Society of Antiquaries of Scotland

PROCEEDINGS OF THE SOCIETY OF ANTIQUARIES OF SCOTLAND

ISSN: 0081-1564 • e-ISSN: 2056-743X

Interdisciplinary approaches to a connected landscape: upland survey in the Northern Ochils

How to cite:
Given, M, Aldred, O, Grant, K, McNiven, P and Poller, T 2019 'Interdisciplinary approaches to a connected landscape: upland survey in the Northern Ochils', *Proceedings of the Society of Antiquaries of Scotland* 148: 83-111. https://doi.org/10.9750/PSAS.148.1268

Click http://archaeologydataservice.ac.uk/archives/view/psas/volumes.cfm to visit the journal homepage.

Proc Soc Antiq Scot 148 (2018), 83–111
DOI: https://doi.org/10.9750/PSAS.148.1268

Interdisciplinary approaches to a connected landscape: upland survey in the Northern Ochils

Michael Given[1], Oscar Aldred[2], Kevin Grant[3], Peter McNiven[4] and Tessa Poller[5]

ABSTRACT

The key to understanding a landscape is through its connections, which tie together people and environment within and beyond that landscape and across many different periods. This is particularly true of the northern face of the Ochil Hills in central Scotland, which is characterised by dense networks of connections between lowlands and uplands, local and regional. To trace those connections we integrate the results of walkover survey, aerial archaeology, excavations, documentary analysis and place-name analysis, revealing significant continuities and differences in the networks and relationships that have connected this landscape across time and space. Iron Age hillforts used their prominence and monumentality to guide people along very specific routes across the Ochils. Regular seasonal movements of cattle and herders in the medieval and post-medieval periods were closely related to the agriculture and settlement they encountered on the way: this interaction can be clearly seen in the elaborate intertwining of paths, braided cattle tracks, farmsteads and enclosures, most strikingly in the 18th century. Such intricate connections across the landscape are equally keyed in to the specifics of particular locations and to much broader networks and historical change.

INTRODUCTION

The Ochil Hills in central Scotland are striking not just for their topographic diversity and historical depth, but for the extent to which they are highly connected across both place and time. These connections run from the valley floor to the Ochils' central ridgeline, from the local area to the wider region and sometimes across the globe, and often from prehistory to the medieval and post-medieval periods. Routes, nodes and meaningful places generate these connections by leading and propelling people and animals across the landscape, and by enabling both persistence and transformation in people's relationships with the landscape across time.

This article investigates connected landscapes in a range of periods from prehistory to post-medieval, focusing on the northern slopes of the Ochil Hills in Perthshire and using data acquired by the Upland Survey component of the 'Strathearn Environs and Royal Forteviot' project (SERF) (Illus 1). Specifically, we explore the interrelationships between different land activities, such as animal husbandry, settlement, place-making and movement, by addressing these questions:

1. How do paths, tracks, enclosures and boundaries facilitate and constrain movement between lowlands and uplands?

[1] Archaeology, School of Humanities, University of Glasgow, Glasgow G12 8QQ. ORCiD: 0000-0002-4450-381X
[2] Cambridge Archaeological Unit, Department of Archaeology, University of Cambridge, Cambridge CB2 3DZ. ORCiD: 0000-0001-5207-7905
[3] K.J.Grant@hotmail.co.uk
[4] Celtic and Gaelic, School of Humanities, University of Glasgow, Glasgow G12 8QQ
[5] Archaeology, School of Humanities, University of Glasgow, Glasgow G12 8QQ

Illus 1 Walkover survey in 2010 above Thorter Burn, looking north over Strathearn. The lone ash tree in the centre marks Scores Farm; the village on the right is Dunning (Michael Given)

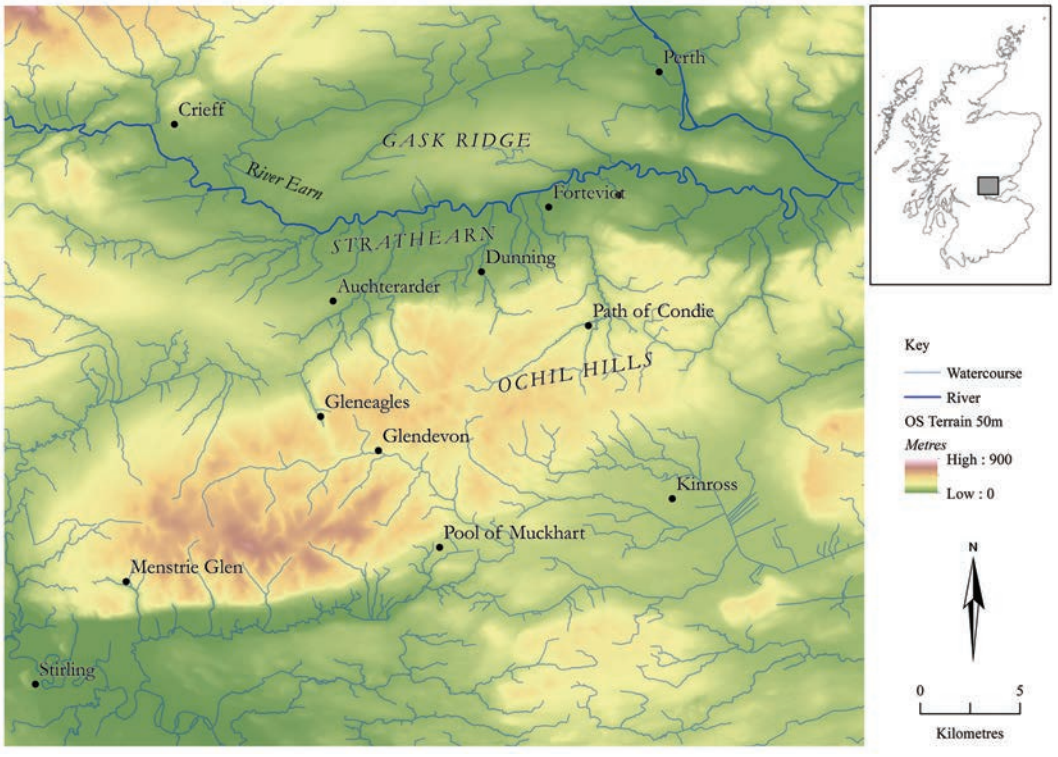
2. What role do regular patterns of movement play in the local and regional landscape, society and economy?
3. How do earlier patterns of movement and activity within the landscape affect later ones, in the long as well as short term? How can we understand the persistence of places?

Our starting assumption is that uplands such as the Ochil Hills do not have to be marginal, isolated or remote (Campbell et al 2002: 111; Davies 2007: 2053). Two 17th–19th-century farmsteads within our study area, for example, have been characterised as exactly that; yet the authors' own analysis shows how integrated they are in a social and economic network stretching as far as London and Barbados (Turner & Williamson 2015–16). Our goal is to identify and understand the interconnections, rather than assuming either marginality or integration. These connections are particularly important when dealing with upland areas, where the key issue of relationship with the lowlands is often neglected (Davies 2007: 2060). Local studies such as ours give resolution and focus when the identification of broad regional trends can smooth out such local particularities (Campbell et al 2002: 113; Davies 2007), while simultaneously demonstrating that the intricacy and elaboration of social networks embrace all scales from the micro to the global (Orser 2009).

The idea of artefacts and monuments having 'biographies' that express their changing networks of connections is now a familiar one (eg Gosden & Marshall 1999; Joy 2009; Witcher et al 2010). The same, of course, applies to landscapes, though in a much more complex fashion than the usual term 'palimpsest' implies (see, eg, Samuels 1979; Gibson 2015; Kolen et al 2015). We are interested not just in the process of landscape change, but in the connections between different pasts and different presents, such as the later impact of the Iron Age hillforts, and the interaction between enclosures and tracks of differing dates. Such a diachronic analysis gives insights into the ways that material things and places persist and adapt to changing conditions through time.

To achieve a robust and nuanced understanding of this very wide range of connections clearly requires the collaboration of researchers from a variety of disciplines. Given the long establishment of disciplinary boundaries and the fast-moving nature of our research environment, interdisciplinary scholarship has to be flexible and fluid; this is, indeed, the 'holy grail' of landscape studies (Jones & Hooke 2011). The collaborative writing of this article has worked towards the critical and reflexive integration of the different disciplines and perspectives of its authors: aerial survey; systematic walkover survey; excavation and measured survey; digital spatial analysis; place-name studies; and documentary and cartographic history. In what follows we synthesise the results of this integrated research to examine the issues of connectivity and mobility in the Northern Ochils across time and space, rather than trying to pursue every facet of the complex history of human activity and occupancy across prehistory and history.

The 'Strathearn Environs and Royal Forteviot' project (SERF) was a major research and teaching project that worked in Strathearn and the Ochils from 2006 to 2017, led by the University of Glasgow (Illus 2) (Driscoll et al 2010; Maldonado 2017; Brophy & Noble nd; Brophy & Wright nd). A key aim of the overall project was to develop a better understanding of the chronology and character of the early prehistoric complex of ceremonial monuments at Forteviot and its influence on the later development of a Pictish royal centre. Fundamental to the understanding of the ebb and flow of Forteviot as a centre of power and ceremony in the past was a wider landscape perspective. A related aim of the SERF project, therefore, was to examine long-term shifts of power, ceremony and settlement in the surrounding environs, covering a much longer time frame.



ILLUS 2 Location map showing the context of the research and places mentioned in the text. Background: EDINA Digimap (Oscar Aldred)

Brief surveys had already been carried out in our area, mostly preceding potential windfarm development or afforestation (Lowe & Dalland 1998; Hind 2004; Turner & Williamson 2015–16). RCAHMS carried out a rapid survey in the Glendevon area between 1996 and 1997; this was entered into the National Record of the Historic Environment (NRHE) in 1998, but the project remains unpublished in written format. More importantly for our approach and interpretation, the comprehensive survey and historical analysis of Menstrie Glen was carried out by RCAHMS just 20km south-west of our area (Cowley & Harrison 2001). The features and patterns they recorded show substantial similarities to what we identified, and they had the advantage of much more intensive recording and a more comprehensive historical archive. Our own goals were to identify any differences to Menstrie Glen, demonstrating the importance of local variation as mentioned above; to engage with the archaeological material in the comparative absence of full estate archives; and to build on their work by seeing how a theoretically engaged and analytical approach can move forward our understanding of this highly connected landscape.

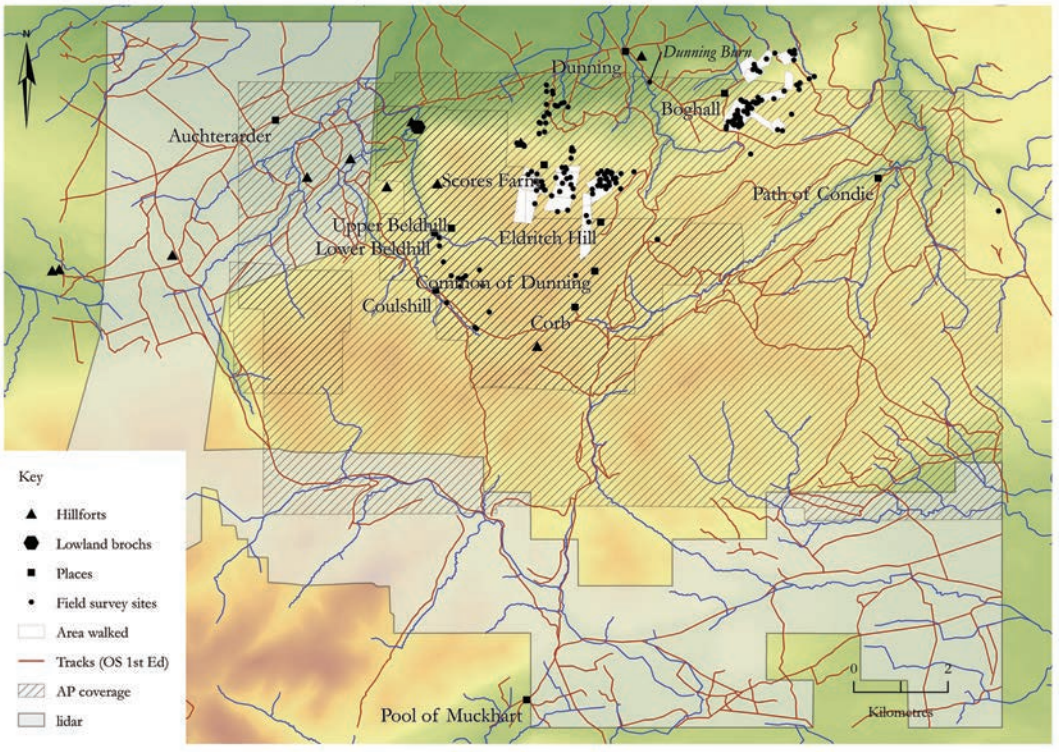
METHOD AND BACKGROUND

The overall methodological aim of this article is to integrate a wide range of methods and perspectives critically, in order to explore the interconnections between different elements of the study area landscape. We do this in the context of a teaching project, part of the SERF field school, which often had to prioritise student learning over speed and coverage. This, however, had the benefit of including extensive discussion about landscape and its interpretation, and some reflection and experimentation with methods. During fieldwork we mainly used longstanding, analogue techniques of walkover and filling in pro formas, to maximise student engagement with the landscape. To this we have added layers of documentary and place-name analysis, along with the capture, transcription and interpretation of aerial imagery.

The core of our ground survey methodology was to carry out systematic and intensive walkover survey across six different areas of the parishes of Auchterarder, Dunning, Forteviot and Forgandenny (Illus 3). A line of between four and 14 walkers, 20m apart, walked across specific areas defined on the map ('Areas walked') and flagged any potential sites or features of interest. We then recorded all those that merited it using a pro forma, along with sketch plans and drawings; site numbers are prefixed 'US' for 'Upland Site' (though preliminary field reports use 'SF', a contraction of 'SERF'). We complemented this by investigating and, where appropriate, documenting the main known sites and features across the study area, and fuller recording and mapping of sites, features and areas of particular relevance to our research interests (eg Scores Farm and Coulshill; see below). A database and GIS of sites allowed analysis of distribution patterns and change over time.

The ten hillforts in the wider environs of Forteviot (Illus 3) form a notable type of prehistoric monument that has survived in this landscape, located in the upland zone or at its fringes and showing some striking contrasts to the way mobility patterns are expressed in later periods. Patterns of recovery and preservation have clearly impacted the identification of other types of prehistoric sites in the Ochils, of which there are only a few scattered examples (Cowley & Harrison 2001: 14). Less substantial structures, in both size and material, would have been more susceptible to obliteration by the later agricultural and pastoral practices that we discuss below. In the high moorlands, very little human evidence from any time period has been identified within the rough vegetation.

Working within the constraints of the known dataset and considering hillforts as significant monuments of their time, a key aim of the SERF investigations was to explore shifts in monumental expressions of power. Our main method was targeted excavations of the ramparts of each site, augmented by detailed measured surveys by Historic Environment Scotland and selective geophysical analyses. Exploring the landscape setting of each of the hillforts involved a combination of field visits and GIS-based examinations of viewsheds and topographic prominence (Poller et al 2016).



ILLUS 3 Map showing coverage of the different data sets: areas walked, recorded sites, hillforts and brochs (which extend beyond this map), tracks, and coverage of aerial photographs and lidar (Background mapping: EDINA Digimap. Airborne Mapping: © Historic Environment Scotland) (Oscar Aldred)

The aim of the aerial survey was to add further reconnaissance imagery to the project and to map the surviving archaeological remains across an area of 300km^2, largely carried out independently of the archaeological and historical sources associated with the Ochil Hills. The aerial survey provides a link between the prehistoric and historic regional analyses, and the documentary sources, to tease out the development of this landscape. The main sources of information were the Ordnance Survey vertical photographs (OS/69/0233, flown June 1969, and ASS/61289, flown May 1989) that were subsequently georeferenced, and 25cm orthophotographs that were captured in *c* 2013–17. In addition, for a few large block areas under investigation, we used Scottish Government 1m-resolution lidar data to identify archaeological features. This aided the identification of settlements, field banks, trackways, and other features visible (and just visible) as earthworks on the surface of the landscape. Mapping was conducted systematically across the area using the above sources in GIS, supported by oblique aerial photographs across several sorties flown between 2015 and 2016. The final airborne mapping that was created between May 2016 to May 2017 is archived in the NRHE at Historic Environment Scotland (Ochil Hills Airborne Mapping project: Event ID 1022167).

The approach to the documentary research was one of historical landscape archaeology, aiming to understand the archaeological evidence in the landscape and documentary evidence *in dialogue*. This is done by interspersing periods of field and documentary research and allowing each to direct the other. This means that it is the landscape that leads the process, rather than pre-conceived historical meta-narratives about the place and period. Rather than the landscape being

the result of abstracted historical processes, change in the landscape should be understood in terms of the individuals and groups who actively effected it (as demonstrated in, eg, Cowley & Harrison 2001; Boyle 2003; Dalglish 2003; Geddes & Grant 2015). The basis of this was an extensive survey of primary sources from before 1100 to the post-medieval period by historian Nicholas Evans (2008). This included chronicles and king lists, charters, papal documents, exchequer rolls, tacks and rentals, testaments, travellers' accounts, descriptions and maps. Evidence from the medieval period is far scarcer than for later periods.

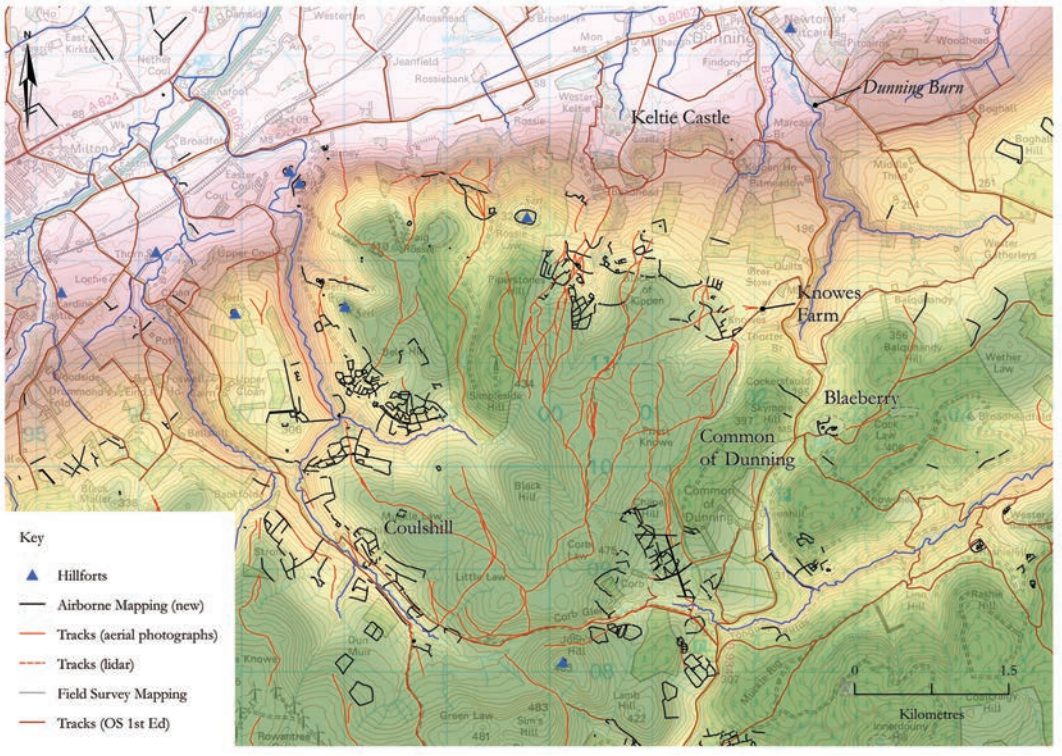
Place names can be a great aid in helping historians and archaeologists understand rural settlement and society in the Middle Ages and beyond to the cusp of the Agricultural Improvements and Industrial Revolution in Scotland in the late 18th and early 19th centuries. Not only do they give us clues to language and landscape use, but they also indicate important aspects of religious and social organisation that would otherwise have gone unrecorded (Hall et al 1998: 139). The methodology behind place-name research involves examining and interpreting early spellings (or forms) of place names found in documents and maps (see Taylor 2016: 69–86 for more details). Often the early forms can give us clues as to what a place name means and, generally speaking, the closer we are to the language in which the place name was coined (in this area either Pictish, Gaelic or Scots), the greater the chance we have of being able to interpret its meaning successfully.

The main kinds of documents used for place-name research are exactly the same as those used by the documentary historian, including royal and ecclesiastical charters, private charters – such as those of the earls of Strathearn – travellers' accounts, the Old and New Statistical Accounts, and wills and testaments. Another major source is maps, particularly older maps, such as those by Pont (1583–96), Stobie (1783) and early Ordnance Survey maps; associated with the latter are the Ordnance Survey Name Books from the third quarter of the 19th century.

From these different methods of investigation, and the different but complementary data that were produced, we used a variety of scales to address issues of connectivity and mobility in this landscape. The main focus of our research consists of the parishes of Auchterarder, Dunning, Forteviot and Forgandenny, and our aerial analysis, documentary research and place-name studies cover this area. Our studies of hillforts, place names and aerial archaeology all went beyond this to give greater context. The walkover survey examined relatively small blocks of territory spread across 40km^2 in the northern face of the Ochils south-west, south and south-east of Dunning (Illus 3). On the basis of informative material and a good fit with our questions, we chose particular areas for more intensive mapping and investigation, including Coulshill and Scores Farm, which are discussed below. All of this is placed in the wider context of Strathearn and the Ochils, Perthshire, Scotland and the British Empire.

THE NORTHERN OCHILS: AN ARCHAEOLOGICAL LANDSCAPE

To introduce the landscape archaeology of the Northern Ochils, we approach and move through it from the valley of Strathearn in the north, climbing southward up the hillslopes to the exposed plateau on top of the range and finishing in the sheltered bowl of the Common of Dunning (for maps see Illus 2, Illus 4). The current expanse of flat, intensively cultivated fields of the valley floor are an artefact of the massive early 19th-century drainage operations documented in the *New Statistical Accounts* (*NSA* 1845: 720–1). The string of medieval and post-medieval villages avoids the marshes by resting on the slightly raised southern edge of the valley: Auchterarder, Dunning, Forteviot and Forgandenny, along with estates such as Keltie and the now vanished Duncrub, just north-west of Dunning. The density of the cropmarks and field scatters investigated by SERF demonstrates the intensity of the human activity that has taken place in the bottomlands, in spite of later destruction through drainage, agriculture and development (eg Brophy & Noble nd; Brophy & Wright nd).



ILLUS 4 Study area with tracks, head dykes and enclosures. The clusters of tracks indicate the most important routeways, especially the route in the west and south from Auchterarder, past Coulshill, through Corb Glen to the Common of Dunning. Note the stretches of multiple, braided tracks, showing movement of livestock, eg on Casken Hill, 1km north-west of Common of Dunning (Background mapping: EDINA Digimap. Airborne Mapping: © Historic Environment Scotland) (Oscar Aldred)

On the lower and middle slopes of the Ochils (*c* 150–350m above sea level) there are few traces of prehistoric archaeology, one important exception being the hillforts. A few hillforts, such as Dun Knock in Dunning, take advantage of small but locally prominent hills that sit below the Ochils. Several others, such as Castle Craig and Kay Craig, are located on precipitous knolls over 100m above sea level and are tightly nestled in the lower slopes. Higher up, the earthwork remains of the hillforts such as Ogle Hill (245m), Rossie Law (319m), Castle Law (Forgandenny; 280m) and Ben Effrey (356m; the highest known hillfort) stand proud on prominences overlooking the valley bottom. A standing stone (US001), possible dun (US177) and a possible circular hut platform (US025) suggest what might have been a much busier prehistoric landscape.

These middle slopes of the northern Ochils are today characterised by large, 19th-century farms with rectilinear, stone-dyked walls, neatly associated with the small quarries that provided their building material (sites US007, 15, 19, 21, 22, 29, 101, 102, 107, 126, 128, 129, 144, 164, 182). Some of the stone-built farmhouses and yards are still used, for example Knowes Farm (US023) and Wester Gatherleys (Fyles 2004); others such as Rashie Lees (US076) are now ruined. Above the drained and improved fields of the lower slopes, between roughly 150m and 350m above sea level, the predecessor of this landscape is clearly visible in an intricate pattern of enclosures, dykes, tracks and vestigial structures. There is a clear pattern of small, turf-built structures associated with rig and furrow and with enclosures. We recorded nine of

these, ranging from about 6m × 4m to 9m × 7m (US003.1–2, US014, US028, US042, US052, US054, US075, US165), and the Pitcairns survey recorded another three (Lowe & Dalland 1998: nos 3, 6, 9) (see Illus 10).

Usually associated with these structures are complex, organic clusters of small, irregular enclosures, generally no more than 15m across and often very hard to distinguish into individual pens. A good example is the cluster on Casken Hill (US005), immediately south-west of Knowes Farm (Illus 4). The small size, irregular shapes and above all their locations in these relatively poor upland soils all suggest these are tathing enclosures for short-term penning of livestock and the resultant enriching of the soil, built using locally available turf. Some sets of enclosures are rather larger and more rectilinear, often trapezoidal, such as around the Thorter Burn (US136, US140), Knock of Boghall (US141), Keltie (US173) and in Menstrie Glen (Cowley & Harrison 2001: 23). A particularly striking one on the top of Waughenwae Knowe is sub-circular, and clearly shows rig and furrow within it (Illus 5). This presumably ameliorated the problem expressed in the Scots place name 'Waughenwae', first attested in a Dunning Parish Register of 1719 and meaning 'wretched damp land' (Watson 1995: 138). These larger, more regular and defined enclosures clearly mark a stage in the long process of modernisation that lies between the small-scale, often temporary tathing and the rectilinear stone-dyked fields of the 19th century.

Some of the longer, straighter dykes lower down the slope shown on Illus 4 are clearly fragments of head dykes, marking the upper limit of the infield agriculture carried out on the farms and estates at the bottom of the slopes. Some show periods of extension and encroachment onto the upper slopes, or have tathing enclosures tacked onto them (eg 1km north-west of Knowes Farm on Illus 4).

These north-facing slopes, ranging from *c* 100–400m above sea level, are cut regularly by incised, V-shaped glens penetrating deep into

Illus 5 Enclosure on Waughenwae Knowe with rig and furrow inside and braided cattle tracks in the foreground, looking north-east to Dunning, Strathearn and the Gask Ridge (Michael Given)

the Ochils. Many of these, such as the glens of Glen Eagles, Coul Burn, the Dunning Burn and the Water of May, have clearly been significant communication routes at many different periods. They have, for example, a clear association with the hillforts perched on the spurs and noses of the ridges that lie between the glens. They also provided sufficiently good arable land for networks of 18th-century farms with small rectangular farmhouses, head dykes and elaborate systems of enclosures. The upper glen of Coul Burn is a particularly striking landscape with at least four such farms (Illus 7).

As we pass above 350m above sea level, the enclosures, structures and dykes thin out rapidly, leaving smoothly rounded hills and ridges of moorland with almost no prehistoric archaeology and only a few traces of historic-period activity. These latter consisted of quarries for the 19th-century stone dykes (eg US107, 126), braided cattle tracks (eg US103) and narrow paths that traverse up the steeper slopes and are carefully cut into them (eg US132, 135).

Within this moorland, surrounded by the rounded hills of the Ochils ridgeline, is a strikingly different landscape: the Common of Dunning. This is a very clear bowl in the landscape, where colluvial processes have created a marked increase in soil depth and fertility, as is evident in the colours of the vegetation (Illus 13). This has a long history of common grazing from the medieval period onwards, but the enclosures and turf banks show increasing arable activity, most likely in the 18th century. Chapel Hill, which may have been owned by Glasgow Cathedral until the 16th century, lies on the southern edge of the Common, and has clear views both north to Strathearn and Dunning and south into the Common. This probable boundary of the Common is marked by a very substantial turf bank.

Through all of these topographical zones run the cattle tracks. Sometimes these can be seen as funnels or 'loanings' that lead the animals between enclosures, such as at Coulshill (Illus 7) and the south side of the Common of Dunning (Illus 13). Elsewhere they appear as a series of deeply incised braided tracks on steeper sections of hillslopes. We were able to identify these on lidar-derived visualisations and vertical aerial photographs, as well as recording them during aerial and walkover survey. A striking example lies on the route from Knowes Farm to Chapel Hill, one section of which consists of 12 individual tracks, eroded up to 2m deep with V-shaped profiles (Illus 11). Their close entanglement with the arable land, enclosures and structures is an excellent demonstration of the workings of this intricate and often highly connected landscape.

CULTIVATING THE LANDSCAPE: FARMSTEADS AND AGRICULTURE

The key to understanding agriculture and land use across the northern face of the Ochils – and other similar upland-lowland interfaces – is communication. Stream incision, peat formation, alluviation, exposure and changing weather patterns have worked together over millennia to create a mosaic of challenges and opportunities to the farmer (Whittington 1973: 554–67). This mosaic has been further elaborated by people's decisions and practices over centuries, along with changes in local landownership and social structure and the ongoing impact of wider currents in ideology, politics, war and empire. All these interconnections, both on the land and in society, can only be navigated by constant mobility, exchange and communication. This can be seen in diverse but graphic ways in the place names, historical documents, archaeological features and landscape patterns seen from the air.

In the medieval and post-medieval periods, the lower slopes of the northern face of the Ochils and the deep glens running into them preserve the best evidence of upland agriculture, both in terms of surviving archaeology and documentary evidence. This evidence demonstrates significant changes in land use over time. A number of townships clustered along these glens. Blaeberry Hill is on record in a feu charter dating to 1565 (Stewart 1967: 40), suggesting a tenancy for arable use rather than upland grazing: it was the southernmost of these agricultural settlements running up into the Ochils. Records from 1574 indicate that the lands of Blaeberry Hill and Fairnyknowes were upland holdings of

Pitmeadow (GD56/36), all of which lie along the route of the Dunning burn.

Pitmeadow as an agricultural settlement clearly has considerable time depth. Although it is popularly believed *pit-*, or more properly, *pett-* names ('land-holding, farm') are Pictish, almost all the second elements of these names in Scotland can be shown to be Gaelic. What we are seeing, therefore, is not a Pictish name but rather a Gaelic name that contains a word borrowed from Pictish, and an indication of the extent of Gaelic-speaking settlement and agriculture in the 10th or 11th centuries. Other place names that seem to indicate agriculture in the medieval and post-medieval periods are Mortly Burn and Craigly Burn, both seeming to contain Scots *lea* ('tilled ground now pasture, open grassland'); Millhaugh near Keltie ('water-meadow of the mill'); and Dalreoch (Gaelic *dail riabhach* 'speckled or greyish meadow').

The case study area has its origins in the Earldom of Strathearn, a vast landholding first mentioned as early as 1120 (Rogers 1992: 292). Throughout the medieval period, parts of the Earldom were given to vassals of the earl or other nearby lords. An example would be the thanage of Edindunning, which was an extensive landholding containing upland and lowland areas which covered much of the Common of Dunning, Kippen and Quilts (Rogers 1992: 303). By the 16th century, the extensive Barony or Thanage of Edindunning appears to have been broken up into many smaller units. This fragmentation can be explained by looking at the wider historical context. By the mid-14th century, the huge Earldom of Strathearn was the exception rather than the rule in terms of land ownership in Scotland, which was increasingly a scatter of small estates and landholdings (Neville 2005: 225).

By the later 17th and 18th centuries, the larger landholdings that characterised earlier periods had been broken up into smaller tenanted farms based in the more fertile lands. These had parcels of upland grazing beyond head-dykes, which separated infield from outfield to create a complex agricultural landscape: this probably represents the fullest extent of settlement in the Ochils. By the time of the first Ordnance Survey in the mid-19th century, much of this land was upland grazing, with many of the arable settlements disappearing altogether, while those lower down survived as single farmsteads. This pattern of development is repeated at Menstrie on the opposite side of the Ochils (Cowley & Harrison 2001: 16–21), and across much of upland Perthshire (RCAHMS 1990: 5; 1994: 113–23).

These patterns can also be seen in the changing patterns and distribution of rig and furrow. Examples of 'narrow curvilinear rig', such as on Casken Hill (US020), have a very flat profile and narrow, irregular intervals, ranging from 2.0m to 4.5m (Halliday 2003: 74; also at Boghall: Lowe & Dalland 1998: 4, no. 1). These reflect often short-lived episodes of cultivation, and seem to constitute the main form of cultivation earlier in the post-medieval period (Cowley & Harrison 2001: 52–3). Others are clearly 'broad, high-backed, curvilinear rig' (eg US002, US061; Halliday 2003: 70–2); in Menstrie Glen they were still in use in the mid-18th century (Cowley & Harrison 2001: 52).

A common land-use strategy along the transitional zone between upland and lowland was the construction of small enclosures for penning animals overnight, not just for safekeeping but for capturing their dung. Once the soil had been thoroughly manured, it could be used for arable cultivation. This process, known as 'tathing', effectively managed the all-important nutrient cycle on upland soils (Dodgshon 1998: 207; Dodgshon & Olsson 2006: 25); the impact of such episodic manuring can still be detected in the soil chemistry (Abrahams et al 2010). Judging from their small size, irregularity and location, this is clearly the function of clusters of enclosures such as those of Casken Hill (US005). The fine resolution of decisions about tathing and other forms of labour-intensive cultivation make them very effective strategies for exploiting opportunities offered by small 'islands' of soil that are better drained and richer in nutrients, even if they lie in a sea of boggy, acid peatland (Davies 2007: 2058).

Several of the small, turf-built enclosures mentioned above are associated with broad

rig and furrow, which is probably as late as the 17th or 18th century, but they clearly pre-date the 19th-century stone farmhouses with yards. William Roy's *Military Survey of Scotland* from 1747–55 indicates cultivation at a rather lower level, no higher than Keltie and Pitmeadow at about 100–150m asl, but this may just reflect the priority he gives to economically or strategically important features around lowland settlements and routes. Our structures most likely belong to the 17th and 18th centuries, when intensification of land use at lower levels led tenants to exploit the patchy arable offered by the upland mosaic of soil, drainage and vegetation (cf Dixon & Gannon 2007: 216–18).

The author of the *Old Statistical Account* for Dunning in the late 18th century is clearly hostile to these labour-intensive techniques. Even so, his careful observation still allows us to see that 'formerly' they played an important and effective role in the mosaic of upland land use:

> These high lands remain mostly uninclosed, except by a few dikes of earth or turf, that formerly had, in irregular forms, chiefly circular, been drawn round some small parcels of ground, once in tillage. These small inclosures, if they deserve the name, are now very properly left in pasture, except one or two adjoining to each dwelling-house, and which are cropped mostly with oats and potatoes. The produce in these high situations is extremely scanty, and the harvest very late (*OSA* 1797: 435).

The usually flat and undeveloped rig and furrow and the organic arrangement of the tathing enclosures suggest a considerable degree of temporary and episodic agriculture in the 18th and 19th centuries. Much of this was closely integrated with cattle husbandry, hence the tathing; and as we will see, the routes taken by the cattle were elaborately intertwined with the arable enclosures. Opportunities offered by the increasing commercialisation of cattle and arable production clearly made the intensive use of pockets of upland soil worthwhile in this case.

Illus 6 Looking from Beldhill, close to Upper Beldhill farmstead (US099), over to the traces of the 18th-century farmstead and enclosures of Hillend. Lower Beldhill farm lies by the burn at the bottom right (Michael Given)

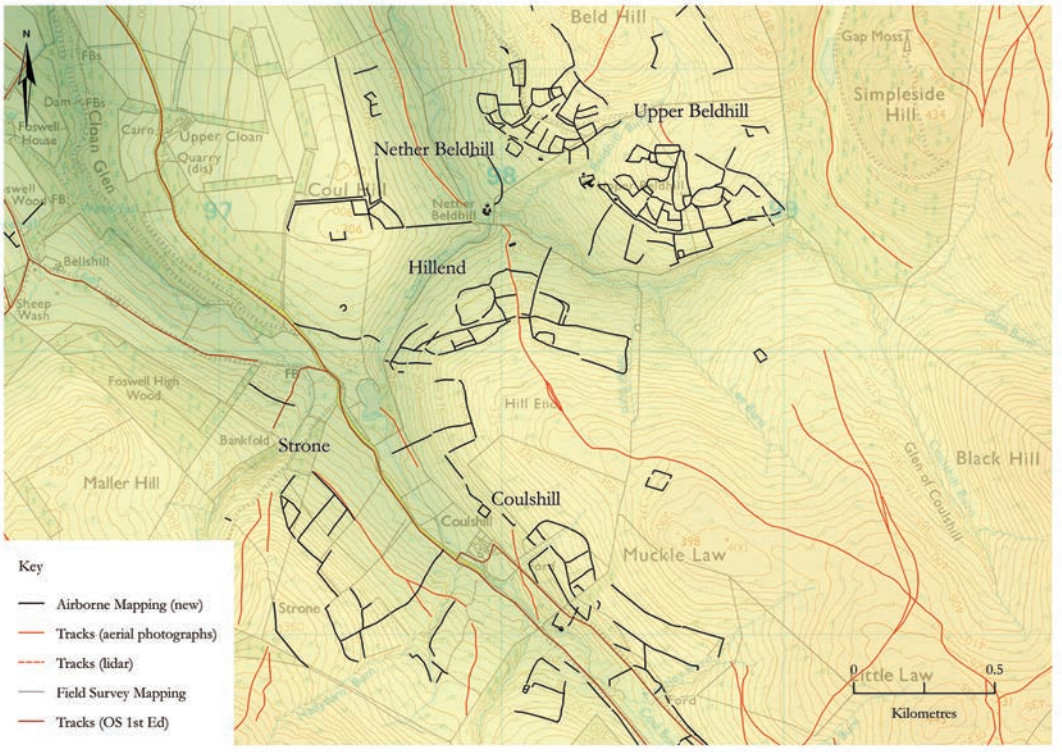
Ironically, perhaps, the author of the *Old Statistical Account* is criticising practices which are in part driven by the increasing commercialisation and intensity of agricultural production.

The flexibility offered by this transitional zone between valley floor and moorland played an important and highly responsive role as a land use 'reservoir'. It could buffer sudden needs for more arable land, supported by turf walls, livestock dung and intensive labour, and easily revert to cattle pastoralism of varying degrees of intensity. To achieve that flexibility, as the following case study will demonstrate, these uplands had to be highly integrated and connected with the lowlands and beyond.

COULSHILL: AN 18TH-CENTURY LANDSCAPE

A strikingly well-preserved 18th-century landscape at Coulshill, 5km south-east of Auchterarder, is an excellent demonstration of the integration of agriculture, intensive stock management and wider communication (Illus 6, Illus 7). Coulshill is named after a hill belonging to the settlement of Coul, the medial 's' of the name seeming to show possession. There are a small number of place names in the Ochil Hills which contain the element *hill* along with an existing settlement name. Rather than just referring to a prominent protuberance, 'hill' designates an area which is an upland pastoral zone for a lowland farm, and sometimes can be some distance from it (Barrow 1998).

Unusually, the landholdings of Coulshill remained relatively stable from the 13th to the 18th centuries, tied to the Graham family, dukes of Montrose. By the later 17th and early 18th centuries, much of the land was parcelled out into smaller tenancies and sub-tenancies. However, many of the feus of these lands



ILLUS 7 Map of 18th-century farmsteads and enclosures at Nether and Upper Beldhill, Hillend, Coulshill and Strone (Background mapping: EDINA Digimap. Airborne Mapping: © Historic Environment Scotland) (Oscar Aldred)

ILLUS 8 Foswellbank Estate plan, 1829, rectified to show field survey and airborne mapping data and tracks from 1st edition OS map. The slight stretch and mismatch of the map to the surveyed data is due to the different survey methods in 1829 and today, compounded by accumulated error in topographic variation (Henderson 1829, National Records of Scotland, RHP140106). (Data added by Oscar Aldred; Airborne Mapping: © Historic Environment Scotland)

retained various obligations and encumbrances dating back centuries. William Foot of Woodend of Coulshill, for example, held a feu of Coul, but was obliged to pay a duty to Strathallan as lords of the abbacy of Inchaffray and to provide horses to carry bark from Kincardine Wood (GD220/1/H/6/3/4). At the end of the 18th century, there were visible traces of former cultivation even on the hilltops round Coul Glen (*OSA* 1792: 34), but even within the head dyke intensively worked arable land was beginning to give way to grazing and occasional cultivation.

Today, the landscape is comprised of large improved and enclosed fields arranged around a central large farmstead at Coulshill. Within these large modern fields lie the remains of a much more complex system of land management, with many small earth dykes enclosing patches of rig and furrow (Illus 7). Clear clusters of enclosures can be seen on the map, each with associated farmsteads varying from one to about five rooms, some with courtyards: Nether Beldhill (US147; Canmore ID 26067), Upper Beldhill (US099; Canmore ID 26069), Hillend (US181; Canmore ID 300985), Coulshill (Canmore ID 283223) and Strone (Canmore ID 25901). The clusters of enclosures tend to lie on the upper, more gentle slopes, clustering along and above a main contouring dyke, with a few extensions below it. The farmsteads tend to be in or just above the valley bottom, particularly Hillend (north and downslope of its enclosures), Coulshill (north-east and downslope of its enclosures) and

Nether Beldhill (south-west and downslope of its enclosures).

It is clear that negotiation between the movement of livestock and the cultivation of the soil is a core part of this intricate landscape. This is orchestrated not just by tracks but by boundaries. The dynamic role of such boundaries or 'marches' is particularly striking here, and can be seen very well in the *Plan of the Estate of Foswellbank in Coul Glen*, dating to 1829 (Illus 8; Henderson 1829). This plan shows a remarkable variety of boundaries, including 'water shear' marches (top right), watercourse marches, marches marked by lines of stones (bottom right), individual stones marking meeting points between boundaries, the summit of Corb Law marking where three boundaries converge, earthen dykes and stone-built dykes. Some of these boundaries are likely to have dated back centuries, whilst others have the appearance of being created to meet particular, perhaps short term, needs. These boundaries enabled and constrained complex networks of interactions, connections and communications across both space and time.

As the Foswellbank Estate plan shows, Coulshill was a busy landscape in the later 18th and early 19th centuries, when it was in a phase of intensified arable farming, which also involved the management of large numbers of sheep or cattle. Our rectified map shows the degree of correspondence between the enclosed and settled landscape recorded in 1829 and our archaeological data (Illus 8). Some features clearly pre-date the 1829 map. Several small enclosures in the open pasture areas in Ballyman, south of Coulshill Farm, and South Corb to the east, are not identified on the estate map; this includes a striking trapezoidal one with opposing entrances on Muckle Law, north of Coulshill Farm (US187; Illus 7). These may represent earlier tathing close to the farmsteads, rather than the intensive movement of cattle up to the Common of Dunning in the 18th century.

Several areas are marked as 'old arable' on the 1829 map, and in these areas there are several organic, oval shaped enclosures that were identified on aerial photographs. The farmstead of Nether Beldhill is marked (immediately east of 'Hill of Coul' in the top left of Illus 8), but the Hillend farmstead has apparently fallen out of use and its enclosures have become part of Coulshill. Taking all these different sources together, it is clear that tracks, boundaries and enclosures were dynamic features of the landscape, constantly changing as relations and mobilities were adapted and renegotiated.

CONNECTING THE LANDSCAPE: COMMUNICATION ROUTES

The most prominent route in the case study area is, of course, the one that runs east-west across Scotland, via Strathearn itself. The importance of this goes back at least to the Iron Age, as we will see, and is also demonstrated by two Roman temporary camps from two separate campaigns (Jones 2011: 191–2, 205–6) and a line of Roman watch-towers along the Gask Ridge on its northern side. Whilst the Strathearn route was probably the key axis of much long-distance movement in the area, the uplands contain evidence of a network of smaller routeways of many different periods. These were crucial components of dense and complex communication networks, which in different ways at different periods linked uplands and lowlands, the local area and the wider region (Illus 4).

PREHISTORIC HILLFORTS: COMMUNICATIONS AND VISIBILITY

The prehistoric hillforts show a particularly striking means of managing and controlling such communication networks. Hillforts are a rare survival of prehistoric monument building in the Ochils. Within the SERF area, as demonstrated through excavation, the earliest evidence for hillfort construction is from the Late Bronze Age at Rossie Law; however, most of the hillforts were built or modified during the Early and Middle Iron Ages. Their monumentality takes many forms; walls and banks incorporate stone, earth and timber in varying ways to enclose internal areas from 0.06ha to 2.5ha. The scale of effort needed to co-ordinate and transport

materials is clearly illustrated at Castle Law, Forgandenny, where stones measuring over 1m long were sourced from various locations and transported uphill for the construction of a massive inner stone enclosure (Poller 2013a; Poller & MacIver 2014). From the broad Earn valley, the new edifice would have dramatically altered the skyline, marking this place out from the higher summits that surrounded it.

Direct evidence for agricultural and pastoral practices in the landscape of these hillforts is largely invisible (RCAHMS 1990; Cowley & Harrison 2001: 14). Trace faunal remains scattered in the ramparts from the SERF hillfort excavations attest to the presence of and dependence on cultivated cereals and livestock such as sheep, cattle and pig. Even the substantial quantities of animal bone, mainly cattle, against walls and in between the masonry, noted by Edwin Bell (1892–93: 20) during his 19th-century excavation of Castle Law, Forgandenny, simply reflect consumption and deposition of such resources. Large-scale cultivation during the Iron Age is unlikely to have occurred within the walls of hillforts and, although there was space to accommodate livestock, grazing would have depended on fields elsewhere. Although the evidence is frustratingly sparse, there are definite but intangible routes of resource movement that connect the hillforts of the Ochils to both the immediate landscape and the valley bottom.

The conspicuous landscape setting of hillforts has inspired numerous studies into aspects of visibility, topographic prominence and accessibility as ways of exploring theories of control, competitive display, communication, power and social cohesion (Bell & Lock 2000; Hamilton & Manley 2001; Sharples 2007; Llobera et al 2011; Driver 2013; O'Driscoll 2017). Combining GIS-based viewsheds with field visits revealed a consistent pattern of visual connection between the hillforts and the low-lying Earn valley. Although alternative high points, which do not have visual connections, could have been chosen, all of the known hillforts are situated with a view towards the valley. More specifically, each hillfort overlooks and has the potential to be seen by a specific area of the valley, sometimes extensive, and sometimes more focused and restricted. Furthermore, each hillfort has other visual connections within their immediate landscape setting, which therefore offer a wide spectrum of ways in which people could have interacted and used these prominent places as they moved through the landscape. Situated prominently between the upland and lowland zones, the hillforts could act as landmarks to audiences of local communities, travellers and traders to inform their movements across the landscape (Driver 2013; O'Driscoll 2017).

As an example of this variability, the visibility of hillforts on higher elevations, such as Ogle Hill (245m), Ben Effrey (356m) and Rossie Law (319m), is notably limited by the rugged head of Craig Rossie. Craig Rossie is the highest northerly point of the Ochils (410m) and marks a key watershed and parish boundary of Auchterarder and Dunning. It controlled and impacted how these hillforts were viewed and what could be seen from them. Interestingly, even from Castle Craig (128m), the visibility to and from the east is restricted by the shoulder of Craig Rossie. But move less than 50m north-west to Kay Craig (119m) and the views toward Dunning open up (see Illus 4, Illus 9). Our excavations suggest that these two sites may have overlapped in time during their use in the first centuries AD. Although they are divided physically by the sheer cliff face of Pairney Burn, they could easily have communicated with each other. The ability to see and to be seen from different parts of the wider and immediate landscape may well have played an important role in how they interacted. (James 2011; James & Campbell 2012; Poller 2013b).

In the first centuries AD, marking a distinct architectural change in expression of visual power from the ramparts of the earlier hillfort, a massive broch tower was built on the summit of Castle Craig (James 2011; James & Campbell 2012). This edifice did not last long, however, and was probably levelled in the 2nd century AD. The finds associated with Castle Craig included a wealth of Roman goods and locally produced materials; a similar breadth of material was found on other lowland brochs such as Leckie and Fairy Knowe (Main 1998; Mackie 2016). The tower, which could have stood up to 7m above

Illus 9 Aerial photograph looking south: hillforts of Ben Effrey, Castle Craig, Kay Craig and Ogle Hill; 18th-century farmstead Hillend; and Pairney Burn and Cloan (SERF)

the ground, would have certainly raised Castle Craig's visibility: given the evident importance of trade relations here, the local elite might have directed this visibility towards the contacts who supplied these materials (Macinnes 1984). The broch would have been particularly impressive as it was approached on a route passing along the foot of the Ochils (like the later medieval route and the modern railway line).

However much people working and living in or travelling along the strath were visually impressed by the hillforts, the routes up to them from the valley floor were not straightforward. Access meant picking a way up the less steep slopes of the uplands or approaching from the south. At Rossie Law, for instance, the sheer cliffs of the west and south side of the hill would not have been easy to scale, and the steep northern face was further cut off from access by the construction of the rampart. Access was from the east, through what would later be Keltie Estate (Illus 4). Alternatively, walking to Rossie Law from the uplands to the east and south-east – such as the Black Hill of Kippen or the Clevage hills – would not have been arduous for travellers on foot, detouring south to find crossing points over burns such as Thorter and Scores. Ben Effrey is the highest hillfort in the area, with extensive views to the modern village of Auchterarder, and is visible from the north and west. Approaching the site directly from the valley, you are confronted with steep scree slopes. The easier approach topographically is across a low saddle to the south-east, from the interior of the Ochils. Ben Effrey invites a potentially circuitous journey, as the only entrance across the three ramparts lies in this south-easterly direction.

Other hillforts seem to have marked key routes across the landscape more explicitly (Driver 2013; O'Driscoll 2017). The cluster of forts in and around Pairney and Cloan Burn at various elevations (Kay Craig, Castle Craig, Ben Effrey, Ogle Hill and Cloan (Canmore ID 26076)) may highlight this location as an

important access point into and across the Ochils (Illus 9). From the north, people may have followed either Cloan or Pairney Burn to join Coul Burn, from there either heading eastwards to Corb Glen or up towards Glendevon. At this point, presiding above the Yetts o' Muckhart, with Glendevon to the east and a route to the Common of Dunning to the west, is the hillfort of Down Hill (Canmore ID 26533), one of the very few hillforts on the south side of the Ochils (see Illus 2 for a location map). Gleneagles would have also been an important route across the Ochils, and therefore it is not surprising to find another hillfort, Loaninghead (Canmore ID 25903), at the head of the glen.

Evidence from the excavations suggest that after the Middle to Late Iron Ages there was a shift away from building new monumental sites in these uplands. The subsequent histories of the established hillforts vary. A scatter of Pictish remains in the form of hearth or midden dumps in the upper fills of ditches suggests, perhaps, a more transient or ephemeral relationship to some of these places. After that, the evidence from the hillforts is one of general decay and physical abandonment, punctuated by points of activity. A 10th-century settlement, for example, was constructed above the debris of the destroyed broch at Castle Craig; at Kay Craig a ditch was deliberately infilled and levelled during the 13th century; 18th- and 19th-century cultivation banks and quarries infringe on Dun Knock; and a Victorian summerhouse on Ogle Hill was erected as part of an estate promenade.

These activities, even if many are destructive, demonstrate that the hillforts in the uplands had the ability to stay within the consciousness of local communities. These places have persisted by their sheer monumentality. Lower down in the valley, however, even these monumental sites were vulnerable to obliteration during the intensification of agriculture, exemplified by the cropmark remains of Dun Knock and Thorn.

MOBILITY OF PEOPLE AND CATTLE IN THE POST-MEDIEVAL OCHILS

One of the most striking demonstrations of the importance and complexity of mobility in the Ochils, and its negotiating force in shaping place and time, comes from the management of cattle in the post-medieval period. Before examining two particular routes in detail, we use place names and historical evidence to demonstrate the primary role that movement played in experiencing, marking and organising this intricate landscape.

A small number of place names show the importance of identifying routes through the hills and important nodes on those routes. Marcassie, found in Marcassie Bridge and Marcassie Burn, is in Gaelic *marc fhasaidh* 'horse stance', probably a resting area for horses on their way to and from Dunning via Clatteringford Burn, Blaeberry and Pitmeadow. At the western end of the study area is Foswell, possibly Gaelic *fos coille* or 'wood stance', an area for resting horses on the route from Auchterarder to Common of Dunning, where it meets the road to Dunning via Blaeberry, and on into Kinross-shire and Fife. The juxtaposition between Foswell and Cloan, Gaelic *cluan* 'meadow', is surely no coincidence. Along this road from Cloan to Common of Dunning is Craig Meed, where *meed* possibly means a marker point along the route on what is a relatively featureless landscape.

Cadgergate Head was a routeway for cadgers (itinerant metal smiths), on their way from Glen Devon to Strathearn, while Gateside, containing Scots *gate* ('road, street'), was a settlement beside the road leading from Dunning to the south via the Common of Dunning. Haldane's research also suggested a number of other materials which frequently crossed the Ochils. Lime for the farmland of Strathearn crossed from west Fife, as did coals and building slate, while grain, flax and wool made the return journey (Haldane 1952: 1). Two accounts at the end of the 18th century suggest coals being transported across much of the region by a network of roads (*OSA* 1792: 44; Robertson 1794: 49). The construction of the Glen Devon turnpike road in the early 19th century significantly reduced the cost of coal in the whole region (*NSA* 1837: 296), and may have resulted in these secondary routes going partially or wholly out of use.

One of the most common patterns of movement in the post-medieval period was

associated with the movement of cattle at a variety of scales. Regular summer movement to upland shielings is known across Scotland and the rest of Europe during the post-medieval period, though it took different forms in different areas. It started to die out in the 17th century, particularly in the Lowlands, though it continued until the early 20th century in Lewis (Whittington 1973: 567–9; Fenton 1999: 130–42; Costello 2018; Dixon 2018; Kupiec & Milek 2018). The nature of the practice in lowland Perthshire, even in the 18th century, is not well understood (Cowley & Harrison 2001: 30–1) and earlier medieval practice is even less well known (Dixon 2002: 41; 2018: 71).

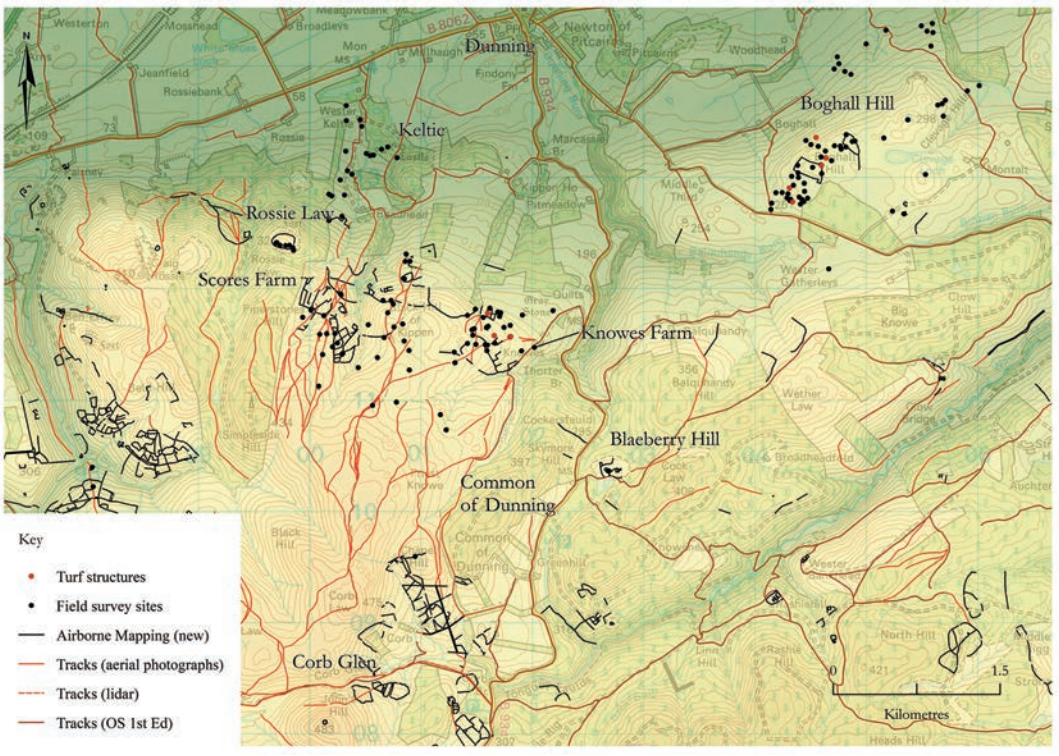
Seasonal movements over relatively short distances between a lowland settlement and nearby upland pastures seem to have died out in the Ochil Hills by the 16th or 17th century (Cowley & Harrison 2001: 30). Witnesses in the 1690s to a case of graziers in Glen Devon who hamstrung animals straying into their grazing area had distant memories of shieling transhumance, but it no longer existed in their day (Dixon 2018: 60). While the Menstrie Glen survey identified 16 shieling groups (Cowley & Harrison 2001: 30–1), our own survey found none at all, in spite of systematic walking across a wide range of appropriate upland landscapes; Bil's study of shielings in Perthshire reports none from the Ochils (1990: 32).

There are no place names indicating transhumance in our area and only about three or four such place names in the whole of the Ochils. Their small numbers and apparently early dates support the historical and archaeological evidence that transhumance was not a post-medieval phenomenon. Auchenharry Burn in Alva Glen, for example, immediately east of Menstrie Glen, is in Gaelic *achadh na h-àirigh* 'field of the sheiling', with Scots *burn* added later. Scots was beginning to make its mark as a naming language in the early 13th century, and there are Scots place names on record in the area stretching from Elcho Castle to Inchaffray Abbey from the 1220s. Gaelic had certainly died out in our immediate area by the time the divisions of Balquhandy had been named *Ovir* et *Nethir* in 1488 (Paul et al 1882–1904: ii, no. 1703). The Auchenharry shielings were clearly in use well before then.

We know from documentary sources that one particular route, from Dunning to the Common of Dunning, was in use from at least the mid-16th century, following a string of small agricultural settlements along the Dunning Burn and its upper tributary the Clatteringford Burn (Stewart 1967: 40). Given the damage that animals' hooves can do, not to mention the eating of crops, it is easy to see that any large-scale frequent movement of animals back and forth to the Common would, if possible, be directed away from the agricultural areas around these settlements. By the 16th century, therefore, there would be a need for an alternative route from Dunning to its Common which by-passed as much as possible the agricultural lands on either side of the burn. During fieldwork in 2009, we discovered evidence of a route between Knowes Farm to Corb and the Common of Dunning, which may have met this need (Illus 4; Illus 10). It is unlikely to be later: a road which follows the line of the modern road and is depicted on a map of 1818 (Drysdale 1818) was probably built sometime in the later 18th century; it is not depicted in Roy's map of the 1750s. This would have made an upland route unnecessary, particularly as by the time of Roy settlements such as Blaeberry along the Clatteringford Burn already appear to have been abandoned.

There are many forms of mobile pastoralism, however, and the Common of Dunning may have been part of an estate-organised summer pasturing system as early as the late 14th century, when the Earls of Strathearn granted 'the meadow of Dunning' to the Rollos of Duncrub (NLS Adv MS 15.1.23). In many areas, periodic cattle grazing replaced this medieval use of the uplands as sheep-walks, as commercial demand for beef on a large scale grew in the 17th and 18th centuries, particularly, as we will see, because of the Royal Navy's increasing requirements (Fenton 1999: 133).

Use of land for pasture tends to leave very little archaeological evidence, save for structures related to animal management. However, taking a landscape approach to the study area has revealed several practices, routes and connections



ILLUS 10 Map of Keltie, Knowes Farm, Common of Dunning and Boghall, showing areas walked, turf structures, routes and places mentioned in the text. Airborne Mapping: © Historic Environment Scotland (Oscar Aldred)

related to the movement of animals. One of the most prominent upland routes across the Ochils was the one between Auchterarder via Coulshill and Corb Glen to the Common of Dunning, and from there southwards to Yetts o' Muckhart (Illus 2). This is the same as the route marked out by the cluster of Iron Age hillforts at its northern end discussed above (Illus 4). Historian A R B Haldane made local enquiries about the road, though unfortunately they are not detailed in his extensive archive in the National Library of Scotland (Ass 6071). What little information there is in his archive suggests that the road does not form part of the extensive network of roads used annually in long distance droving, as the main routes bypass the Ochils (Haldane 1952: map). He suggested it was overshadowed by the parallel routes to Yetts o' Muckhart from Gleneagles and Dunning, major roads which were well maintained and improved in the later 18th and early 19th century (Drysdale 1818).

The most striking archaeological evidence for this regular movement of cattle consists of the deeply incised braided tracks on steeper sections of hillslopes, with marked V-shaped profiles up to 2m deep (Illus 11). The form of these 'braided' trackways is known in several places across Scotland, though they are not by any means universally distributed (see below). However, given their localised character, is there something unique in these settings regarding their formation processes? As we observed at a much smaller scale with a free-ranging herd on Beldhill (Illus 6), cattle follow each other up the slope in the steeper sections. In doing so, there is considerable erosion from their hooves: as they scrabble up from muddy track to as yet uneroded grass, they create nick-points which gradually work their way up the slope, resulting in these

ILLUS 11 Braided cattle tracks on Eldritch Hill looking south, 2019 (Pablo Llopis)

ILLUS 12 Scores Farm (US133; Canmore ID 320528) from the east in 2016, with braided cattle tracks (marked by arrows) and enclosures (Michael Given)

impressive monuments of very specific routine practices. As we explain below, the historical and archaeological evidence appears to back up this interpretation. It is very likely that the combination of local geology, soils and slope angles are also contributing to the 'scoring', as well as the frequency, intensity and duration of their use.

The landscape around the 18th-century farmstead at Scores is a striking example of the close relationship between arable practices and stock movement on the northern slopes of the Ochils (US133; Canmore ID 320528) (Illus 1). Round the remains of five buildings, a corn-drying kiln, an enclosure and a later sheepfold is a dynamic landscape, where seasonal changes of land use lay alongside long and short-term practices aimed at maximising the output of the land (Illus 12). The close relationship between arable and pastoral practices is very clear here, with braided trackways for the frequent movement of cattle between Strathearn and the summer grazing on the Common of Dunning.

Both above and below Scores Farm are clear stretches of braided cattle tracks. They only appear on the steeper slopes, typically fanning out from the break of slope into anything between three and eight separate furrows, normally *c* 0.5m deep and *c* 2.0m wide. The spatial relationships between the tracks and the tathing enclosures make it very clear that the animals were directed round the outside of the enclosures. One set of tracks, for example, (US139) clearly directs the cattle into a gap between two sets of enclosures (US138, US140). As the enclosures lie on flatter ground, the cattle tracks disappear, though the route between the enclosures is very clear. At a break of slope at the northern end of the enclosures the braided tracks appear again, running down the deep slope, and then disappear on the next broad terrace directing the cattle to the west of Scores Farm. This form of cattle management may also explain how the occasional breaks in the head dykes, deeply scarred from the movement of cattle, were used.

Other examples of braided tracks identified on lidar are located on the steeper slopes on the western side of the study area (predominately north-facing), such as on Wether Hill (Canmore ID 353874) and Craigentaggert Hill (Canmore ID 352065, 353875). For other examples of braided tracks seen on vertical aerial photographs, the area south of Maller Burn, on Maller Hill and Carlownie Hill (Canmore ID 353878) has extensive tracks again on the northern slopes, as do the area south and west of Black Hill of Kippen, close to Little Law (Canmore ID 353880), and the area just west of Scores Farm (US134; adjacent to Canmore ID 26700) (Illus 7). From aerial survey, the best example was seen on the northern slopes of Eldritch Hill, first identified during walkover survey (Illus 11) but also photographed from the air (Canmore ID 350095 on the oblique aerial view catalogue number DP 233272).

The distribution of braided trackways across the rest of Scotland, visible as either earthworks or cropmarks, suggests that they largely occur in the eastern part of Scotland close to the Cairngorms and the Scottish Borders, close to or on the lowland/upland interface (Canmore ID SC 1596413). This may, however, reflect biases in their preservation and survival, as well as in the survey record. There are examples in the Scottish Borders, such as at Camp Moor (Canmore ID 84471), and at Sannox on Arran (Canmore ID 357880), as well as others closer to the Ochils on the Hill of Drimmie (Canmore ID 28763) and at Garrow (Canmore ID 113503), both in Tayside. With the increasing use of technologies such as lidar, we will be able to address more fully questions of formation processes, grazing practices and the relationship between the land and the movement of animals and people.

One clear target for graziers in the Ochils from the medieval period to the 18th century was the Common of Dunning. Even the increasing numbers of enclosures across the Common in the 18th century are carefully arranged around the regular, large scale movement of cattle, with clear funnels or 'loanings' leading the cattle between the enclosures (Illus 13). On the south side, where the Common seems to be bounded with a very substantial turf bank, there are several stretches of braided cattle tracks leading up the slope towards a pronounced cleft immediately east of it.

Illus 13 'Funnel' for cattle movement between two arable enclosures on the west side of Chapel Hill, on the northern edge of the Common of Dunning, taken from Corb Law in June 2016 looking north-east, with Strathearn visible on the top left (Michael Given)

The shieling system ended at very different times in different parts of the country, responding to changes in the economy and patterns of landholding. In central and south-eastern Scotland, sheiling practice was no longer common by about the 17th century. Following this, there were two main forms of upland grazing practice in areas in the east of Scotland, particularly those bordering the lowlands. The first was local use of grazings above the head dyke. This was particularly important for farmers of marginal ground, for whom their cattle were an important source of dairy for subsistence and payments in-kind, and could be readily sold if needed: by grazing them in the uplands they could make up the short-fall from poorer crop yields in the less productive uplands (Fenton 1999: 135). The second type of movement of cattle to the grazings is that driven by the estates. Local lairds employed herdsmen to prepare the upland pastures in advance and to gather cattle and drive them there en masse. In some places, cattle were driven on to the hill pasture along prescribed routes daily during the relevant seasons, returning at night or being penned in tathing enclosures.

This general pattern of use is supported by documentary evidence in the comparable landscape of Menstrie Glen. There, the landowner specified the route to be taken to the grazings and employed a herdsman to ensure careful management of the stock in the mid-18th century (Cowley & Harrison 2001: 23). It is important to note that although the management was carried out by estates, the basic unit of production still consisted of individual farmsteads and families, and they retained ownership of the individual cattle (Fenton 1999: 137). More centralised management of the upland grazings allowed the lairds to control the use of the land and maximise the output of cattle, which would in turn allow their tenants to pay higher rents. This raises the complex and important issue of who was driving changes such as this in the rural landscape (see

Boyle 2003; Campbell 2009; Geddes & Grant 2015): was it landlords, well-to-do tenants, particular families or individuals, or intricate combinations of these different agencies?

The more intensive, centrally controlled model is a good explanation for the braided trackways of the uplands in the Ochils. Being regularly used by herdsmen moving large herds of animals back and forth, perhaps even on a daily basis at times, the ground was continually eroded and did not have time to dry out, forcing the animals to weave around the damaged ground, creating multiple trackways. The braided trackways then, rather than being evidence of generations of annual transhumance, should be considered as evidence of a complex and intensive system of cattle management which occurred over a relatively short period in the 18th century.

THE OCHILS AND THE WORLD

As well as all these relatively local networks of connections, the Ochils were also connected socially, culturally and economically to a much wider landscape – and seascape. These connections are more challenging to understand, but our interdisciplinary approach allows us to push out the scale of analysis. A crucial connection was in the form of obligations and rights, some of which survived from medieval times into the 18th century. In the medieval and early post-medieval period, significant amounts of land in the area were granted to the church. The abbey of Inchaffray, for example, is closely associated with the area, being granted the church of St Kessog in Auchterarder in 1200. Maria, daughter of the Earl of Strathearn, granted a pension to Inchaffray from the lands of Pairney in the later 13th century (Rogers 1992: 306). In the 16th century such church obligations survived, although most of the church lands had been given out in tacks (Dilworth 1986).

Through such obligations to monasteries and abbeys, the people of the uplands were connected to monastic orders which operated internationally, and to ways of life and understandings of the world shared across Europe and beyond. Such relationships were expressed on the ground: they involved people moving across the landscape, carrying materials, letters, and perhaps meeting regularly to discuss or negotiate these obligations – such acts were in and of the landscape, not abstracted historical constructs.

Economic changes occurring in the wider world also found expression in the uplands. The grazing of sheep probably dominated upland Perthshire in the medieval period (Fenton 1999: 133), as was probably the case in Menstrie Glen. The presence of a possible weaving-shed in the later medieval settlement of Blaeberry Hill certainly supports this (Canmore ID 26689; US027), and the village of Dunning itself has a long history of weaving (*OSA* 1797: 440; *NSA* 1845: 722), as is evidenced by the surviving weaving sheds in the village (Canmore ID 316884). It is interesting that much of the supporting work for weaving could be done in the uplands while tending stock, such as spinning, the bleaching of previously woven cloth and collecting roots, herbs and lichens for making dye (Fenton 1999: 137).

The increasing price of cattle from the 16th to 18th century in Scotland resulted in a large cattle-rearing and droving economy. The reasons for this are complex (Haldane 1952; Adamson 2014: 30–8), but include the need to feed the growing cities of the south. London, for example, was consuming over 75,000 cows a year by the end of the 17th century (*OSA* 1797; Koufopoulos 2004: 111–12). This was supplemented by the enormous demand from the Navy, which drove production of both salt beef and fresh beef from places as distant as the Hebrides (Haldane 1952: 174–7; Moreland & MacLean 2012: 6). The increasing organisation of the Victualling Board from the early 18th century and its policy of targeting small and large producers alike from across the country played a major role in the development of commercial cattle-raising operations at all scales, regardless of distance from London or closeness to harbours or major roads (Rodger 2004: 304–7).

These national and international changes stimulated changes in upland landscapes, such as the complex and extensive tathing pens to be found at both Coulshill and Scores Burn. It is

interesting to consider how the increased demand for cattle may have influenced the availability of fleeces for this weaving industry – it may well be that as the uplands became more valuable as a place to rear cattle, the economics of the weaving trade were affected. The 19th- and 20th-century change from mixed-use of the uplands to open hill pasture for cattle is also part of a wider change in land use in Scotland that included the Highland Clearances (Cameron 2001). As we have seen, the uplands were intimately connected to much wider economic networks, responding to change in distinctive ways. They were not just receivers of change, but drivers of it through their complex web of connections to the wider world.

CONCLUSIONS

All the long connections across time and space that we have explored in the northern Ochils have challenged us to examine a range of difficult issues closely: connectivity; persistence; transhumance; the uniqueness of locality and the problems of fragmented data. Bringing a range of disciplinary perspectives to these issues has been key to the insights that this highly connected and complex landscape has given us.

Paths and tracks have a much closer relationship to the landscape and to human society than just facilitating movement. In the case of trackways that develop organically through use, such as the braided cattle tracks, it is clearly the initial movements that facilitate the path; moving beasts and animals continue to develop the path and so attract future movements. Hillforts, farmsteads, farmhouses and estate buildings are placed at influential nodes within those patterns of movement, such as hilltops, spurs, passes and crossroads. They then contribute to the attraction and funnelling of continuing movements of tenants, graziers, livestock and merchants. Hillfort construction altered movement and access within local contexts but, more regionally, their conspicuous setting along the fringes of the Ochils – coupled with the persistence of their monumental architecture – enabled them to be visual guides as people moved both along the strath and across key routes over the Ochils.

Together, all these routes, tracks and nodes form highly complex and interlocking social units: relationships are created and developed by physical movements that stretch from the next field to the Indian Ocean. It is not just cattle that are tathed overnight in irregular turf-dyked enclosures, for example, but the actions, focuses and perceptions of their tenders. Boundaries can direct movement just as much as preventing it, by pushing cattle or tenants along the march dyke, or funnelling them through dedicated gateways. As with the 17th-century graziers in Glen Devon (Dixon 2018: 60), the visible, tangible boundaries create contestation and even violence by the simple act of being crossed.

It is impossible to separate connections across place from connections across time. This is emphatically not the essentialist, grossly over-simplified notion of ‘continuity’, which conjures up the spectre of ‘tradition’ that fossilises human sociality and landscape alike. Persistence implies an intent or attentiveness, for example, to the traces of past connections that are incorporated into contemporary life, just as a 1663 marriage stone was incorporated into an 18th-century farmstead (Turner & Williams 2015–16: 93). Old ramparts, enclosures, tracks, trees, ecologies and social memories are all contributors to the infinitely complex networks of relationships that constitute the social landscape of any one moment.

Transhumance provides an excellent example of a system of interaction between humans, animals, vegetation, topography, the seasons and the past. There are many forms of such systems, and the variations in time and space in the Ochils are particularly interesting. Unlike Menstrie Glen just 20km away on the southern slopes of the Ochils, there is little evidence for shieling transhumance in our area, though place names suggest it took place in the medieval period. Instead, there has been a clear focus on the Common of Dunning since at least the late 14th century. More research is still needed, but there does seem to be a wide range of highly localised patterns of rights and obligations to land and land-use in the uplands. It may be, for example, that the continuing power of these local land rights prevented the development

of community shieling areas, in contrast to Menstrie Glen.

Our project has found important new evidence for cattle movement by identifying braided cattle routes, but these are clearly associated with 18th-century intensification of cattle production for the booming commercial market. Even if they have made a very significant change to the landscape, they were created by a comparatively short-lived relationship between landowners, cattle and the market for the beef that fed the UK and its Navy during a period of colonial and imperial expansion.

The striking variation in patterns of seasonal movement between the north and south faces of the Ochils is just one example of the uniqueness of locality demonstrated by this project. Such local particularities are essential for understanding landscapes – at a regional scale as much as that of a single case study (Campbell et al 2002: 113; Davies 2007). This especially applies to historical archaeology, where simplistic historical meta-narratives often fail to recognise the dynamism and complexity in post-medieval rural landscapes (Campbell 2009; Geddes & Grant 2015). This study therefore joins the growing body of work that advocates a more nuanced understanding of the changes which occurred in rural landscapes across much of Scotland in the post-medieval period (Cameron 2001; Dalglish 2003; Campbell 2009; Adamson 2014; Geddes & Grant 2015; Bezant & Grant 2016). These seek to challenge the simple dichotomies of pre- and post-Improvement to understand change as a process that is varied and local, but also an integral part of wider changes in societies and landscapes across the post-medieval world.

The topographical diversity of the uplands generates a mosaic of soils, habitats, constraints and opportunities, which interact elaborately with social pressures and individual decisions. The field survey evidence and aerial archaeology have shown the clear differences in organisation of boundaries, farmsteads and tracks between two adjacent routeways: the tolled one from Dunning via Blaeberry to the Common of Dunning, and the toll-free route from Auchterarder via Coulshill and Corb to the Common of Dunning. Hillforts, apparently in very similar landscape settings, actually have very precisely targeted fields of visibility, and therefore distinct fields of communication. Even individual cattle being driven up a hill choose to walk in separate lines, thus forming the distinctive braided cattle tracks.

One of our biggest challenges has been fragmentary and often incomplete data, partly but not only because of the specific aims and context of our project. The intensification of land use in the 17th and 18th centuries has obliterated most of the evidence for earlier settlement and land use, including what must have been a significant Iron Age settled and cultivated landscape. On the other hand, abandonment of what Improvers saw as 'marginal' arable land led to the excellent preservation of a busy 18th-century landscape (as in Menstrie Glen; Cowley & Harrison 2001: 14). We have found it enormously stimulating and productive to push questions and problems backwards and forwards between ground and aerial survey, Iron Age hillforts and post-medieval tracks, place names and topography, documents and structures. We strongly believe that connectivity between disciplines is essential for understanding connectivity between times and places.

ACKNOWLEDGEMENTS

We are very grateful to Historic Environment Scotland for their financial, logistical and intellectual support of the Strathearn Environs and Royal Forteviot project. We would like to thank all the landowners who have kindly given us permission to work on their land: Simon and Heather Baker of Upper Coul; Michael Blanche of Culteuchar Farm; Lord and Lady Coulsfield; Alexander Dewar and the Dupplin Estate; Richard Haldane of Cloan Estate; David Mitchell of Pairney Farm; Ann and David Myles of Knowes Farm; George Ritchie of Montalt Farm; Calum Rollo of Keltie Estate; and Lady Wemyss and Brian Henderson of Invermay Estate.

We are grateful to the many students who undertook field survey in all weathers, and to our survey supervisors Stephen Digney, Sarah Thomas, Anne-Marie O'Donnell and Gordon McKellar. Thanks to Historic Environment Scotland for the licence to use the aerial transcription data and for funding Open

Access for this article, and to National Records of Scotland for permission to publish the estate map of Foswellbank. We are grateful to Chris Dalglish, Stephen Driscoll, Nicholas Evans and Cathy MacIver for their wide-ranging contributions to this project. Dave Cowley, Chris Dalglish and three anonymous reviewers gave very helpful comments on an earlier draft which have greatly improved this article; we of course retain the responsibility for everything written here.

REFERENCES

Abrahams, P W, Entwistle, J A & Dodgshon, R A 2010 'The Ben Lawers Historic Landscape Project: simultaneous multi-element analysis of former settlement and arable soils by X-ray fluorescence spectrometry', *Journal of Archaeological Method and Theory* 17: 231–48. https://doi.org/10.1007/s10816-010-9086-8

Adamson, D 2014. 'Commercialisation, change and continuity: an archaeological study of rural commercial practice in the Scottish Highlands', PhD thesis, University of Glasgow.

Barrow, G W S 1998 'The uses of place-names and Scottish history: pointers and pitfalls', *in* Taylor, S (ed.) *The Uses of Place-Names*, 54–74. Edinburgh: Scottish Cultural Press.

Bell, E W 1892–93 'Notes on the British fort on Castle Law, at Forgandenny, Perthshire, partially excavated during the summer of 1892', *Proc Soc Antiq Scot* 27: 14–22.

Bell, T & Lock, G 2000 'Topographic and cultural influences on walking the Ridgeway in later prehistoric times', *in* Lock, G (ed.) *Beyond the Map: Archaeology and Spatial Technologies*, 85–100. Amsterdam: IOS Press.

Bezant, J & Grant, K 2016 'The post-medieval rural landscape – toward a landscape archaeology?', *Post-Medieval Archaeology* 50: 92–107. https://doi.org/10.1080/00794236.2016.1169782

Bil, A 1990 *The Shieling 1600–1840: The Case of the Central Scottish Highlands*. Edinburgh: John Donald.

Boyle, S 2003 'Ben Lawers: an improvement-period landscape on Lochtayside, Perthshire', *in* Govan, S (ed.) *Medieval or Later Rural Settlement in Scotland: 10 years on*, 17–29. Edinburgh: Historic Scotland.

Brophy, K & Noble, G nd *A prehistoric ceremonial landscape: Forteviot excavations 2007–2010*. York: Council for British Archaeology.

Brophy, K & Wright, A D nd *A prehistoric farming and settlement landscape: Dunning excavations 2012–2017*. York: Council for British Archaeology.

Cameron, E (ed.) 2001 *Clearances of the Highlands and Islands*. Oxford: Oxford University Press.

Campbell, C, Tipping, R & Cowley, D 2002 'Continuity and stability in past upland land uses in the western Cheviot Hills, southern Scotland', *Landscape History* 24: 111–20. https://doi.org/10.1080/01433768.2002.10594542

Campbell, S D 2009 'Post-medieval settlement in the Isle of Lewis: a study in adaptability or change?', *Proc Soc Antiq Scot* 139: 315–32.

Costello, E 2018 'Temporary freedoms? Ethno-archaeology of female herders at seasonal sites in northern Europe', *World Archaeology* 50: 165–84. https://doi.org/10.1080/00438243.2018.1472633

Cowley, D & Harrison, J G 2001 '*Well shelterd & watered': Menstrie Glen, a farming landscape near Stirling*. Edinburgh: Royal Commission on the Ancient and Historical Monuments of Scotland.

Dalglish, C 2003 *Rural Society in the Age of Reason: An Archaeology of the Emergence of Modern Life in the Southern Scottish Highlands*. New York: Kluwer Academic/Plenum.

Davies, A L 2007 'Upland agriculture and environmental risk: a new model of upland land-use based on high spatial-resolution palynological data from West Affric, NW Scotland', *Journal of Archaeological Science* 34: 2053–63. https://doi.org/10.1016/j.jas.2007.02.003

Dilworth, M 1986 'The commendator system in Scotland', *The Innes Review* 37: 51–72.

Dixon, P 2002 *Puir Labourers and Busy Husbandmen: The Countryside of Lowland Scotland in the Middle Ages*. Edinburgh: Birlinn.

Dixon, P 2018 'What do we really know about transhumance in medieval Scotland?', *in* Costello, E & Svensson, E (eds) *Historical Archaeologies of Transhumance Across Europe*, 59–73. Abingdon: Routledge.

Dixon, P & Gannon, A 2007 'The transformation of the rural landscape', *in* RCAHMS and Society of Antiquaries of Scotland (eds) *In the shadow of Bennachie: A Field Archaeology of Donside, Aberdeenshire*, 215–44. Edinburgh: RCAHMS and Society of Antiquaries of Scotland.

Dodgshon, R A 1998 *From Chiefs to Landlords: Social and Economic Change in the Western Highlands and Islands, c. 1493–1820*. Edinburgh: Edinburgh University Press.

Dodgshon, R A & Olsson, G A 2006 'Heather moorland in the Scottish Highlands: the history of a cultural landscape, 1600–1880', *Journal of Historical Geography* 32: 21–37. https://doi.org/10.1016/j.jhg.2005.01.002

Driscoll, S T, Brophy, K & Noble, G 2010 'The Strathearn Environs and Royal Forteviot Project (SERF)', *Antiquity Project Gallery*. http://antiquity.ac.uk/projgall/driscoll323/. Accessed 27 February 2019.

Driver, T 2013 *Architecture, Regional Identity and Power in the Iron Age Landscapes of Mid Wales: The Hillforts of North Ceredigion*. Oxford: Archaeopress.

Drysdale, R 1818 *Copy plan of proposed road between Yetts of Muckhart and Dunning*. RHP 6307. Edinburgh: National Records of Scotland.

Evans, N 2008 *List of documentary sources for the SERF project*. Glasgow: SERF.

Fenton, A 1999 *Scottish Country Life*. East Linton: Tuckwell Press.

Fyles, C 2004 'Wester Gatherleys', *Discovery and Excavation in Scotland* 5: 103.

Geddes, G & Grant, K 2015 'The plan and the porcupine: dynamism and complexity in the landscape of St Kilda', *Landscapes* 16: 145–63. https://doi.org/10.1179/1466203515Z.00000000048

Gibson, E 2015 'Movement, power and place: the biography of a wagon road in a contested First Nations landscape', *Cambridge Archaeological Journal* 25: 417–34. https://doi.org/10.1017/S0959774314000791

Gosden, C & Marshall, Y 1999 'The cultural biography of objects', *World Archaeology* 31: 169–78. https://doi.org/10.1080/00438243.1999.9980439

Haldane, A R B 1952 *The Drove Roads of Scotland*. Edinburgh: Birlinn.

Hall, M, Henderson, I & Taylor, S 1998 'A sculptured fragment from Pittensorn Farm, Gellyburn, Perthshire', *Tayside and Fife Archaeological Journal* 4: 129–44.

Halliday, S 2003 'Rig-and-furrow in Scotland', *in* Govan, S (ed.) *Medieval or Later Rural Settlement in Scotland: 10 Years On*, 69–81. Edinburgh: Historic Scotland.

Hamilton, S & Manley, J 2001 'Hillforts, monumentality and place: a chronological and topographic review of first millennium BC hillforts of south-east England', *European Journal of Archaeology* 4: 7–42. https://doi.org/10.1179/eja.2001.4.1.7

Henderson, A 1829 *Plan of the Estate of Fosswellbank*. RHP 140406. Edinburgh: National Records of Scotland.

Hind, D 2004 'Knowehead Wind Farm', *Discovery and Excavation in Scotland* 5: 102.

James, H 2011 *Castle Craig Excavations 2011: SERF Data Structure Report*. Glasgow: SERF.

James, H & Campbell, E 2012 *Castle Craig 2012: SERF Data Structure Report*. Glasgow: SERF.

Jones, R 2011 *Roman Camps in Scotland*. Edinburgh: Society of Antiquaries of Scotland.

Jones, R & Hooke, D 2011 'Methodological approaches to Medieval rural settlements and landscapes', *in* Christie, N & Stamper, P (eds), *Medieval Rural Settlement: Britain and Ireland, AD 800–1600*, 32–42. Oxford: Windgather Press.

Joy, J 2009 'Reinvigorating object biography: reproducing the drama of object lives', *World Archaeology* 41: 540–56. https://doi.org/10.1080/00438240903345530

Kolen, J, Renes, J & Hermans, R (eds) 2015 *Landscape Biographies: Geographical, Historical and Archaeological Perspectives on the Production and Transmission of Landscapes*. Amsterdam: Amsterdam University Press.

Koufopoulos, A 2004 'The cattle trades of Scotland, 1603–1745', PhD thesis, University of Edinburgh. http://hdl.handle.net/1842/9425

Kupiec, P & Milek, K B 2018 'Ethno-geoarchaeological study of seasonal occupation: Biliscleitir, the Isle of Lewis', *in* Costello, E & Svensson, E (eds), *Historical Archaeologies of Transhumance Across Europe*, 75–92. Abingdon: Routledge.

Llobera, M, Fábrega-Álvarez, P & Parcero-Oubiña, C 2011 'Order in movement: a GIS approach to accessibility', *Journal of Archaeological Science* 38: 843–51. https://doi.org/10.1016/j.jas.2010.11.006

Lowe, C & Dalland, M 1998 *Pre-afforestation Survey: Pitcairns Estate, Dunning, Perthshire.* Edinburgh: Headland Archaeology.

Macinnes, L 1984 'Brochs and the Roman occupation of lowland Scotland', *Proc Soc Antiq Scot* 114: 235–49.

Mackie, E 2016 *Brochs and the Empire: The Impact of Rome on Iron Age Scotland as Seen in the Leckie Broch Excavations.* Oxford: Archaeopress.

Main, L 1998 'Excavation of a timber round-house and broch at the Fairy Knowe, Buchlyvie, Strirlingshire, 1975–8', *Proc Soc Antiq Scot* 128: 293–417.

Maldonado, A 2017 'Barrows and the conversion of the landscape at Forteviot, Perthshire', *in* Edwards, N, Ni Mhaonaigh, M & Flechner, R (eds), *Transforming Landscapes of Belief in the Early Medieval Insular World and Beyond: Converting the Isles II*, 219–350. Turnhout: Brepols.

Moreland, J & MacLean, G 2012 'The mountains survey: Loch Aoineart' *in* Parker Pearson, M, Sharples, N & Symonds, J (eds) *South Uist: Archaeology and History of a Hebridean Island*, 83–117. Stroud: Tempus.

Neville, C 2005 *Native Lordship in Medieval Scotland.* Dublin: Four Courts Press.

NSA 1837 'Parish of Auchterarder, Presbytery of Auchterarder, Synod of Perth and Stirling', *in The New Statistical Account of Scotland*. Edinburgh: Blackwood.

NSA 1845 'Parish of Dunning (Presbytery of Auchterarder, Synod of Perth and Stirling)', *in The New Statistical Account of Scotland* 10: 716–23. Edinburgh: Blackwood.

O'Driscoll, J 2017 'Landscape prominence: examining the topographical position of Irish hillforts using a cumulative viewshed approach', *Journal of Archaeological Science: Reports* 16: 73–89. https://doi.org/10.1016/j.jasrep.2017.09.033

Orser, C E 2009 'The dialectics of scale in the historical archaeology of the modern world', *in* Horning, A J & Palmer, M (eds) *Crossing Paths or Sharing Tracks? Future Directions in the Archaeological Study of Post-1550 Britain and Ireland*. Woodbridge: Boydell Press.

OSA 1792 'Parish of Auchterarder', *in The Statistical Account of Scotland, County of Perth*, vol 4, 33–46. Edinburgh: W. Creech.

OSA 1797 'Parish of Dunning (County of Perth, Synod of Perth and Stirling, Presbytery of Auchterarder)', *in The Statistical Account of Scotland*, vol 19, 434–42. Edinburgh: W. Creech.

Paul, J B, Thomson, J M, Dickson, W K & Stevenson, J H (eds) 1882–1914 *Registrum magni sigilli regum Scotorum; The register of the great seal of Scotland; A.D. 1424–1659*. Edinburgh: HM General Register House.

Poller, T 2013a *Castle Law, Forgandenny Excavations 2013: SERF Data Structure Report*. Glasgow: SERF.

Poller, T 2013b *Kay Craig, Auchterarder Excavations 2013: SERF Data Structure Report*. Glasgow: SERF.

Poller, T & MacIver, C 2014 *Castle Law, Forgandenny Excavations 2014: SERF Data Structure Report*. Glasgow: SERF.

Poller, T, Watterson, A, Baxter, K, Anderson, J & Duncan, K. 2016. 'Designing Digital Engagements: The SERF Hillforts Project'. http://www.seriousanimation.com/hillforts/. Accessed 27 February 2019.

Pont, T 1583–96. 'Pont 21: Lower Glen Almond; Strathearn'. https://maps.nls.uk/rec/281. Accessed 27 February 2019.

RCAHMS 1990 *North-East Perth: An Archaeological Landscape.* Edinburgh: Royal Commission on the Ancient and Historical Monuments of Scotland.

RCAHMS 1994 *South-East Perth: An Archaeological Landscape.* Edinburgh: Royal Commission on the Ancient and Historical Monuments of Scotland.

Robertson, J 1794 *General View of the Agriculture in the Southern District of the County of Perth.* Edinburgh: Alex Smellie.

Rodger, N A M 2004 *The Command of the Ocean: A Naval History of Britain, 1649–1815.* London: Allen Lane.

Rogers, J M 1992. 'The formation of the parish unit and community in Perthshire', PhD thesis, University of Edinburgh. http://hdl.handle.net/1842/6796. Accessed 25 March 2019.

Roy, W 2007 *The Great Map: The Military Survey of Scotland 1747–55*. Edinburgh: Birlinn.

Samuels, M 1979 'The biography of landscape: cause and culpability', *in* Meining, D W (ed.) *The Interpretation of Ordinary Landscapes*, 51–88. Oxford: Oxford University Press.

Sharples, N 2007 'Building communities and creating identities in the first millennium B.C.', *in* Haselgrove, C & Pope, R (eds), *The Earlier Iron Age in Britain and the Near Continent*, 174–84. Oxford: Oxbow.

Stewart, M E C 1967 'Blaeberry Farm, Dunning', *Discovery and Excavation in Scotland* 1967: 40.

Stobie, J 1783 'Map of the counties of Perth and Clackmannan'. https://maps.nls.uk/joins/664.html. Accessed 27 February 2019.

Taylor, S 2016 'Methodologies in place-name research', *in* Hough, C (ed.) *The Oxford Handbook of Names and Naming*, 69–86. Oxford: Oxford University Press.

Turner, L & Williamson, C 2015–16 'Inheritance, entitlement and a sense of place: a study of two Perthshire farmsteadings', *Tayside and Fife Archaeological Journal* 21–22: 83–95.

Watson, A 1995 *The Ochils: Placenames, History, Tradition.* Perth: Perth and Kinross Libraries.

Whittington, G 1973 'Field systems of Scotland', *in* Baker, A R H & Butlin, R A (eds), *Studies of Field Systems in the British Isles*, 530–79. London: Cambridge University Press.

Witcher, R, Tolia-Kelly, D P & Hingley, R 2010 'Archaeologies of landscape: excavating the materialities of Hadrian's Wall', *Journal of Material Culture* 15: 105–28. https://doi.org/10.1177%2F1359183510355228

This paper is published with the aid of a grant from Historic Environment Scotland.