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18. "ONE ON TWO, AND TWO ON ONE": PRELIMINARY RESULTS FROM A SURVEY OF DRY STONE WALLS ON THE NATIONAL TRUST ESTATE AT MALHAM

T C Lord

INTRODUCTION

Dry stone walls are a key cultural element in the landscape of the Yorkshire Dales. Yet we actually know very little about them, and have only limited survey data about their condition. Arthur Raistrick's booklet *The Story of the Pennine Walls* first appeared more than fifty years ago (Raistrick 1946). Little has been published since, although a parish study of Dacre, and brief notes by Hudson demonstrate the potential of dry stone wall studies in the Yorkshire Dales (Dacre Parish Council 1998; Hudson 1995; 1996). This is confirmed by a series of recent studies by Dennison (eg 1996, 2000, and *this volume*).

The palimpsest of field boundaries in the vicinity of Malham (Fig 18.1) has long attracted archaeological study (Raistrick and Chapman 1929; Raistrick 1947; Raistrick and Holmes 1962; Moorhouse 1987; Horne and MacLeod 1995). The principal focus of interest has been the extensive, and often well preserved earthwork field boundaries, 'humps, bumps and banks' which sometimes underlie upstanding dry stone walls. Probably because of these earthworks, most researchers have tended to ignore the dry stone walls, a still-in-use bit of the cultural landscape, perhaps viewing them rather like topsoil in a 'Time Team' excavation, something to be mentally scraped off so as to reveal the 'real' archaeology underneath. The possibility that certain types of dry stone wall may be 'fossilised' fragments of archaic farming landscapes, and contemporary with some of the earthworks, is rarely considered. For a recent example of this approach, in an otherwise admirable study of Coniston Castle Scar in Wharfedale, see Horne and MacLeod (2001).

Land managers currently lack both sound dating evidence, and a comprehensive typology for dry stone walls in the Yorkshire Dales. This makes it difficult to argue for the conservation of a particular wall on the basis of age, one of the criteria used in the listing of domestic buildings. It is also hazardous to argue for the conservation of a wall on the basis of rarity as this is impossible to substantiate without quantitative data. The National Trust intended to address these shortcomings in commissioning the survey.

At present, the only published typology and dating evidence for dry stone walls is Martin Wildgoose's pioneering study at Roystone Grange, Derbyshire (Hodges 1991; Wildgoose 1991). However, we do not know whether all, none, or just parts of the Roystone Grange wall data are applicable to other areas. One suspects the last. The 'orthostatic walls' of the North York Moors (Spratt 1988) are just one instance of a regional wall type not represented at Roystone Grange. Dry stone walling is a poorly documented craft and practical experience helps understanding of construction techniques. It is instructive that Wildgoose was a farmer, and had practical experience of dry stone walling.

At the request of the National Trust, the author conducted a structural and condition survey of the 136km of dry stone walls on its Estate at Malham in 1998. The survey was designed to be a tool and data-base for future management of the walls. It attempted to record the different kinds of walls that make up the present day wall pattern, to devise a way to classify them, and utilised objectively defined criteria to classify the walls into condition categories primarily for land management purposes.

The National Trust Estate rises from about 220m near Malham village to almost 600m on the summit of Fountains Fell. The geology of much of the higher ground is mainly Carboniferous limestone which forms an extensive plateau at an altitude of about 300-400m. The limestone frequently outcrops at the surface as limestone pavement, but it is more generally masked by a variable cover of glacial drift, giving rise to a range of soil types. The area today is entirely devoted to livestock husbandry.

The Estate consists of contrasting landscape components. Five large hill farms on Malham Moor make up by far the greatest part. The hill farms were formed in the 16th century during the post-Dissolution re-organisation of the monastic pasture systems on Malham Moor. Four out of the five farmsteads, Darnbrook, Middlehouse, Waterhouses and Lower Trenhouse, are probably on medieval core sites occupied by Fountains Abbey lodges. The fifth, Tennant Gill, is most likely a wholly post-Dissolution creation. It occupies part of an extensive coaxial field system crossing the upper reaches of Cowside Beck that originally included at least four farms. Three of these farms, two at Stangill and one at Freer Head, are now abandoned. By contrast, nearer to Malham village, the Trust's Estate includes adjacent parts of two formerly stinted sheep pastures, Ewe Moor and Prior Raikes, divided by a Parliamentary award in the 1840s, as well as part of the village infield south east of Malham Cove which was probably divided by piecemeal enclosure before the end of the 18th century (Fig 18.2). The dry stone walls on the Malham Estate may be considered as a representative sample of walls built over a long period of time in a variety of upland landscape contexts.

THE STRUCTURAL SURVEY

The basic unit for the purpose of this structural survey is a wall section, a length of wall with the same dimensions, profile and structural characteristics. In theory each wall section should match a length of wall originally built to a particular set of specifications. Occasionally a wall section

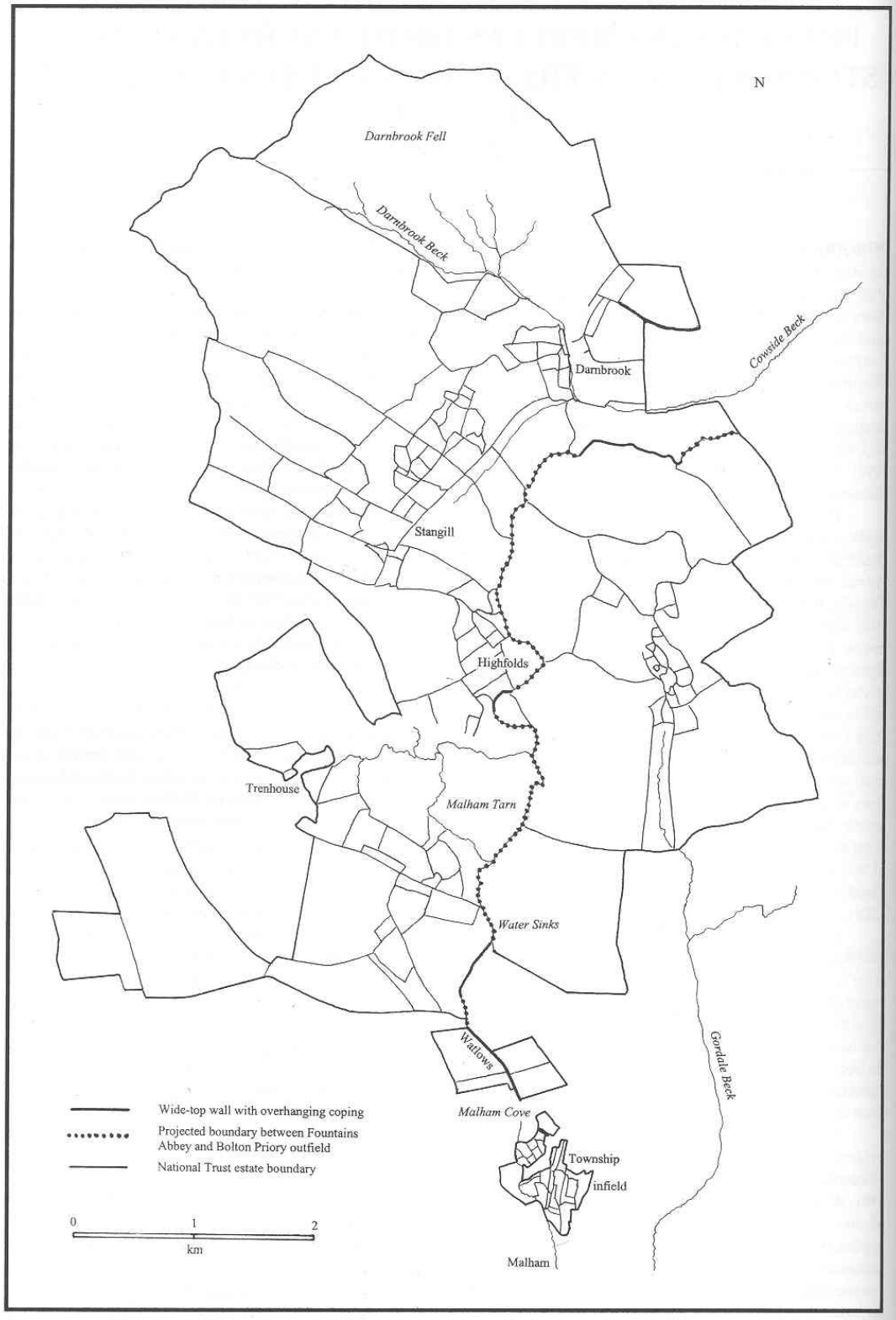

Figure 18.1. Field walls on the National Trust estate in the Malham area.

Figure 18.2. Piecemeal enclosure in the former Malham infield. Narrow top wide base walls and stone dumps with plough scratched stones.

may end at a wall junction where there is a clear stratigraphic relationship with another wall section, but this is rare. The usual case is for a wall section to end with no detectable join to the next wall section apart from a change in structure. At Malham it seems wall heads were generally avoided wherever possible unless they represented a change in ownership of the wall. The exception is where walls were built on steep slopes. These may incorporate wall heads as a device to reduce the extent of down hill collapse resulting from a gap on the steep slope. All wall heads were recorded as items of wall furniture.

The premise underlying the adoption of this unit of record is based on the observation that dry stone walls are built in lengths using a template called a walling frame (Brooks 1997, 48). A walling frame is a simple 'A' shaped wooden frame for attaching two string lines, one to each side. The history of walling frames is not known although Charles Fothergill describes their use in Wensleydale in 1805 (Romney 1984, 115).

In new work, walling frames are used in pairs made up to the shape and size of the required walling. The outer edges exactly match the cross section of the new wall. The string lines attached to these provide a precise guide for placing the outer edge of the face stones all the way up the wall. Using a walling frame and string lines a dry stone wall can be built to any length with a consistent profile and dimensions.

In theory it should be possible to identify a length of wall built to the same specification, providing enough of the original wall survives to be certain of its dimensions, profile and structural characteristics. However, identification requires an understanding of the processes which cause dry stone walls to decay because, lacking mortar bonding, dry stone walls are inherently plastic structures.

Decay processes in dry stone walls cause irreversible changes to the original structure, rather like middle age in humans. The base of a double wall may move like doing the splits: it can spread and easily double its original width. As the footings move, fillings higher up fall into the voids causing the face stones to swivel, so that the face of the wall bows in and out, destroying the original wall profile. The top of the wall sags, and eventually even the coping can cope no more. Being on top of the wall, the coping is the part most at risk from decay. Wall repairs too often modify the original structure, and may be apparent only by changes in construction techniques. Dry stone walls, like humans, usually look very different in old age.

Factors that affect the decay of dry stone walls may be divided into three main categories; geomorphic, climatic and biological. (Table 18.1) Geomorphic factors are primarily the mass movement processes which operate on the footings of a wall causing the footings to move. These processes are in turn affected by the nature of the substrate the wall is built upon and the wall's relationship to slope. Climatic factors

Main Categories	Processes	Key Variables
Geomorphic	Soil Creep Solifluction Talus Creep Rockslide Mudflow Fluvial	Relationship to slope Nature of substrate: bedrock alluvium glacial drift peat Vegetation cover
Climatic	Wind Snowfall Freeze-thaw Dessication	Microclimate Aspect Nature of substrate: bedrock alluvium glacial drift peat
Biological	Burrow activity Sheep jumping Humans climbing Tree disturbance Management history	Earthworm density Rabbit and mole density Sheep behaviour and stocking rates Proximity of trees to walls Value of wall to land manager Vegetation cover Nature of substrate: bedrock alluvium glacial drift peat

Table 18.1 Decay Processes affecting the Structure of Dry Stone Walls

include stresses on walls exposed to the prevailing wind where storm conditions accompanied by heavy rain or snow can move stones in the face of the wall. Extreme weather conditions such as frost and drought can also cause footings to move. Biological factors include moles and rabbits tunnelling under the wall and undermining the footings, and the displacement of stones by jumping sheep and careless, climbing humans. The trunks, branches and roots of trees close to walls can also cause damage. Although factors may be classified under one heading they are usually connected in some way. For example, freeze-thaw due to frost, a climatic factor, may result in soil creep or solifluction which are mass movement processes.

One distinctive aspect of the National Trust Estate at Malham is the presence of much exposed limestone bedrock in the form of limestone pavement. This provides a stable substrate for dry stone walls built upon it, and so provides excellent conditions for preserving original wall structures.

A record form was designed for the Malham survey to record the dimensions and structural characteristics of each wall section. The wall height, width beneath the coping and width at base were measured to the nearest 5cm. Measuring dry stone walls requires experience and a practiced eye. The bedrock, and the surface deposit the wall is built upon, wall furniture such as gates, stiles, cow creeps, sheep creeps, rabbit smouts, water pens, and wall heads were also recorded. Trevor Croucher of *DataGraphics*, Hebden, entered the information about each wall section in a relational data base and mapped it using a digitised map base and GIS.

The Malham survey recorded 576 wall sections where enough of the apparently original wall survived to record its dimensions, profile and structural characteristics. These have a total length of 125km, and represent about 92% of the 136km of wall surveyed (Table 18.2). The remaining 11km of wall, represented by 50 wall sections, about 8% of the total survey, were too decayed to be confident of their original structure.

RESULTS OF THE SURVEY

The survey identified three basic forms of dry stone wall. By far the commonest are double walls, familiar as the standard construction form in use today. The survey identified 520 double wall sections with a total length of 116km, 85.4% of the surveyed walls. A double wall is a two-sided dry stone wall usually constructed upon two rows of footings. The middle of the wall is packed with stone fillings and the two faces may be bound together by through stones. In cross-section double walls exhibit a variety of forms which provide a useful means of classifying them.

Two obsolete forms were identified. Single walls, hitherto unrecorded in the Dales, and three-quarter double walls, a hybrid form incorporating elements of double and

Basic Forms	Main Styles	MainTypes	Numbers of Wall Sections	Total Wall Length	% of all Walls Surveyed	Average Length of Wall Section
Double Wall	**Wide top** >0.5m beneath coping	Base< 0.85m	72	10.16km	7.5%	141m
		Base> 0.90m	10	0.56km	0.4%	56m
	Narrow Top <0.45m beneath coping	Base< 0.85m	389	100.99km	74.3%	260m
		Base> 0.90m	39	3.84km	2.8%	98m
	Unclassified		10	0.45km	0.4%	
Single Wall			39	6.91km	5.1%	177m
Three-Quarter Double Wall			22	2.08km	1.5%	95m
Relict Wall			50	10.87km	8.0%	
Total			631	136.20km		

Table 18.2. A Preliminary Typology for Dry Stone walls at Malham

single walls that had not been recognised anywhere before. The survey identified 39 single wall sections with a total length of 6.91km. Three-quarter double walls are even rarer. Twenty-two three-quarter double wall sections, with a total length of 1.8km, were identified. They were only recorded built on limestone bedrock. It is possible that they are a very restricted local style confined to surface exposures of limestone.

Single walls are only one stone in thickness across their width and built up as a single row. Rainsford-Hannay (1976, 51) comments that each stone in a single wall has at least three points touching its neighbours. Seen against the sky, the spaces between the stones are a mass of lace like points of light which are believed to deter livestock. At Malham the single walls are rarely more than 1.2m high. However, by running the wall along the edge of a shallow limestone outcrop, additional height is gained on one side. They are almost entirely restricted to outcrops of limestone bedrock. Being less tolerant than double walls to the footings moving at the base of the wall may account for their limited distribution. Single walls are found in wall lines with double and three-quarter double walls.

Three-quarter double walls resemble wide-top double walls in cross-section, but they are more slender. They consist of deep stones running right through the width of the wall, interspersed with pockets of opposing face stones. However, they generally lack fillings in the middle, and so can not be described as a fully double wall. Neither can they be described as single walls because they have pockets of opposing face stones, and coping like a double wall. Three-quarter double walls often occur in wall lines with double wall forms where the substrate switches back and forth between glacial drift and limestone bedrock, with double wall forms found on the drift and three-quarter double walls on the bedrock.

Double walls, for the purpose of developing the wall typology, were divided into main styles according to differences in cross section. The survey identified two principal styles using differences in the width of the top of the wall beneath the coping. Wide-top double walls were defined as having a width of 50cm or more beneath the coping, and narrow-top double walls have a width of 45cm or less. The survey identified 520 double wall sections; of these 418 are 40cm or less, 82 are 50cm or more, and only 10 are 45cm wide beneath the coping. This is a markedly bimodal distribution. It means that it is quite easy to differentiate wide-top and narrow-top double walls in the field. The recognition of wide-top and narrow-top double walls is totally new.

The width at the wall base may be used to sub-divide wide-top and narrow-top wall styles. Double walls with a width at base of 90cm or greater were called broad base, those with a width at base of 85cm or less standard base. Nearly all wide-top and narrow-top double walls are standard

base (Table 18.2). The small proportion of broad base double wall forms is clearly unusual.

Narrow-top double walls with a broad base occur in the former village infield south east of Malham Cove. The face stones in these walls are mostly rounded stones described in the survey as cobbles. They derive from the local glacial drift and were probably brought to the surface by ploughing. The infield at Malham contains numerous grassed over lynchet banks and plough strips. Several plough-scratched stones, built into the infield walls or lying on adjacent stone heaps, were noted. Fine scratches were possibly made by an iron coulter, the vertical cutting knife fitted in front of the plough share. The scratches are nearly always parallel to each other which suggests the plough team repeatedly ploughed along the same axis. This is consistent with the dimensions of the plough lands which are basically too narrow to permit transverse ploughing. One stone observed on a dump had more than twenty parallel scratches.

specialised type of low wall known as a cow wall (Brookes 1997, 61), normally built to a height of about 1.2m, sufficient to deter cattle.

Two helpful structural criteria to further differentiate double walls are the arrangement of the through stones which pass through the thickness of the wall and the placement of the coping. The arrangement of the throughs where they are laid in rows is especially useful, because the faces of these walls are less prone to decay and it is usual to find the original wall structure well preserved. Charles Fothergill described recently built narrow-top walls in Wensleydale with rows of through stones. He noted in his diary for September 5th 1805 "There are however men who make wall-building their chief profession and so far as I could learn the following methods are observed. Great improvements have of late been made and more skill and knowledge of mechanics [are] observable: a section of a modern stone wall in these dales would form something like this appearance:" (Fig 18.3)

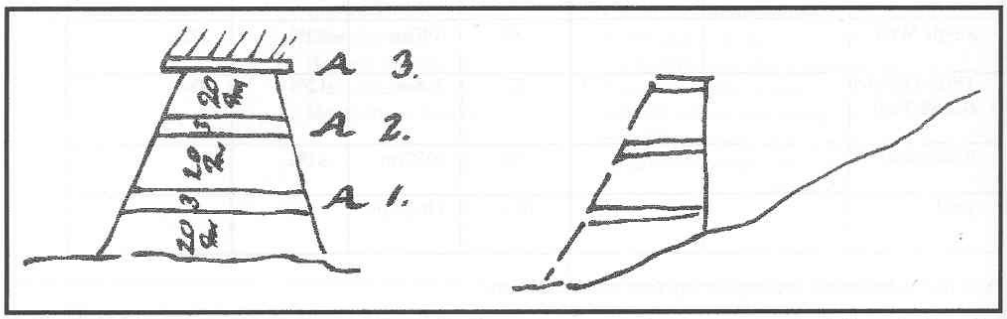

Figure 18.3. Charles Fothergill's 1805 sketch cross sections of walls in Wensleydale. The right hand version indicates the form of a wall built running round a hill-side.

A distinctive aspect of these walls is the presence of wide inclusions. This term was coined to describe where a double wall widens at its base and top, and then after a short distance returns to its original dimensions, the whole forming a continuous structure. In ground plan they are usually asymmetrical with the widening occurring on one side of the wall only. Here the line of the footings may be seen to kick out abruptly to accommodate the extra width. Wide inclusions are in the order of 1.5m wide at the base and 1m wide at the top. They lack any proper coping. The narrow-top walls with a broad base and wide inclusions were clearly intended to use up surplus stone, and thus are a type of consumption wall (Rainsford-Hannay 1976, 68-72).

The Malham survey identified only ten wall sections of wide-top double wall with a broad base. These had an average length of only 56m (Table 18.2). Some of the wall sections resemble the 'wide inclusions' found in narrow-top walls with a broad base. They are probably a more specialised type of consumption wall, designed to use up even greater quantities of stone, which would explain their much shorter average length.

At present the wall typology outlined in Table 18.2 is still in a preliminary stage. However, it should be possible to further sub-divide double walls according to height and structural criteria. Height may be used to identify a

When the wall is raised according to the above figure about 20 inches (50cm) from the ground, observing to keep the width or thickness of the base from 24inches (60cm) to 30inches (75cm), tapering gradually to the top where it must be left about 15inches (*c* 40cm), a large flat stone that will reach thro' the wall and is about 3inches (*c* 10cm) thick is then laid on, and in the above section is marked A1: these stones are called *throughs.* Three of them are used in the perpendicular of one of these walls and are put in rows 20inches (50cm) above each other" (Romney 1984, 114-15) Technically the throughs in the third row, directly underneath the coping, are coverbands (Rainsford-Hannay 1976, 34). These are rare in limestone areas such as Malham, because of the lack of thin bedded stone. They are probably more common in areas with fissile rocks like flaggy sandstone.

Coping provides another means of differentiating types of double walls. However, the coping is particularly vulnerable to changes from decay and repair, and may not always survive or be replaced in its original style. The coping on narrow-top walls at Malham is nearly always the style where the top stones are placed across the top of the wall and lean against each other. The top stones are usually D-shaped and sometimes widen towards the outer curve like an orange segment. The flat edge is placed across the wall, and the stone is tilted over until it comes to rest on the

Figure 18.4. Wide top double wall with projecting topstones in the Watlowes dry valley.

previous top stone. They are generally about the same width as the top of the wall so that they rarely project, laid directly onto the top course of face stones, and should bind the top of the wall faces together. Occasionally the top stones have been carefully sorted so as to be nearly the same size, and in some instances they have been dressed with a hammer, although this is rare with limestone.

The coping on wide-top walls is more variable. The commonest style is similar to the coping on most narrow-top walls. However, in most cases this coping is probably a replacement. The coping is quite different on wide-top walls built on limestone bedrock where the structure is especially well preserved. There the top stones are basically laid flat across the top of the wall. Two styles are present. The first is where the top stones are laid flat and end flush with edge of the wall. The second is more complex. In this style the top stones are laid flat, and overhang about 15cm on one side, making a continuous projecting lip clearly intended to deter jumping animals. Because of the overhang, which increases the width of the coping to about 65cm, the top stones are rarely long enough to reach all the way across the top of the wall, and tie the opposing rows of face stones together. To compensate for this, an extra row of stones cross the gap between the inner edge of the projecting top stone and the opposing face stones. Finally more stones rest directly on the projecting top stone in the middle of the wall, possibly to anchor it and make it less prone to overbalance or slide off. The projecting top stone is probably the least stable coping style, and therefore the one most prone to decay. It seems likely too that the overhanging lip on the top of the wall to deter jumping animals went out of use. Subsequently when the coping needed repair, it was replaced by the simpler style where the top stones cross the entire width of the top of the wall, and lean against each other.

Wide-top walls with projecting top stones were originally built 1.6m to 1.8m high. With a width at base of 70-80cm, and a width beneath the coping of 50cm, they were often constructed with very little batter, and have a nearly vertical profile. With the addition of a continuous lip projecting some 15cm on the top of one side of the wall, this side must have presented a considerable obstacle to a jumping animal. These wide-top walls exhibit other distinctive structural characteristics.

Firstly, large stones occur high up in the wall, because the greater width of the wall requires much deeper face stones laid end in, end out, to reach into the heart of the wall. This results in the face stones appearing much less sorted for size than in narrow-top walls. Secondly, straight joints, considered a defect in narrow-top walls, are fairly common. A straight joint is formed where a face stone fails to cross the vertical gap between two underlying stones. It seems that the builders of wide-top walls relied far more on the binding properties of large stones laid end in, end out, rather than crossing the joints between the face stones, as is the case in narrow-top walls. Thirdly, the footings invariably include orthostats (Fig 18.5).

An orthostat is a large slab-like stone placed on its side or even on end, rather like a playing card stood on one

side rather than laid down flat. At Malham the orthostats are nearly always flaggy pieces of limestone pavement. They are placed so their outer face is more or less vertical at the foot of the wall. They are generally set less deeply than the adjacent footings, and are rarely wide enough to go right through a double wall. Orthostats might be expected where especially deep footings go nearly through the wall and reduce the space for the opposite row of footings. But this does not seem to be the case. It is usual to find the space immediately behind the inner face of an orthostat packed with large fillings. Moreover it is not uncommon to find orthostats placed directly opposite each other. In these instances there may be a through running the width of the wall resting directly on top of each orthostat. This creates a box-like structure at the base of the wall, probably intended to bind the tops of the orthostats into the face of the wall and reduce the tendency for them to be displaced outwards. Orthostats usually occur singly, but sometimes two or more may be placed next to each other.

Orthostats rarely occur in narrow-top walls. They are more easily accommodated in the nearly vertical sides of wide-top wall types than in the more sloping sides of most narrow-top walls. However, orthostats are a fairly consistent feature of three-quarter double walls. In cross section three-quarter double walls have nearly vertical sides like wide-top walls. Rows of orthostats formed from up-ended pieces of flaggy limestone pavement further add to the distinctive appearance of this walling form.

MEDIEVAL LAND USE

The distribution pattern of wide-top walls with overhanging coping at Malham suggests that they were built as part of an infield/outfield system of land use. This system was already well established by the 13th century when historical records for Malham proliferate as a result of grants to, and disputes between, Fountains Abbey and Bolton Priory, the major medieval landowners. All too frequently historians see the infield/outfield system from a lowland perspective where arable product is usually dominant. However, in upland areas, livestock and livestock products were more important, with arable product relegated to subsistence levels. This is certainly suggested by the early 14th-century accounts for Bolton Priory's arable demesne at Malham (Kershaw 1973, 42). The paucity of information for upland areas also obscures how the infield/outfield system developed in the later medieval period, particularly in response to the major demographic and social changes in the 14th century (Fryde 1996), and the deteriorating climatic conditions with the onset of the "little ice age" (Fagan 2000). A further dimension in areas dominated by monastic landholding is how property was managed in the three centuries before Dissolution of the monasteries. During that period, as a general rule, the management of monastic land passed from direct monastic control to lay overseers and then to tenants (McDonnel 1990, 28).

A cluster of mid-13th-century disputes about grazing rights at Malham must stem from increasing numbers of agisted livestock. Agistment is the practice where livestock from elsewhere graze the pastures on a seasonal basis, usually, but not always, over summer (Winchester 2000, 92-98). The owner of the agistment rights charges a headage fee, and normally undertakes any supervision. The monastic houses used agistment rights on the pastures at Malham to summer livestock from their lowland holdings. In a mid 13th-century settlement Fountains Abbey agreed not to "over burden the pasture belonging to the vill of Malgum with *their cattle of other places*" (Morkill 1933, 80 [my italics]). Agistment is central to understanding the management of the outfield at Malham.

Agisted livestock generally needed less supervision than that required for stock giving birth, or needing milking. Winchester suggests agistment suited horses, geld cattle, and flocks of wethers or hoggs. Some of these are notoriously prone to wander. Stray horses belonging to Bolton Priory, for example, are cited by Fountains Abbey in one of the mid-13th-century disputes (Morkill 1933, 79). They were probably animals summering at Malham from the Priory's stud farm at Bolton (Kershaw 1973, 103), a fact of which Fountains Abbey staff would be well aware. However, it was not only livestock belonging to the monastic houses that were troublesome. In a mid-13th-century settlement Fountains Abbey agreed "if the cattle of Ranulf, Hugh and William *unherded* shall occasionally climb towards the rocks, they shall be returned without law proceedings" (Morkill 1933, 80 [my italics]).

Agistment is specifically mentioned in a grant to Fountains Abbey from Baron Henry de Percy in 1328 of "all the agistment of Malghom and Malgmore" (Morkill 1933, 71). It is likely that the practice was already well established. Furthermore, it was not only the preserve of the great landowners. In the first half of the 13th century Thomas of Malham gave Bolton Priory pasture rights for 30 mares with their offspring and issue of three years (Kershaw 1973, 103). About the same time Bolton Priory also received a grant of sheep handling facilities and pasture sufficient for three hundred ewes and two years crops of lambs (*op. cit.* 82). In 1259 an assessment was made of the quantity of livestock each bovate of land was capable of carrying at Malham. The need to make the assessment is itself evidence of increased grazing pressure. It was concluded that each bovate was "able to sustain six oxen and six cows with their young of three years, four mares with their young of three years, two hundred sheep, five she-goats, one sow with the young of one year, four geese and one gander" (Morkill 1933, 81). Bolton Priory's original land grant in Malham was at least eight, and possibly as many as twelve bovates, (Morkill 1933, 62). Multiplying the 1259 livestock assessment for a bovate by 8 to 12 indicates the potential quantity of livestock Bolton Priory could pasture at Malham. The sheer numbers suggest the figures include an entitlement for agisted stock. It would seem hardly possible to over winter so many animals on individual holdings at Malham. In *c* 1300 Bolton Abbey kept only about twelve oxen for a single plough on their arable demesne at Malham (Kershaw 1973, 94).

However, other individuals with pasture rights were named in the dispute that precipitated the assessment of 1259. It was claimed that as well as the Prior of Bolton "the Abbot of Dereham, Elias de Cnoll, Richard de Oterburn, Thomas of Maleghum, Richard son of Ranulf, Elias son of Richard, and Richard his brother, William son of Robert of Arneclyve, Henry de [illegible] and William Fraunk unjustly overburdened the common pasture in Maleghum having in

it many more animals and cattle than they ought" (Morkill 1933, 80). Some of these individuals may have exercised pasture rights belonging to Bolton Priory, because the evidence for stock numbers at Malham in the Priory's accounts (Kershaw 1973, 79-112) fall far short of the numbers expected from the figures calculated from the bovate entitlement of 1259. It is possible too that they did not hold plough lands in Malham. The Abbot of Dereham, for example, held two bovates in Kirkby Malham (Morkill 1933, 93). The presence of surnames relating to settlements outside Malham such as Otterburn and Arncliffe also suggests these individuals held plough lands elsewhere. This is further supported by the presence of Elias de Cnoll on the list immediately after the Abbot of Dereham. He is probably either the Elias de Knoll who held the manor of Hellifield in the 1240s, or his immediate successor (Ryder and Birch 1983, 81-82). The 1259 assessment at Malham suggests that livestock were summered on the Malham outfield then wintered elsewhere, and that they belonged to a variety of non-resident landowners, and not just Fountains Abbey and Bolton Priory.

It is significant that Fountains Abbey continued with the practice of agistment right up to the Dissolution when a survey of their properties shows the Abbey was directly engaged in the agistment of cattle and sheep at Malham. (Morkill 1933, 83-85; Atkin 1990-91, 70). The lease for part of the lodge of Tranhoulhouse in 1514 stipulates that "[Thomas Knoll] binds himself by these presents to keep in summer a wether flock belonging to the abbot and convent at his proper cost on such "raykes" and other pastures as they have been accustomed to be kept before, for which he will be allowed 10s per annum on his account, and for washing and clipping them as is customary in that area" (Michelmore 1981, 45). The wether flock at Trenhouse numbered about 200 to 240 animals. Fountains Abbey summered five more wether flocks, one ewe flock, and two unspecified flocks at their other lodges on Malham Moor, (Morkill op. cit.). Yet only one wether flock remained over the winter. As the medieval climate deteriorated, perhaps snowfall posed too great a risk in the colder winters.

In the 1530s Fountains Abbey hired herdsmen to look after their summering cattle. Evidence about this is contained in the testimonies of elderly witnesses about a tithe dispute in 1597/8 concerning Fornagill, a former Fountains Abbey lodge on the north-west flank of Fountains Fell. One octogenerian, John Lawson of Arncliffe, "saith that he was a hired servant to the Abbay for the tenne yeres in sommer tyme onelie, during which tenne yeres he in sommer tyme served the Abbey as a keper of ther cattell in a ground called Fountains Fell adjoining to the ground called Fornagill and lying open to it, and helped at May day yerlie during the same tenne yeres or theraboutes to fetch ther cattell and shepe at Fountance Abbey and drive them to Fornagill, and about Michaelmas did also yerelie during the same time help to drive the same cattell and shepe to Fountains Abbey again, Which cattle and shepe were burned and marked with the burne and mark of the Abbey" (Purvis 1949, 162).

It appears that the Fountains Abbey tenants were not averse to agisting livestock themselves. A clause in the lease for part of Darnbrook in 1520 specified "that [John Buke] shall not taik to *agesteament* no *foryn cattel* to surcharge the common pastor over his stynt" (Michelmore 1981, 47 [my italics]). This was probably the "greate common callyd Fontaunce Fells" described in possession of the Abbey in the Dissolution survey (Morkill 1933, 85). There the dominant vegetation was probably *Calluna vulgaris* - *Eriophorum* spp - *Nardus stricta* (heather - cotton grasses - mat-grass, Williams 1963, 130). Grazing by cattle in the summer can severely damage *Calluna* (Holliday and Townsend 1967, 85), and this might explain the Abbey's attempt to limit the numbers of cattle. In the medieval period parts of Fountains Fell carried a herd of red deer, which it was claimed still numbered forty or fifty head in the early seventeenth century (Whitaker 1878, 266). *Calluna* may have been important in their winter diet. Records for the deer park belonging to the de Lacy Estate of Blackburnshire, in the Lancashire Pennines, for *c* 1300 show that the cattle were routinely turned out in the autumn to preserve the forage for the deer over winter (Atkin 1994, 12).

To ensure forage for its over-summering cattle, sheep and horses, Fountains Abbey took steps to ensure that stock proof boundaries were maintained. The leases for lodges on Malham Moor contain clauses binding the tenants to maintain boundaries at their own expense. In 1516 Henry Paicoke at Cowpmanhow, had "to repair, make walls and other fences in and around his tenement as has been done before at his own cost" (Michelmore 1981, 46). In 1520 John Buke at Darnbrook had "to maintain all fences in hedging, ditching, walling and all other fencing at his own cost" (*op. cit.* 47). It is clear from these examples that walls had been built in the vicinity of the lodges prior to the dissolution. This is further supported by the testimony of Roger Buck of Darnbrook in the tithe dispute of 1597/8 concerning the lodge of Fornagill. Buck recalled that "at the time of the Dissolution of the Abbey and before and sence [Fornagill pasture] lay open to the rest of Fountains Fell but was divided from other groundes that bounder upon it with walls and other fences" (Purvis 1949, 164).

DATING EVIDENCE

In the Yorkshire Dales late 18th-century specifications for the width beneath the coping of double walls invariably stipulate a 'narrow-top'. The enclosure awards for Fremington in 1778 and Grassington in 1788, specify 16ins (40cm), and Linton in 1792 specifies 14ins (35cm) (Raistrick 1946, 9-10; White 1997, 74). In 1805, Charles Fothergill observed that the tops of recent walls in Wensleydale were about 15ins wide (Romney 1984, 113).

It is clear that Fothergill made enquiries to ensure the accuracy of his observations, so his remarks about recent improvements in walling techniques are particularly revealing. Narrow-top walls with regularly laid throughs in rows are probably an 18th-century innovation. They are documented in the specifications for Fremington in 1778, and may have originated a decade or two earlier as Parliamentary Enclosure of common pastures took hold in the Dales.

One aspect of Parliamentary Enclosure walls that sets them apart from earlier walls is their layout. They pay scant respect to the local topography, being the product of an arithmetic division of land by a surveyor. They have to boldly

go where no walls have gone before. Land surveyors faced with the necessity of building walls against the grain of the topography may have been instrumental in the "great improvements" in walling and "knowledge of mechanics" observed by Fothergill. The regularly laid rows of throughs are nearly always protruding and so easily seen. As well as binding the two wall faces together, they also provide an indisputable record that the contractors undertaking the walling kept to the specifications.

The Malham Enclosure Award is quite late by comparison with other parts of the Dales. It took place shortly after the General Enclosure Award Act of 1845, and the common pastures survived to be mapped by the Ordnance Survey in 1847. The walls built as a result of the Award are quite variable, so it seems it was left to individual landowners to build the walls as they saw fit. The Enclosure Award surveyors laid out the new fields in the vicinity of Watlowes, the steep dry valley above Malham Cove, with customary disregard for the difficult topography. The 'narrow-top' walls built here with regularly laid throughs are technically very accomplished. They display structural adaptations to counteract the effects of slope. Scarcement, which is an extra row of wider footings at the base of a wall, is used where the wall line runs along the contour to minimise the tendency of the footings to slide downslope. Where the walls have to make the steep descent into the dry valley, multiple wall heads act as bulkheads to reduce the extent of any collapse caused by gapping. Nevertheless it is worth bearing in mind comments by a contemporary observer who visited Malham Cove soon after their construction. "The view from this elevation is extensive, but the appearance of the high pastures near the cove the tourist will not think improved by the new stone fences. The walls in most parts of Craven are a drawback to the scenery, and here they are peculiarly so, for time has not given them the usual hint" (Howson 1850, 39).

These examples suggest that by the end of the eighteenth century there was a preference for narrow-top double walls. However, it is likely that wide-top walls became obsolete much earlier. At Malham some wide-top double walls are consistently 50cm in width beneath the coping. The width is equivalent to the span of a man's arm from the elbow joint to the tip of the middle finger. This measurement is the long obsolete cubit. Its possible use as a specification in the construction of certain types of wide-top walls hints at a considerable antiquity for these structures.

Fragments of overhanging coping survive on a piece of wide-top wall enclosing the village infield south east of Malham Cove. The overhanging lip formed by the projecting top stones faces outwards to deter animals from jumping

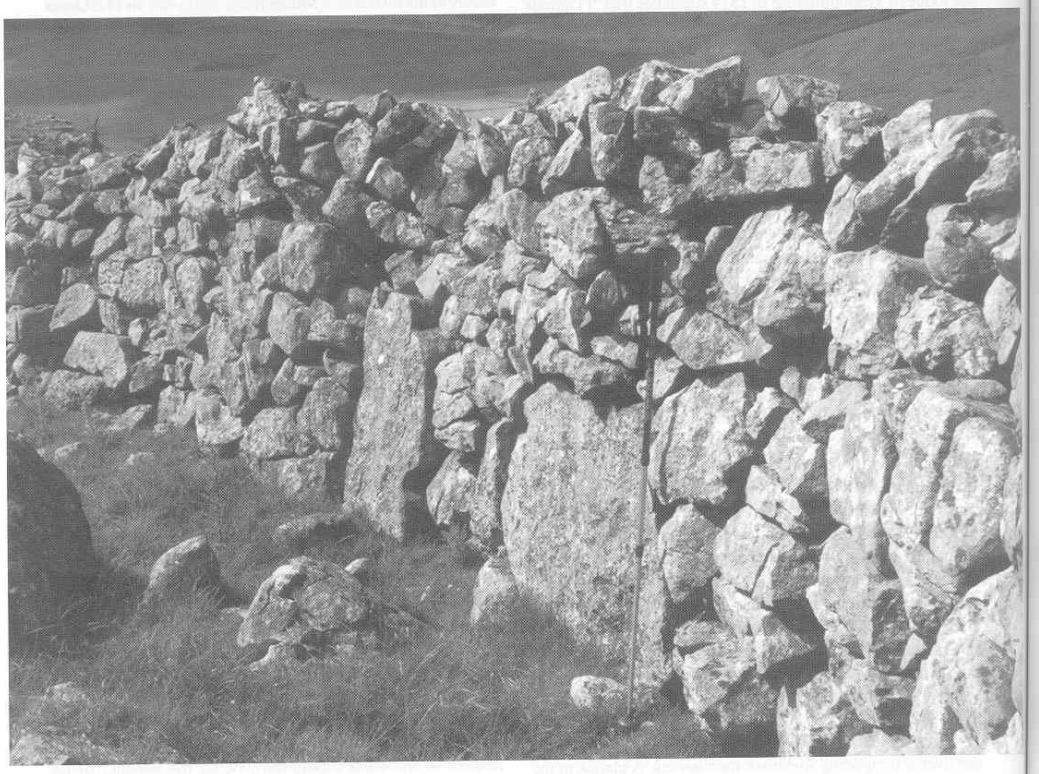

Figure 18.5. Orthostats at the base of a wide top double wall near Darnbrook. The original topstones are missing.

into the infield. Stock proofing this boundary is crucial in the upland infield/outfield system. "By whatever name it was known, the head dyke was the most fundamental feature in the upland landscape. Marking the limit of enclosure and thus the boundary between land appropriated to individuals and the common grazings on the waste, it was one of the few permanent enclosures in the mediaeval peasant-farming landscape" (Winchester 2000, 53). Wide-top walls with fragments of overhanging coping, and built to the same dimensions as the Malham examples, occur in the head-dyke of the former hamlets of Cowside and Winskill near Langcliffe, in Ribblesdale. At Winskill documentary and field evidence indicates that the head-dyke wall pre-dates *c*1590, and parts of it pre-date an earlier plough phase which is likely to be medieval (Lord *in prep*). At Cowside the wide-top wall runs on top of an earlier head-dyke composed of a bank with an associated ditch, and presumably replaced it. At Winskill and Cowside the coping overhangs on the side facing towards the outfield, like the wall in the Malham head-dyke.

However, at Malham wide-top walls with overhanging coping also form important boundaries in the outfield. Although it might be considered unusual to divide the outfield with stockproof boundaries in the medieval period, 13th-century evidence for agistment, increased stocking rates, and disputes over grazing provide just the conditions where it might be needed. Add to these the conflicting interests of the major landowners, Fountains Abbey and Bolton Priory, and medieval boundary construction to separate the outfield becomes all the more likely.

Fragments of overhanging coping still survive on the wide-top wall running the length of the boulder strewn floor of Watlowes, the dramatic dry valley above Malham Cove (Fig 18.5). A post-Dissolution dispute about grazing in 1569 refers to this boundary as the western limit of Bolton Priory's grazing. Significantly the boundary was not the subject of the dispute which was about who had rights to graze the "Prior Raike" (Morkill 1933, 66). The wide-top wall with projecting top stones continues northwards, beyond the head of Watlowes, as far as sink holes for the overflow stream from Malham Tarn. At this point the sub-strate becomes less favourable for wall preservation, and there is evidence of extensive re-walling.

Two wide-top walls each side of the steep gill downstream of Darnbrook, have overhanging coping that points away from the gill. This suggests that the walls were constructed as a deterrent to animals jumping into the gill. The wall on the north side of the gill is continuous with a ditch and bank that can be followed back to the vicinity of the farm house at Darnbrook. The Percy family gifted Darnbrook to Fountains Abbey in the early 13th century along with the steep gill, then called *Juden* that runs down into Littondale (Morkill 1933, 69). Yew trees still grow on steep cliffs in the gill today, and *Juden* probably means the yew valley. The leaves of yew are poisonous to livestock, and it may be that the wide-top walls with overhanging coping were built simply to protect livestock from being poisoned. However, it is more likely that the walls were built to protect the valuable woodland in the gill from being grazed.

The wide-top wall with overhanging coping on the south side of Darnbrook gill (Fig 18.6) is part of a wall line, interrupted only by Malham Tarn, which runs nearly to the head of Malham Cove directly overlooking the infield. Initially it flanks the Fountains cattle pasture along Cowside beck, then it turns to follow a limestone outcrop along the north side of the Highfolds col. This is probably the area of disputed grazing between Fountains and Bolton Priory in the early thirteenth century when the Prior of Bolton claimed that Fountains had taken from him "[the] common of pasture in the moor of Malgum from the spring of Malgewater to Clouenstan and from Clouenstan by the middlefolds of Cunyesskker as far as Coltenab" (Morkill 1933, 78). 'Clouenstan', meaning the stone clough, may be safely identified as Stangill. A map of Thomas Lister's Malham property in 1760 has the legend "Coney Scar" next to Highfold's Scar (Lang 1760, plan XI) which confirms 'Cunyesskker' as Highfolds Scar. Where the Highfolds col descends into the Great Close, the wall line turns sharply west, blocking access to the col from Great Close. The wall then climbs up onto the Highfolds Scar and appears contiguous with a derelict, large, arc shaped fold on the west side. On the outcropping limestone bedrock, the wall survives as a particularly massive wide-top wall with fragments of overhanging coping facing to the north. The wall here is a complex structure with additions on the southern side making it especially wide. It is made almost entirely of large pieces of weathered limestone pavement. As the wall descends towards Malham Tarn from the top of Highfolds there is even a wide inclusion suggesting intentional clearance of surface stone. The wall line is lost in the steep descent through the woods to Malham Tarn, but is rejoined south of the Tarn following the route of the outflow stream. At the furthest point where the stream sinks, the wide-top wall with overhanging coping is reached which descends into Watlowes. Along the floor of Watlowes the wide-top wall with overhanging coping runs almost to the head of Malham Cove.

This boundary probably marks the western and northern extent of the grazing belonging to that part of Malham where Bolton Priory was the major landowner. It differs from the present township boundary between Malham and Malham Moor, which is possibly a late 16th-century creation. The township boundary is not a consequence of Norse settlement as Raistrick (1947, 10) believed, but part of the legal process whereby medieval rights to pasture livestock were converted into freeholds by the purchasers of the monastic estates.

The wide-top walls with overhanging coping at Malham, and at Winskill and Cowside in Ribblesdale, are built mostly out of limestone. A wide-top wall with overhanging coping which forms part of the boundary of Ingman Lodge Hall Farm, near Ribblehead, is also built out of limestone. However, a wide-top wall with overhanging coping near Stainforth is made out of Silurian sandstones and slates and shows that this wall type is not restricted to limestone areas.

All the sites where wide-top walls with overhanging coping have been observed were under monastic ownership in the medieval period. The Malham sites were owned either by Fountains Abbey or Bolton Priory. The Ribblesdale sites in Langcliffe and Stainforth, were owned by Sawley Abbey (Brayshaw and Robinson 1932), while Ingman Lodge Hall

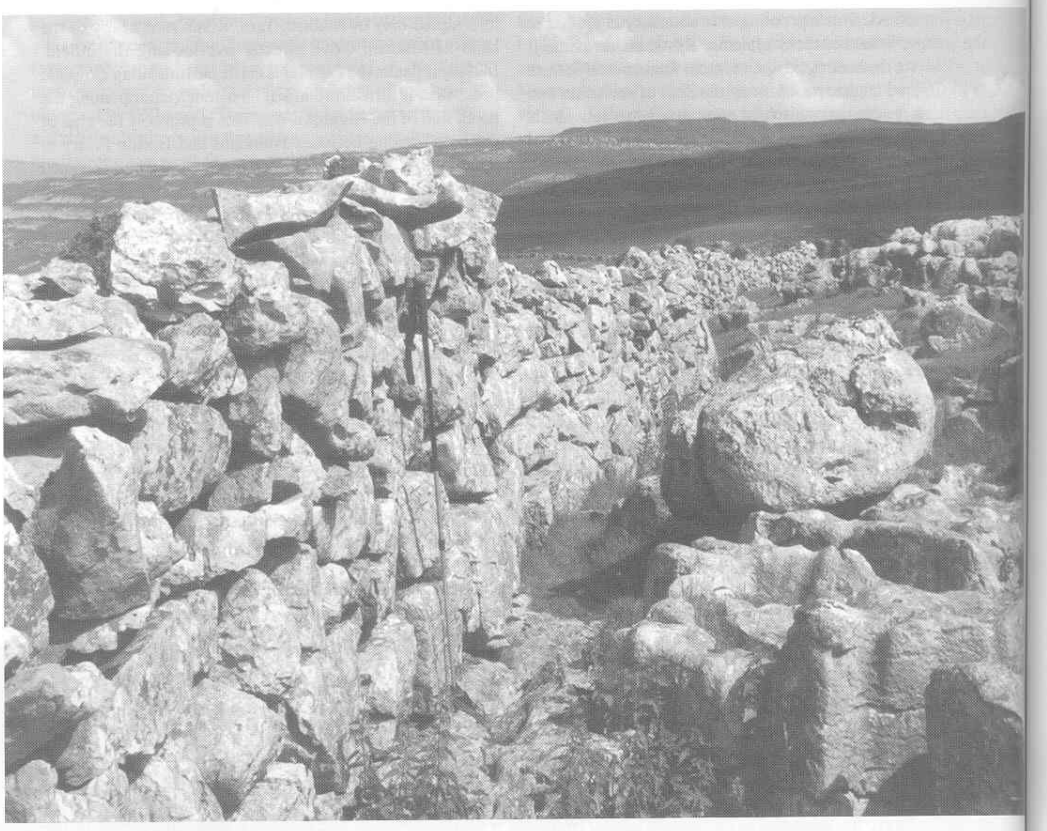

Figure 18.6. Wide top double wall with projecting topstones built on limestone pavement near Darnbrook.

belonged to Furness Abbey (Horton Local History Group 1984). It is entirely feasible that wide-top walls with overhanging coping were built to specifications issued by monastic estate managers. This would explain the consistent dimensions and structural characteristics of these walls. The need for the overhanging coping is puzzling, so too is why it went out of use. If it was only to deter young sheep or even wethers, the domestic livestock most likely to jump, why did the practice go out of use?

An intriguing possibility is that it was designed primarily to deter wild, rather than domestic animals. Deer are obvious candidates, especially the two native species, roe and red deer, and their demise in the area by the seventeenth century might explain why the overhanging coping went out of use. Then of course there is the wolf, an animal that greatly exercised the medieval mind, with good reason judging from the losses attributed to wolves in some upland areas. Livestock records for the De Lacy Estate of Blackburnshire, in the Lancashire Pennines, attribute to wolf attack the loss of six calves, four yearling cattle, five cows and two oxen from four vaccaries in 1295-6 (Atkin 1994, 8). Raistrick (1976, 9) refers to payments by Fountains Abbey and Bolton Priory for killing wolves, and to Fountains Abbey hiring men in the 15th century to keep a nightly watch against wolves on Fountains Fell. The overhanging coping on wide-top walls may have been intended primarily to repel wolves. Subsequently the extirpation of the wolf might explain why it went out of use.

Map evidence suggests that cow walls running along the tops of scars in the vicinity of Malham Tarn, were built during the later part of the 19th century. These walls are all narrow-top types. However, there are decayed wide-top cow walls in derelict wall lines between Stangill and the head of Cowside Beck which are probably much older. It is possible that they are part of the management system for the Fountains Abbey cattle on the pasture at Cowside mentioned in the Dissolution survey.

CONCLUSIONS

Analysis of the data recorded for the 631 wall sections at Malham is still in progress. Dividing double walls into wide-top and narrow-top styles represents a significant advance in understanding the development of dry stone walling styles in the Yorkshire Dales. The chronological evidence for single and three-quarter double walls is uncertain. However, their inclusion in wall lines with double

wall types suggests they are contemporary with these structures. Perhaps the major finding so far is the recognition of a standard mediaeval wall type, the wide-top double wall with projecting top stones.

A special aspect of the Malham landscape is the presence of much exposed limestone bedrock in the form of limestone pavement. It forms a stable substrate for the dry stone walls built upon it, and so provides excellent conditions for preserving early wall structures in reasonably pristine conditions. This is a crucial factor in the survival of medieval walls in the survey area. The medieval walls were built in the context of an infield/outfield system where agistment was practiced in the outfield, and direct monastic control continued to the Dissolution.

It is possible that narrow-top double walls replace wide-top walls after the break up of the monastic estates, and the wider reorganisation of the upland landscape in the 16th and 17th centuries. Narrow-top walls mark a considerable advance in construction methods. By comparison with wide-top walls, they use less stone for the same height of wall, and can be built out of smaller stones. Narrow-top double walls deserve to be recognised as an important agricultural innovation.

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