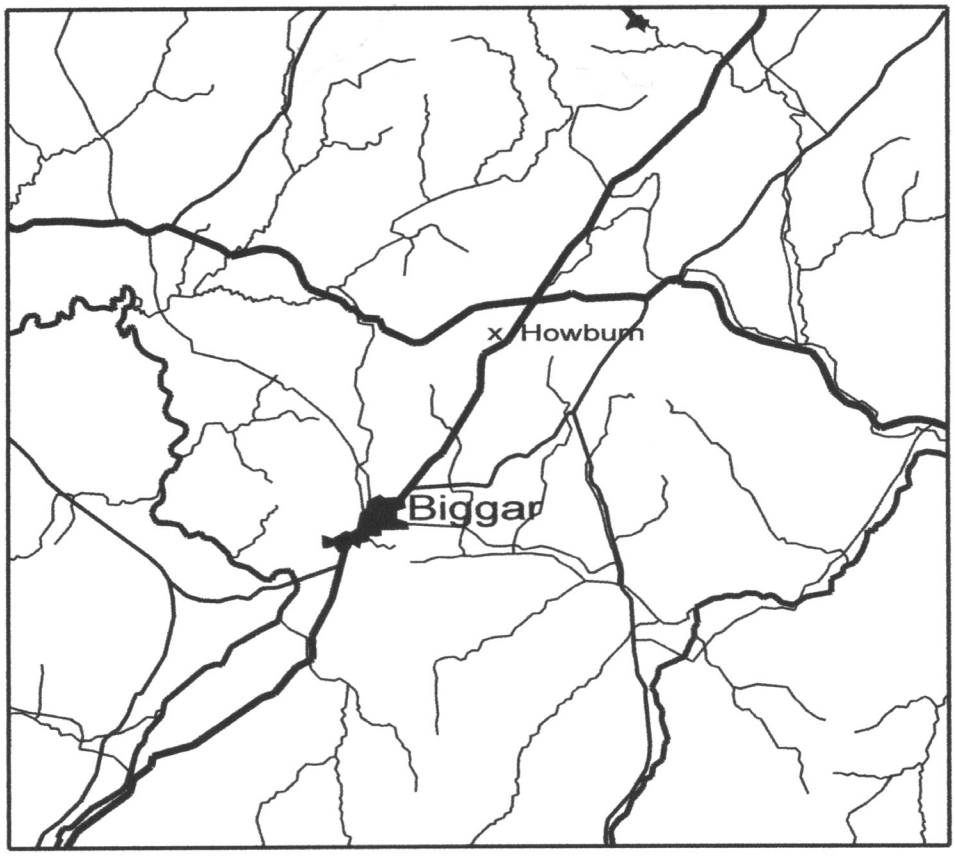


Figure 3. The location of the Howburn site in the general Biggar area. The main roads (thick black lines) and rivers are shown.

The location

The Howburn site is in South Lanarkshire, southern Scotland, some 7 km north-east of the town of Biggar, approximately 50 m west of the A702 road from Biggar to Edinburgh (NGR: NT 08209 43629; Figures 2-3). This is an inland location, *c.* 35 km from the nearest modern shore at the Firth of Forth to the north and *c.* 75 km from the nearest point on the modern east-coast. Biggar lies on the axis of a broad south-west to north-east trending pre-glacial, fault-guided valley between a ridge of Devonian sandstones, the Pentland Hills to the north, rising to *c.* 560 m above OD and 516 m above OD directly opposite the archaeological site, and the Silurian mudstones of the Southern Uplands to the south, rising locally to *c.* 750 m above OD on Culter Hill (Figure 4). The Rivers Clyde and Tweed run parallel for some distance before diverting north and east respectively. Between and connecting them, the Biggar 'gap', east of Biggar, is a valley floor occupied today by a small stream.

The archaeological site is situated on the lower, west-facing flank of Broomy Law, at 265-268 m above OD (Figure 5). The bedrock geology is of Lower Devonian andesite, but this crops out only on higher and steeper valley sides. Lower slopes are mantled by a thin sandy diamict (see pedological section, this volume). A stream drains the slope, with a small catchment, its headwaters originating in part in a meltwater channel, one of a series, *c.* 450 m to the south-east and *c.* 75 m higher than the archaeological site. The stream is incised through a series of glaciofluvial gravel terraces. It flows to the south of the archaeological site (Figure 6) and is currently incised below it. Excavation Trench 2 is in a slight depression on a generally fairly level terrace of diamict (Figure 7). Other horizontal terrace surfaces, fragments of probable former lake shorelines, are cut into this in places at slightly lower altitudes. Viewshed analyses, made assuming no vegetation taller than herbs, show that the view to the Pentland Hills to the north-east is patchy but extends *c.* 15 km. That to the south west is more circumscribed, blocked by the hills at Greenwood (Figure 5).

The stream then falls onto a broad, flat valley floor lying at around 245 m OD. The head of this valley, to the north-east at Melbourne (Figure 4), is a small plug of mounded glacial deposits rising to 265 m OD, separating the north-east flowing Back Burn from the south-west flowing How Burn. The How Burn is at present a straight canalized ditch, draining a spread of lacustrine alluvium *c.* 1.2 km long and *c.* 0.2 km wide, extending over some 30 ha. The alluvium represents a

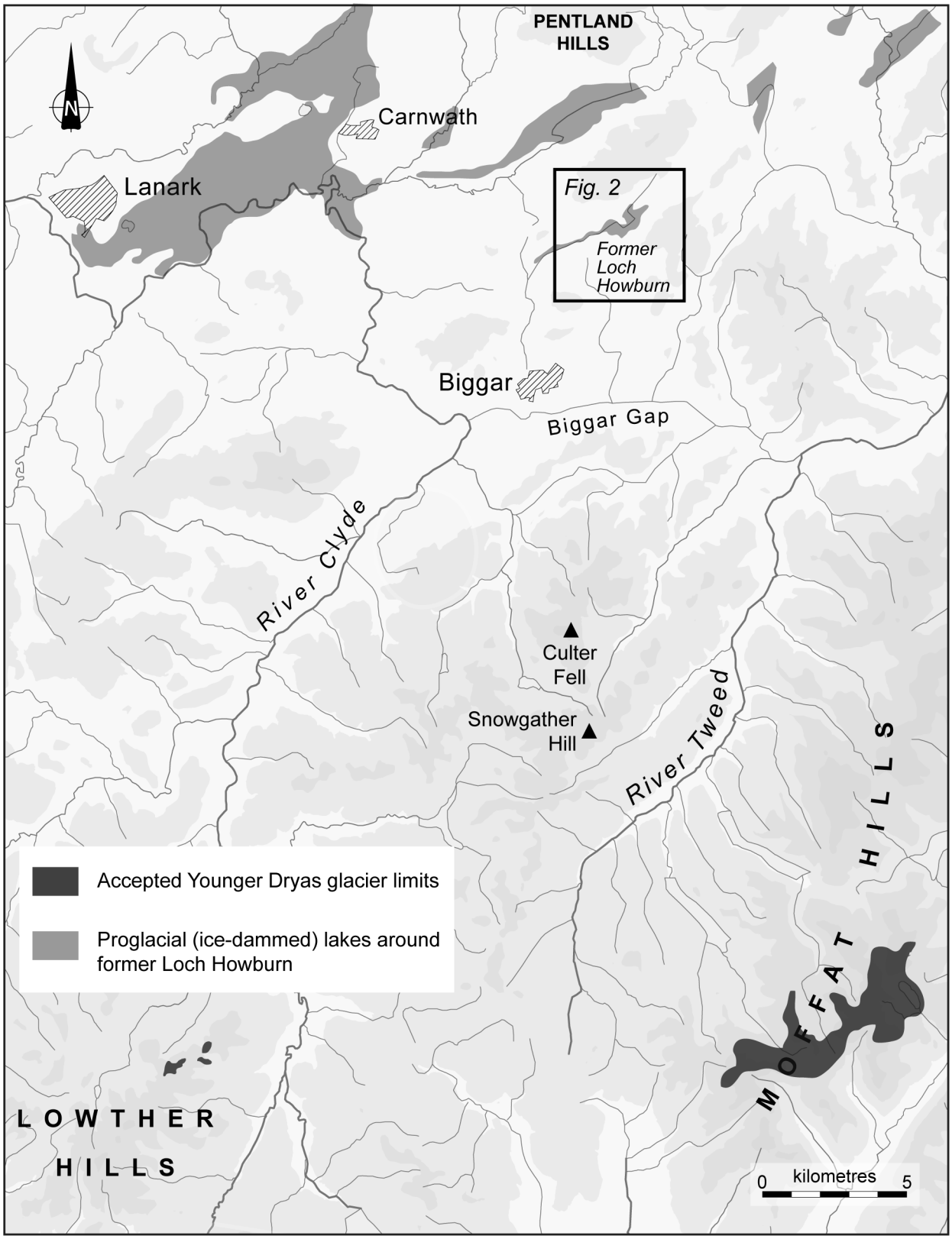


Figure 4. The location of the former 'Loch Howburn' in southern Scotland near the Biggar Gap, between the Pentland Hills and the Southern Uplands, showing the courses of the Rivers Clyde and Tweed and Clyde, the outlines of similar glacio-lacustrine lake basins (Bennett, Huddart & Thomas 2007; Price 1961; Thomas and Montague 1997) and the currently accepted extents of Younger Dryas (Loch Lomond Stadial) glaciers (Golledge 2010).

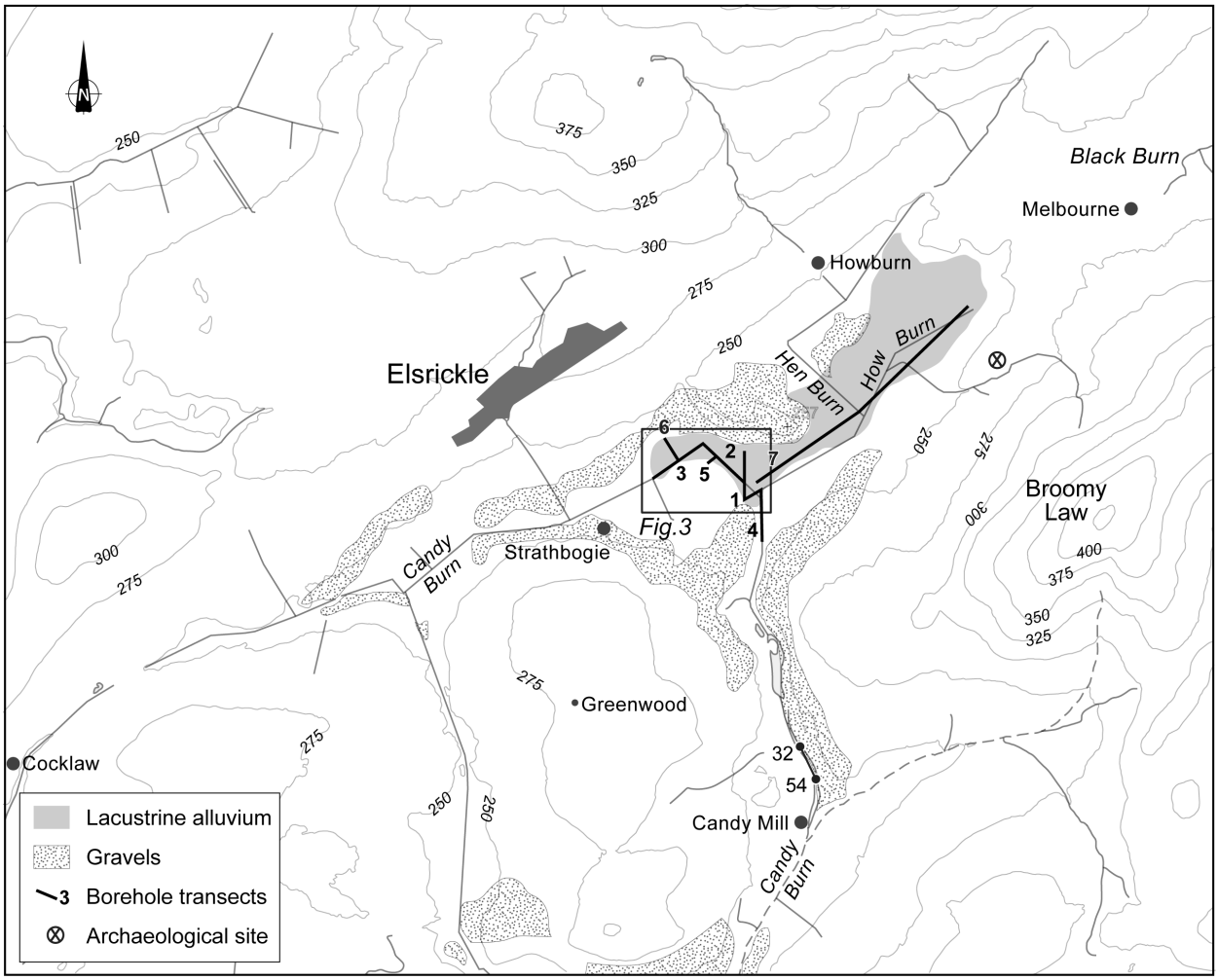
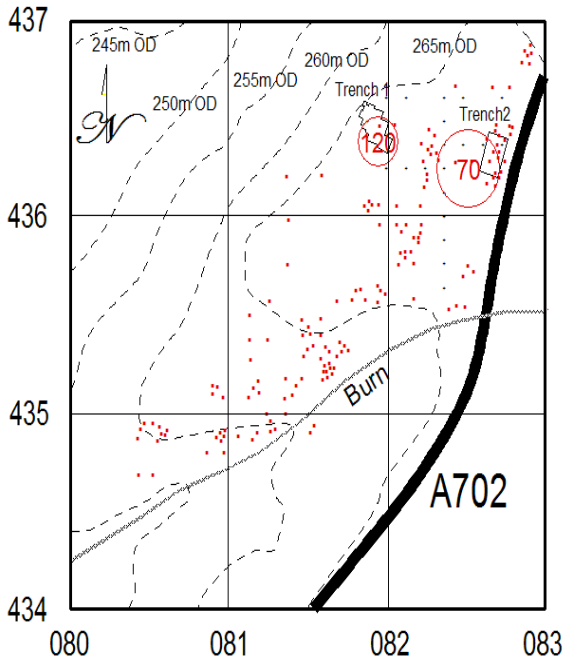


Figure 5. The area around the Howburn archaeological site showing settlements, surrounding hills and valleys, streams and rivers as they are today, the extent of lacustrine alluvium of the former 'Loch Howburn' and glaciofluvial gravels on valley sides (McMillan et al. 1981). The distance from Cocklaw to Candy Mill is 3.5 km.



former lake on the valley floor, in this volume referred to as 'Loch Howburn'. The How Burn barely falls in altitude over more than a kilometre to its confluence with the Candy Burn east of Strathbogie, which flows north-east from another low col in the west at *c.* 250 m OD. Gravel mounds and poorly defined terraces line both these valley sides below *c.* 260 m OD. From their confluence, the Candy and How Burns turn south and down a narrow, steep-sided bedrock-lined gorge from *c.* 240 m OD to below 230 m OD at Candy Mill.

Figure 6. The Howburn terrace, the two excavation trenches, and the lithic surface finds (dots) (based on map by Ian Paterson, BAG). The grid lines relate to the 100 m intervals of the national grid.

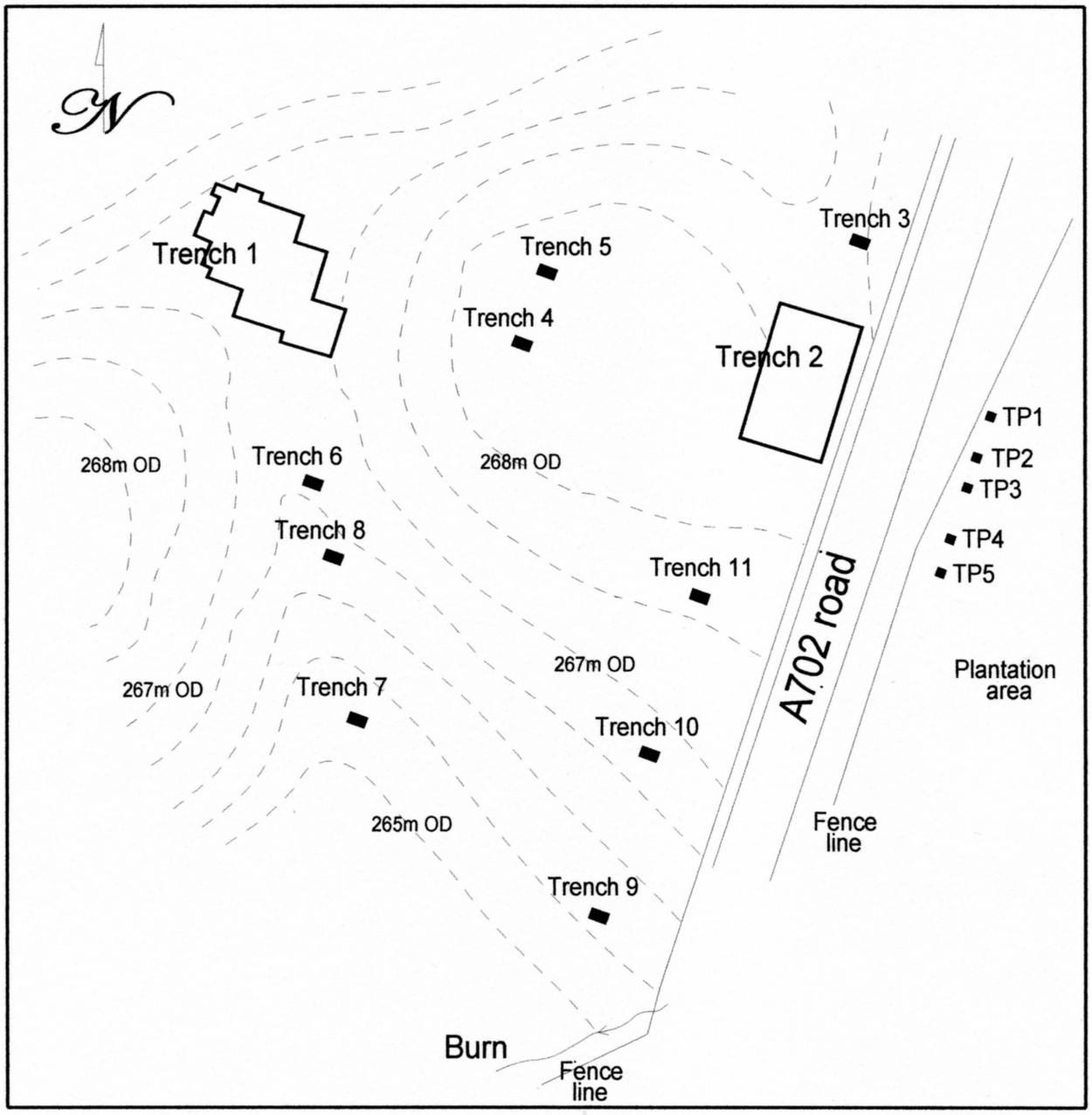
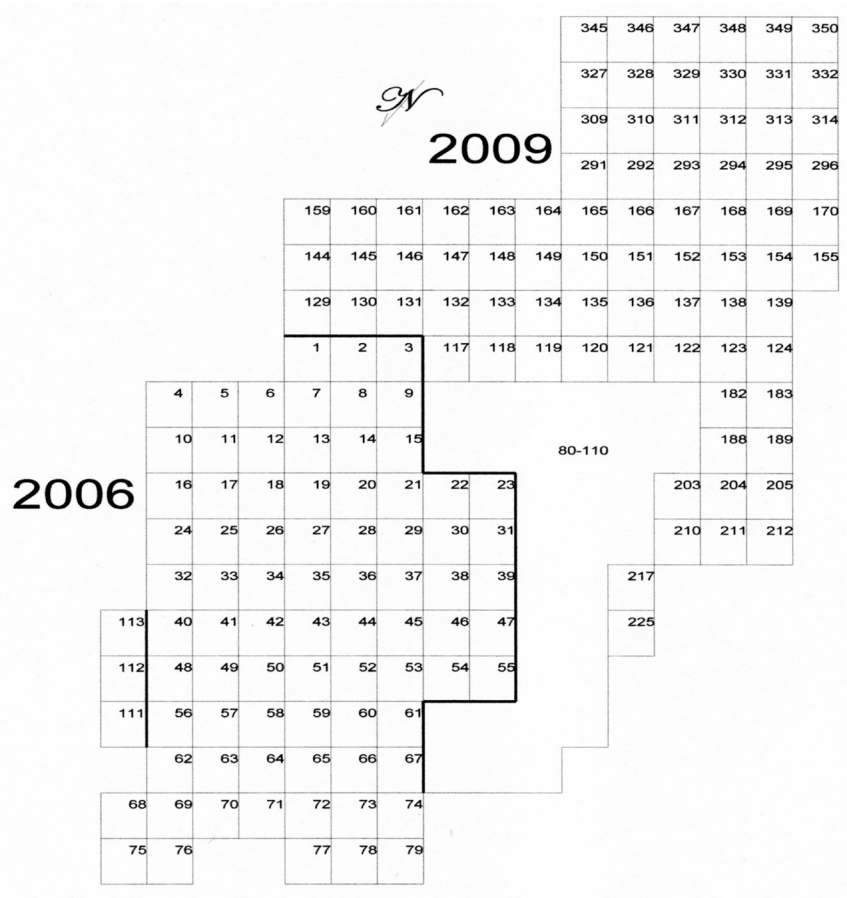


Figure 7. The Howburn terrace and all excavation trenches and trial pits (based on map by Ian Paterson, BAG).

The investigation of the site

The fieldwalking at Howburn in 2003–2005 by members of the BAG followed their standard practice of walking in parallel rows, 2-3 m apart. It was noticed that the area outside the terrace, which measures *c.*150 x 100 m NE-SW, yielded few finds, and the later stages of fieldwalking therefore focused on this part of the field. Renewed ploughing of the field in 2005 revealed one particularly dense concentration, unusually of flint rather than chert (the main raw material exploited during the Mesolithic and Early Neolithic of South Lanarkshire; e.g., Ballin and Johnson 2005; Ballin and Ward 2013; Paterson and Ward 2013). This concentration was therefore selected for excavation.

The excavation was carried out over the winter of 2005–2006, when a grid of 79 metre squares was positioned over the concentration (Figure 8). The ploughsoil was excavated entirely by hand and, in the absence of any obvious archaeological stratigraphy, finds were bulk recorded within each metre square. All the fieldwalked finds (Figure 6) were retrieved before the excavation grid was established, and although the position of most finds recovered during the fieldwalking was fixed by GPS, some significant artefacts are only recorded as



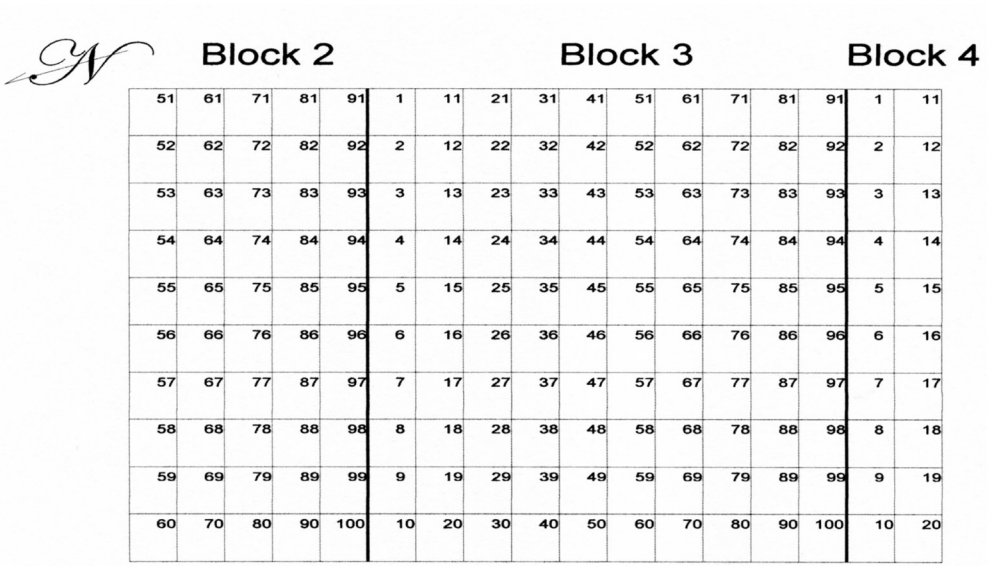


Figure 8. Trench I (left) and Trench II (right) with the original grid numbers. Trench I has been subdivided into the parts excavated in 2006 and 2009, respectively. Trench II has been subdivided into the original 'blocks' referred to during the excavation. The location of these two trenches is shown in Figures 6 and 7.

coming from the surface of the ploughsoil above the excavated area, rather than from particular metre squares. The excavation confirmed the observations from fieldwalking, that the ploughing was regularly cutting into the subsoil and subjecting lithic artefacts to both vertical and horizontal displacement, and inevitably to damage. This is probably reflected in the high blade-fragmentation ratio, which is 88% – that is, only 12% of the blade material is intact.

From the 2006 excavation at Howburn, 1099 lithic artefacts were recovered (Table 4). These constitute the key outcome of this excavation and provided the focus for the first report on the Upper Palaeolithic finds from Howburn (Ballin *et al.* 2010). The lithic assemblage is clearly mixed chronologically, but in the course of the excavation there was no clear stratigraphic or preservational evidence to guide subdivision of the 2006 finds.

As mentioned above, the excavation of 2009 saw the extension of the initial trench (Trench I [2006]) towards the south (Trench I [2009]), as well as the opening of a new trench immediately west of A702 (Trench II). The two new trenches measured 113 m^2 and 170 m^2, respectively (Figure 8). The positioning of the two new trenches was partly directed by results from fieldwalking but, in the case of Trench I (2009), it was also directed by the hope that an extension of the initial trench towards the south would allow distribution analysis by contour-mapping to more precisely define the outline of the main concentration in the southern corner of Trench I (2006). Distribution analysis would show whether this scatter might be the footprint of a tent-like structure like that suggested by Holm (1991: Figure 8) in connection with his interpretation of the Hamburgian and *Federmesser-Gruppen* settlement at Slotseng, southern Denmark. Although typo-technological scrutiny of the finds from the grid units (80-110) west of the original trench suggests that this area may indeed have formed part of this potential dwelling, these finds unfortunately became mixed during the excavation and now form an uncontexted sub-assemblage within the general collection from Trench I (2009).

During the 2009 excavation, Trench II was subdivided into four blocks (1-4), each of 100 grid units (Figure 9). Only three m^2 of Block 1 were excavated, nine metres north of the excavated parts of Block 2; 50 m^2 of Block 2 were excavated (grid units 51-100); 100 m^2 of Block 3; and 20 m^2 of Block 4 (grid units 1-20). As these 'mechanically defined' excavation trenches, blocks

Figure 9. Excavation of Trench II by BAG (2009) (photo: Tam Ward).

and units have proven to match individual Upper Palaeolithic concentrations and distribution patterns in a useful manner (see distribution section), they have been retained through this report.

During the fieldwork, it was noticed that, in places, soil initially perceived to be sterile moraine differed slightly from the glacial deposits by its colour (a slightly darker yellow), and it also contained some artefacts (Figure 10). It is thought that this context incorporates the cryoturbated Late Glacial ground surface, which has not been affected by ploughing (below referred to as 'subsoil', with the term 'topsoil' referring to the site's ploughed upper levels). This hypothesis was confirmed by the lithic finds from the excavation of the context, which are almost entirely in flint, and which only included artefacts datable to the Upper Palaeolithic period (Figure 11). This undisturbed (by man) layer was only recognized consistently in Trench I (2009), southern corner, as well as in Trench II (Block 2).

The new trenches were generally excavated in the same way as the 2006 trench, that is, entirely by hand and without the consistent application of sieving. In the absence of any obvious archaeological stratigraphy, most finds were bulk recorded within each metre square, although in the two areas with surviving Late Glacial soil, also by level. As noted during the excavation of Trench I (2006), ploughing is regularly cutting into the subsoil and subjecting lithic artefacts to vertical and horizontal displacement, thus causing some mixing of finds of different dates in the topsoil.

No structural remains or stone-set hearths were found (by Erwin Cziesla referred to as 'evident structures'; Cziesla 1990: 257), but as shown in the distribution section below, it is possible to define some 'latent structures' (Cziesla 1990: 257) on the basis of distribution patterns (reduction waste, cores, tools, burnt flint, etc.).

Finds from the smaller trenches, as well as from the initial fieldwalking (Figures 6-7), suggests a wider distribution of Late Upper Palaeolithic finds around the two main trenches, and it is almost certain that the terrace and the fields around it include remains from other visits to the area during the Hamburgian and *Federmesser-Gruppen* periods.

Pedological analyses at Trench II

A *c.* 8 m long section at Trench II, close to the field edge, was excavated down to the underlying till and examined in order to fully describe the deposits and to get a better understanding of their origins and formation processes.

Table 1 is the profile description, after Hodgson (1976). Two undisturbed 8 x 6 x 4 cm 'Kubiena' tin samples were taken from the deposits at depths of 40-48 cm and 55-63 cm, covering Units C1, C2 and C3 (see Table 1). They were prepared according to methods outlined at http://www.thin.stir.ac.uk/ and examined on a light box and then using an Olympus BX51 petrological microscope at magnifications of between x20 and x200 in plane polarised light (PPL), cross polarised light (XPL), and oblique incident light (OIL). Descriptions (Table 2) were made using the standard terminology of Stoops (2003).

Thin section 1 (40-48 cm): Light box examination showed C1 to be a mid brown, dense and seemingly structureless sandy loam containing few sand-sized iron nodules. The boundary with C2 is straight, clear and sharp, although it is traversed by fine plant roots. C2 is a mid

Figures 10-11. The subsoil.
Figure 10. Excavation of the flint-bearing subsoil.
Figure 11. Vertical blade-scraper in the subsoil, indicating solifluction or cryoturbation (photos: Tam Ward).

Table 1. Soil profile field description.

Depth cm	*Description*
0-15	(Ap1) Dark brown 7.5YR 3/2, organo-mineral silty clay loam with a well developed crumb and fine/medium blocky structure and moderately porous. Contains many fine roots, few small and medium sub-rounded stones, few abraded tile and pottery inclusions, and rare charcoal, all randomly distributed and orientated throughout the soil. Lower horizon boundary clear, straight and abrupt: *upper plough soil*
15-29	(Ap2) 10YR 4/2, organo-mineral, silty clay loam with a well developed medium blocky structure. This horizon contains common fine roots, few small and medium sub-rounded stones, and few abraded tile and pottery inclusions all with a random distribution and orientation. There are a few distinct mottles towards the base of the horizon that are concentrated around root channels. Lower horizon boundary is clear and wavy (vertical variation of 5 cm over 0.8 m) and is broken by vertical channel voids infilled with humic topsoil material: *plough soil associated with intermittent deep ploughing*
29-42	(C1) 10YR 4/3, structureless sandy silt loam which although compact was weak and brittle. It contained few fine roots, few sub-rounded, small and medium stones and rare charcoal that was predominantly found in the upper few cm of the deposit. The stones were randomly distributed and had no preferred orientation, but increased in frequency towards the base of the deposit. Lower boundary was clear, straight and abrupt.
42-48	(C2) 7.5YR 4/6, structureless, weak and brittle, sandy silt loam, containing slightly less clay than C1. This deposit contains few fine roots and few sub-rounded and sub-angular, fine and medium stones. Lower boundary clear, abrupt and straight.
48-78	(C3) 10YR 4/5, stuctureless and very compact sandy silt. This deposit contains very few fine roots and few fine and medium sub-rounded stones. The stones appear to have a weakly banded distribution with an inclined orientation that broadly reflects the underlying slope angle. Towards the base of this deposit are rounded clods of up to 10 cm diameter of C4 material. There are common, distinct bands of mottles, strong brown and reddish brown in colour, which follow the inclined orientation of the stone bands: *C1-C3 Sedimentary deposits (fluvial?)*
78+	(C4) 5YR 5/4 Compact, structureless, silty clay loam with common medium sub-rounded and sub-angular stone inclusions, root free: *diamict (glacial till)*

Table 2. Micromorphological summary descriptions for Howburn C1, 2 and 3.

		Coarse mineral matt						Fine groundmass (<10 microns)	Voids			Pedofeatures						Micro-structure	Coarse material arrangement	Total porosity	Related distribution	C:F ratio
Slide	Zone	Quartz	Feldspar	Muscovite	Biotite	Igneous	Sandstone		Vughs	Packing voids	Channels	Amorphous & crypto-crystalline Fe nodules	Clay coatings	Silt coatings	Silt cappings	Excremental (mammilate)	Excremental (spheroidal)					
1	C1	***	*	*	t	*		Mid brown in PPL, orange brown in OIL, organo-mineral, with a stipple speckled b-fabric and occasional black punctuations.	*		*	**				t	t	Vughy	single space porphyric	10%	random	2:3
1	C2	***	*	*	*	**	t	Orange brown in PPL, and orange in OIL, mineral, with a stipple speckled b-fabric.	*		**	**	*		*	t	*	Vughy and channel	close porphyric	20%	random	1:1
2	C3	****	**	*	*	**		Greyish brown in PPL and grey or orange in OIL, mineral, with a weakly stipple speckled b-fabric.	*	**	*	*	**	*	**			Single grain	gefuric, chitonic and close porphyric	25%	banded	5:1

Frequency classes			Textural pedofeatures		
t	trace	<1%	*	rare	<2%
*	very few	1-5%	**	occasi	2-5%
**	few	5-15%			
***	frequent	15-30%			
****	common	30-50%			

pinkish brown, dense sandy loam. The deposit shows little evidence of structural development of peds (aggregates), and the porosity is dominated by channel voids, which appear to be largely root derived. The matrix is well sorted, but contains frequent weathered basalt clasts between 5 mm and 30 mm long. These gravel sized clasts are generally arranged randomly through the deposit. However, towards the base of the slide the gravel clasts appear to have a steeply inclined (*c.* 35°) banded distribution.

Examined under the microscope, C1 has a mid-brown, organo-mineral fine groundmass with a stipple-speckled b-fabric. The microstructure is vughy (total porosity *c.* 10% context area) with no evidence of aggregate development. Vugh voids are typically around 100 microns long, whilst the channels that traverse this material are up to 500 microns wide. The coarse mineral component is dominated by fine-to-medium quartz sand with few feldspar grains, few coarse sand-sized grains of basaltic material, and few silt-sized, acicular biotite and muscovite grains. No coarse organic component is present; the organic component is confined to the fine groundmass in the form of amorphous organic matter and fungal biomass. Trace spheroidal and mammilate excrements typical of earthworms and *enchytraeids* are present in the channels, but these are heavily coalesced, indicating ageing. The material also contains few amorphous and crystalline iron nodules which are mostly orthic (*in situ*) although rare disorthic nodules are also present, indicating some turbation of the material.

The fine groundmass of C2 is orange brown in PPL and orange in OIL, indicating that this is a mineral deposit with a stipple-speckled b-fabric. The deposit shows no evidence of aggregate development and the microstructure is instead dominated by channel and vugh voids. Total porosity is around 20% of the context area with vughs in the order of 200-500 microns long and channels up to 2000 microns wide and sub-vertical in orientation. The mineral component is dominated by fine and medium sand-sized quartz grains, randomly distributed and with a tight single-space porphyric distribution relative to the fine groundmass. Also present are few sand-sized feldspar grains, few silt-sized acicular muscovite grains, and few acicular and tabular biotite. The deposit also contains few gravel-sized clasts, predominantly of weathered basalt, but also with traces of sandstone. These are randomly distributed with the exception of a band of gravel-sized clasts towards the base of the slide. This band is inclined by ca. 35°. The coarse:fine ratio (10 microns) is ca. 1:1.

Very few spheroidal and trace mammilate excrements (typical of *enchytraeid* and earthworms respectively) are present within channel voids and are moderately to strongly coalesced. Low numbers of amorphous and crystalline iron nodules are present throughout this material. Some of these are *in situ* orthic features whilst others are disorthic and possibly even anorthic. Limpid orange clay coatings and infillings are present within some voids. The coatings exhibit diffuse extinction lines indicating only partial orientation of the clay particles, but the coatings are intact. At the base of the slide on the upper surfaces of the band of basaltic gravel clasts, a poorly sorted silt link-capping is also present.

Thin-section 2 (55-63 cm): Underlying C1, the bulk of the slide consists of C2, which on the light box is seen to be a dense, pale greyish-brown sandy loam, containing frequent weathered basalt clasts. The deposit is structureless and has a low porosity, dominated by closed, irregular vugh-type voids. Both the sandy loam matrix and the basalt clasts are well sorted. The basalt clasts are rounded and sub-sounded, 5-10 mm long (rarely 15 mm) and are arranged in distinct parallel bands *c.* 15-20 mm apart, with a slight inclination of *c.* 2°.

Examined under the microscope, C2 has a fine groundmass composed of two materials. Amorphous yellow material distributed as chitonic coating on sand grains with an undifferentiated b-fabric, and a mid-brown silty clay material distributed as gefuric bridges between sand grains, with a weakly stipple-speckled b-fabric. The microstructure of this deposit is single-grain with the porosity (total *c.* 25% of the slide area) dominated by simple open and closed packing voids and very few vughs (up to 1000 microns long) and channels (up to 1500 microns wide). The coarse mineral component is dominated by fine quartz sand with lesser amounts of coarse silt-sized and medium sand-sized grains. Also present are few fine sand-sized feldspar grains, as well as few silt-sized acicular muscovite and acicular tabular biotite sand and silt grains. The rare igneous gravel clasts (principally basaltic) are sub-angular, sub-rounded and rounded, and predominantly equant in shape. They have a clearly banded arrangement. These gravel bands are not associated with any distinctive characteristics in either the sand- and silt-sized fractions or the fine groundmass. The coarse:fine distribution is chitonic and gefuric, and the ratio is in the order of 5:1.

This context contains significant evidence of clay and silt translocation in the form of a range of textural pedofeatures. The most extensive features are silt link-cappings covering the upper surface of the bands of gravel clasts and occasionally sand grains in discontinuous layers between these bands. Textural void coatings are also present; they include both limpid and dusty clay coatings, and impure and silt coatings. Where the coatings are layered, silt coatings are always overlain by limpid clay. The distribution of the two types of coatings also differs, with the silt coatings largely limited to the silt cappings on gravel clasts, whilst clay coatings are predominantly found lining channel voids and occasionally within the silt cappings. Low numbers of opaque amorphous iron nodules of coarse silt and fine sand size are present; they are randomly distributed, and appear to be anorthic in nature, suggesting that they are inherited rather than *in situ*.

Discussion

The field and micromorphological evidence suggests a truncated sequence of glacial diamict (till: C4), overlain in depressed areas with sandy silt sediment (C1-3), which on the basis of its texture, sorting and preserved sediment stratigraphy appears to be fluvially or glaciofluvially derived. No evidence of soil formation was identified affecting the glacial till surface below the sandy silts, which suggests that the deposits are Devensian Late Glacial in origin.

Evidence of soil formation (pedogenesis) was present in the upper sandy silt layers (C1 and C2) in the form of iron and excremental pedofeatures, root traces and channel voids. These features suggest processes of wetting and drying as well as bioturbation, possibly resulting in the loss of a micro-stratigraphy similar to that preserved in C3. Units C1 and C2 were identified by the excavation team as those bearing the Palaeolithic flints. If so, their presence in fluvial/glaciofluvial deposits may mean that the flint is not *in situ*. However, it is also possible that the flints were deposited later than C1 and C2, perhaps incorporated through later bio- or cryo-turbation processes.

Micromorphology highlights freeze-thaw activity at the microscopic scale in these deposits, in the form of silt cappings and coatings in unit C3. However, at the field scale, the limited section exposures examined contained little evidence of cryoturbation, with glacial stratigraphic layers largely preserved intact. The trench sections did not penetrate deeply enough into the adjacent and underlying C4 glacial deposits to unambiguously identify freeze-thaw features.

These deposits are sealed beneath a plough soil that shows signs of intermittent deep ploughing to a depth of 29 cm. The absence of a B horizon between the Ap and C1, C4 contexts hints at truncation of earlier land surfaces, hence the mixing of Mesolithic and Neolithic lithics in the plough soil. This interpretation is supported by the field-scale evidence of the plucking of stones from the surface of C4.

Conclusion

Contexts C1-3 appear to have been deposited in water, either fluvially or fluvio-glacially. The deposits have been affected by freeze-thaw processes, but within the limited exposure examined, there was no evidence of more extensive cryoturbation affecting the deposits. There is evidence of pedogenesis in contexts C1 and C2 consistent with a sub-soil, but plough activity, and particularly intermittent deep ploughing to 29 cm, appears to have led to truncation of the C1 and C4 contexts and the loss of any earlier top soils.

Post-excavation aims and history

Once the affinities of the dominating mainly flint segment of the assemblage had been established to be Late Hamburgian or Havelte (see dating and discussion sections below), a number of key aims were more or less given, and it was decided during the final combined write-up of the two excavations to focus on the following points:

- To allow the comparison of the Howburn lithic assemblage with contemporary assemblages (primarily Continental Hamburgian and British Creswellian assemblages) it was necessary to first characterize the finds in detail and store the information in a computer-based catalogue (an Access database).
- Although the assemblage is thought to also include other Late Upper Palaeolithic finds, such as artefacts of *Federmesser-Gruppen* affinity, this material is difficult to quantify, due to the shift of raw material preferences, from almost (but not entirely) Doggerland flint during the Hamburgian to local and exotic forms of chert. It was therefore decided to focus on the collection's Hamburgian element, but characterize and discuss the *Federmesser-Gruppen* element to the degree this was possible.
- The typo-technological data stored in this database was then to be summarised and discussed in a detailed report, with the main points of focus being: raw material preference, typo-technological composition, vertical and horizontal distribution, dating, comparison with contemporary assemblages, and discussion of these points as well as cultural affinities and economy/activity patterns to the degree the finds would allow this.
- As part of the discussion of distribution patterns, the possible presence of remains of one or more dwellings (possibly tent-like structures), activities, and the dating of the finds, distribution maps should be produced by the application of suitable computer software.
- Finally, it was also necessary to integrate the results of the palaeo-environmental analysis of the Howburn settlement into the report, not least regarding the possibility of a small lake having been present below the Howburn terrace during stages of the Late Upper Palaeolithic ('Loch Howburn').

During the project, and as a consequence of most of the finds from Howburn being characterized by typo-technological attributes usually associated with the Late Hamburgian of north-west Continental Europe, relevant expertise was consulted, first and foremost investigators at Centre for Baltic and Scandinavian Archaeology (ZBSA)

at Schloss Gottorf, Schleswig-Holstein, whose chief research focus is the Hamburgian period. Throughout the project, contacts were maintained mainly with Drs Sonja Grimm and Mara Julia Weber of ZBSA, but matters were also discussed with Dr Jørgen Holm (then the Danish National Museum), the excavator of the Hamburgian sites Jels and Slotseng in southern Jutland, but also British Late Upper Palaeolithic expertise was consulted, such as *inter alia* Professor Nick Barton, School of Archaeology, University of Oxford.

Following the production in 2010 of the report on the combined finds from the 2006 and 2009 excavations (by TB), the finds and draft manuscript was passed on to AS for commenting, and it was hoped that publication of Howburn (eagerly awaited by researchers of the Late Upper Palaeolithic throughout north-west Europe) was imminent. However, Saville unexpectedly became seriously ill, and in 2016 he sadly passed away (Ballin 2016a). TB therefore completed the Howburn manuscript, and final comments on this document were obtained from Dr Weber at ZBSA, for which we are grateful.

Chronological framework

In the present volume, the Late Upper Palaeolithic period is defined as in Pettitt (2008) and Pettitt and White (2012: 423) as the period from the beginning of the Late Glacial amelioration to the beginning of the Holocene (the Mesolithic), and in Scotland embracing the Hamburgian (Pettitt's LUP I; Rust 1937; 1943; Grimm and Weber 2008), *Federmesser-Gruppen* (LUP II; Schwabedissen 1954; Terberger 2006; Conneler 2007) and Ahrensburgian industries (LUP III; Rust 1958; Vermeersch 2015), as well as possibly elements linked to the Scandinavian Fosna Hensbacka Culture, which may date to the Late Upper Palaeolithic-Mesolithic transition (Ballin and Bjerck 2016) (Table 3; for an overview, see Ballin 2017a).

At the present time, the only potential Creswellian object recovered in Scotland is the angle-backed point from Fairnington in southern Scotland (Saville 2004: Figure 10.23), which the authors find of 'dubious' value in terms of stating a Creswellian presence north of the Anglo-Scottish border, and certainly in need of corroborating evidence. In a sense, this piece corresponds to the Early Hamburgian shouldered point from Bjerlev in central Jutland (Becker 1970) which, half a century after its recovery, is still the only diagnostic piece from the early part of the Danish Hamburgian, with all Hamburgian assemblages and stray finds found in Denmark since then dating to the Late Hamburgian. The question is whether pieces like the Bjerlev point, as well as the Scottish Fairnington piece, could have travelled hundreds of kilometres embedded in wounded game animals (reindeer, wild horse?) and therefore have little to offer in terms of defining Late Upper Palaeolithic social territories and human mobility?

We have chosen to apply north-west European terminology (names of industries), and by doing so we follow Pettitt who wrote (2008: 19): '*My perspective is overtly Europeanist and I make no apologies for using Continental names for cultural groupings when I believe British materials can be identified with them*'.

The Scottish industries clearly show the closest parallels with those directly across the now submerged Doggerland basin (Ballin 2016c) (Tables 24-25), and given the presence of the Creswellian Complex south of Scotland, any contacts (direct or indirect) across Doggerland at the time are likely to have been with Hamburgian groups in southern Jutland (e.g., Holm 1991; Holm and Rieck 1992; Vang Petersen and Johansen 1991) and north-west Germany (e.g., Grimm and Weber 2008; Grimm *et al.* 2012; Weber 2012), rather than for example with Hamburgian groups in the Low Countries (Johansen and Stapert 2003). In addition, Hamburgian sites and assemblages are known from regions further towards the east, such as southernmost Sweden (Larsson 1996) and Poland (Breest and Veil 1991).

Table 3. The Scottish Late Upper Palaeolithic period and Late Upper Palaeolithic lithic industries identified in Scotland. Dates largely according to Sonia Grimm (pers. comm.).

Lithic industry	*Onset cal BC*	*Scottish assemblages*	*References*
Early Mesolithic	9,800		
Ahrensburgian	10,800	Brodgar, Orkney	Ballin & Bjerck 2016
		Tiree, Inner Hebrides	Ballin & Saville 2003
		Shieldaig, Loch Torridon	Ballin & Saville 2003
		Rubha Port an t-Seilich, Islay	Mithen *et al*. 2015
Federmesser-Gruppen	12,000	Kilmelfort Cave, Highland	Saville & Ballin 2009
Hamburgian	12,700	Howburn	Ballin *et al*. 2010