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THE HISTORIC LANDSCAPES OF THE SEVERN ESTUARY LEVELS

By Stephen Rippon

The deep alluvial sequences that make up the Severn Estuary Levels comprise a series of stratified landscapes dating from early prehistory through to the present day. Most of these landscapes are deeply buried, and, whilst exceptionally well-preserved, are largely inaccessible and so ill-understood. It is only with the 'historic landscape', that lies on the surface of the Levels, that we can really start to reconstruct and analyse what these past landscapes were like. However, although the enormously diverse historic landscape is itself an important source of information, its full potential is only achieved through its integration with associated archaeological and documentary evidence. This presents many challenges and whilst much has been achieved in the last ten years, there is a long way to go before we can write a comprehensive history of the Severn Levels.

Two techniques are vital. Historic landscape characterisation *focuses on the key character defining features of different landscapes and can suggest the processes that may have led to their creation. This is almost invariably a complex story as most landscapes combine features from a number of different periods, though* retrogressive analysis *can disentangle this palimpsest. In the past ten years, both techniques have been successfully applied to various of the Severn wetlands, although attention has focused upon the wholly cultural process of reclamation: the potentially significant role played by certain features of the natural environment, including the belt of sand dunes that fringe much of the Somerset coast, has been neglected. Elaborate models have also been constructed, based largely on landscape morphology, and there is a desperate need to test these hypotheses through fieldwork. Above all there is a need to move beyond simple landscape charcterisation towards more detailed palaeogeographies.*

Introduction

Despite the long history of archaeological and palaeoenvironmental investigations in the peatlands of Somerset, the remarkably rich archaeology of the Severn Estuary as a whole only came to be recognised from the 1970s. Following the pioneering work of John and Bryony Coles in the Somerset Levels, subsequent discoveries elsewhere around the Estuary have maintained the region's national if not international profile. These finds are significant in themselves, but in coming from a wetland environment their value is enhanced by the integrity of their context: their association with other contemporary landscape features and palaeo-environmental evidence (e.g. Bell *et al.* 2000; Nayling 1998; Nayling and Caseldine 1997). In the medieval period, documentary material provides yet another source of information, and the abundant archives of Glastonbury Abbey for example, whose estates included large tracts of the Somerset Levels, have also made a major contribution to the development of agrarian history (e.g. Harrison 1997; Keil 1964).

Considering the richness of these archaeological, palaeoenvironmental, and documentary resources, it is perhaps surprising that until recently few attempts were made to combine all three. Indeed, it was only in the 1990s that the value of what is arguably the richest resource of all – the historic landscape (the present pattern of fields, roads, settlements etc.) – started to be recognised. This paper will review some of the developments in historic landscape studies around the Severn, while a case-study, revisiting the Caldicot Level in South East Wales, will illustrate how we can progress beyond simple historic landscape characterisation towards more detailed palaeogeographies.

Coastal wetlands: the range of opportunities

The present appearance of the Severn Levels is almost entirely due to the work of some 60 generations of human communities over the past two millennia, with a freshwater, largely agricultural, landscape being created from a wide range of intertidal and perimarine environments. That mankind should chose to transform the landscape in

this way is not simply an issue for wetland archaeologists and historians. The reasons behind environmental change on this scale have implications for any scholar studying these periods, in that the reasons why wetlands were manipulated to this extent must reflect wider economic, social and demographic trends.

As described in more detail elsewhere (Rippon 2000a), the rich ecological mosaics that coastal wetland environments contain offer a very wide range of natural resources that were *exploited* by human communities throughout prehistory. These resources would have included fishing, wildfowling, the grazing of livestock, and the opportunity for producing salt by boiling sea water, and could be exploited without significantly changing the natural environment. Experiments in the Netherlands and Germany (Bottema *et al.* 1980; Van Zeist *et al.* 1976), along with palaeoenvironmental evidence from both Britain and the continent have shown that it is even possible to grow crops on a high intertidal marsh, though such environments are not ideally suited to agriculture (Behre and Jacomet 1991; Behre *et al.* 1991; Crowson *et al.* 2000; Körber-Grohne 1981; Pals 1999; Van Zeist 1974; 1989). One solution to the problem of flooding is to *modify* the landscape, for example through the construction of low embankments to protect crops from summer flooding, but without the intention of providing year-round flood defence. Such 'ring' or 'summer dikes' certainly existed in the Netherlands and Germany (Bazelmans *et al.* 1999; Lambert 1971, 94; Mayhew 1973, 48), and the 'infield' enclosures identified on the Severn Levels may have performed a very similar function (Figures 1 and 4; Rippon 2000a). While such 'summer dikes' will provide some protection, they existed in what remained an intertidal environment and in order to realise fully the agricultural potential of coastal wetlands, the landscape needs to be *transformed* through reclamation. This involves the construction of a sea wall to keep the tides permanently at bay, and led to an intertidal environment becoming wholly freshwater and with a managed water table. This sequence from exploitation, through modification, to transformation appears to have occurred in both Britain and mainland Europe (e.g. Bazelmans *et al.* 1999; Crowson *et al.* 2000; Rippon 2000b, 169-77), and as the historic landscape of today was created through a combination of these processes, it contains within

Figure 1: The early medieval 'infield' at Vole, in Brent on the Somerset Levels (see Turner et al. *fig. 1 this volume for location). These oval-shaped enclosures are characteristic of the higher, coastal parts of the Severn Levels and would appear to have been the earliest reclamations in an otherwise open and relatively feature-less marsh. A key issue is whether they pre-dated the construction of a sea wall (ie were analogous to the continental 'ring' or 'summer' dikes, or whether they were simply the earliest areas to be enclosed in an area recently protected from tidal inundation by embankments along the coast and major tidal rivers.*

its fabric valuable evidence for the changing ways in which human communities decided to utilise their environment.

Reclamation: high cost, high risk but high return

Reclamation was the key process in the creation of the historic landscape and as such is deserving of further attention. There has been some debate in recent years about the adoption of new agricultural technology and the context in which agricultural innovation occurred (Astill and Langdon 1997). Reclamation provides one example. The costs, risks and benefits of that approach to landscape utilisation have been considered in detail elsewhere (Rippon 2000a). In summary, the rich natural resources of coastal wetlands are lost once the area is embanked and drained, representing the first cost of reclamation. The capital cost of constructing flood defences is also enormous, and once built, the sea walls and drainage systems required regular maintenance: another cost of reclamation. Even well maintained flood protections schemes could be overwhelmed by freak storms, indicating that reclamation was also a high risk strategy towards wetland utilisation. Considering these high costs and high risks, one might ask why anyone bothered: the answer is that reclamation offered a high return on that investment in terms of increased agricultural productivity.

It is very difficult to assess the relative importance of arable versus pastoral farming without detailed documentary sources. For the Severn Levels, these only really exist for Glastonbury Abbey's estates at Brent, Sowy and Withy. There has been a tendency to stress the importance of arable cultivation on reclaimed coastal marshes, and the survival of ridge and furrow in a few areas certainly supports the documentary evidence for fairly extensive arable cultivation, at least from the 11th to 14th centuries (Allen 1992; Rippon 1996, fig. 52; 2000a, 229-34), while arable yields and land values were far higher than on the adjacent drylands (Harrison 1997). The archaeological evidence for arable cultivation on the Levels is slim, such is the lack of large-scale excavation and palaeoenvironmental sampling from medieval settlements, though results from Seabank (Insole 1999) and Rockingham Farm (Locock and Lawler 2000, 100) on the Avonmouth Levels and Puxton in North Somerset (Julie Jones, unpublished data) suggest that wheat, barley, beans, and possibly oats were cultivated. The significance of the legumes is considered further below.

Despite the apparent extent of arable cultivation, all the Severn Levels retained extensive areas of pasture well into the medieval period. This is reflected in the fabric of the historic landscape by the extensive network of often funnel-shaped droveways that linked the mainly coastal settlements with usually common pastures in the lower-lying backfens. The relative significance of arable versus pastoral farming is difficult to assess, but recent work is suggesting that the latter may have been rather more significant than previously thought, since part of the arable sector may have been geared towards livestock husbandry.

Where 'account rolls' survive they allow the proportion of different crops being grown in the arable fields to be assessed, and at Brent, Sowy and Withy at least, a remarkably high proportion of the demesne was being sown with beans (see Table 1; Rippon forthcoming).

Table 1: acreages sown with wheat, oats barley and beans on the Brent demesne, AD 1282-1330

	wheat			*oats*			*barley*			*beans*				
	acres sown	yield/ acre	yield/ seed	acres sown	yield/ acre	yield/ seed	acres sown	yield/ acre	yield/ seed	acres sown	yield/ acre	yield/ seed	total sown	% beans
1282/3	289	4.0	2.0	151	11.1	2.2				800	4.3	2.2	1240	64.5
1300/1	272	3.4	1.7	220	10.2	1.7				no data				
1302/3	308	4.3	2.2	228	12.6	2.1				521	5.9	3.0	1057	49.3
1304/5	298	2.6	1.3	204	12.1	2.1				183	6.0	3.0	685	26.7
1311/12	261	7.1	3.6	179	10.1	2.1				203	4.7	2.4	643	31.6
1313/14	179	5.5	2.8	171	10.0	2.0	29	8.1	4.1	275	7.0	3.5	654	40.0
1314/15	296	8.4	4.3	131	11.6	2.3				209	13.7	6.5	636	32.9
1330/1	44	6.6	3.3	87	12.9	3.2				131	4.5	2.2	262	50.0
1333/4	44	7.3	3.6	95	12.6	3.1				165	6.2	3.1	304	54.3
average	221	5.5	2.8	163	11.4	2.2	(29)	(8.1)	(4.1)	311	6.5	3.2	685	43.6

*: the high yields per acre of oats was due to the very high sowing rate: Harrison 1997, 291 source: Harrison 1997, table 4.25

The cultivation of beans during the medieval period is a sign of progressive agriculture, and the *c.*20% of demesne sown in areas such as Norfolk and Kent is usually seen as being very high (Campbell 1991; 1997, table 10.1; Campbell *et al.* 1993, 136, fig. 20). Clearly, the figures for Brent (43.6%) and Withy (100%) are extraordinarily high. It has traditionally been argued that the introduction of legumes into medieval agriculture was primarily as part of crop rotations in order to improve soil fertility (e.g. Brandon 1972, 418; Campbell 1988, fig. 1; 1991, 144-5; Currie 1988; Gross and Butcher 1995, 109; Postan 1966, 583; Titow 1969, 41). Contemporary writings certainly show that the potential for growing legumes for this purpose was recognised, and the acreages sown in parts of East Anglia and South East England were sufficient to imply that improving fertility was the prime objective (Farmer 1977, 564). In most cases, however, the far smaller areas that were devoted to legumes were used instead of fallow in order to produce a superior fodder crop. Comparison with the rest of medieval England suggests that the acreages sown with beans on the Somerset Levels represents a highly specialised form

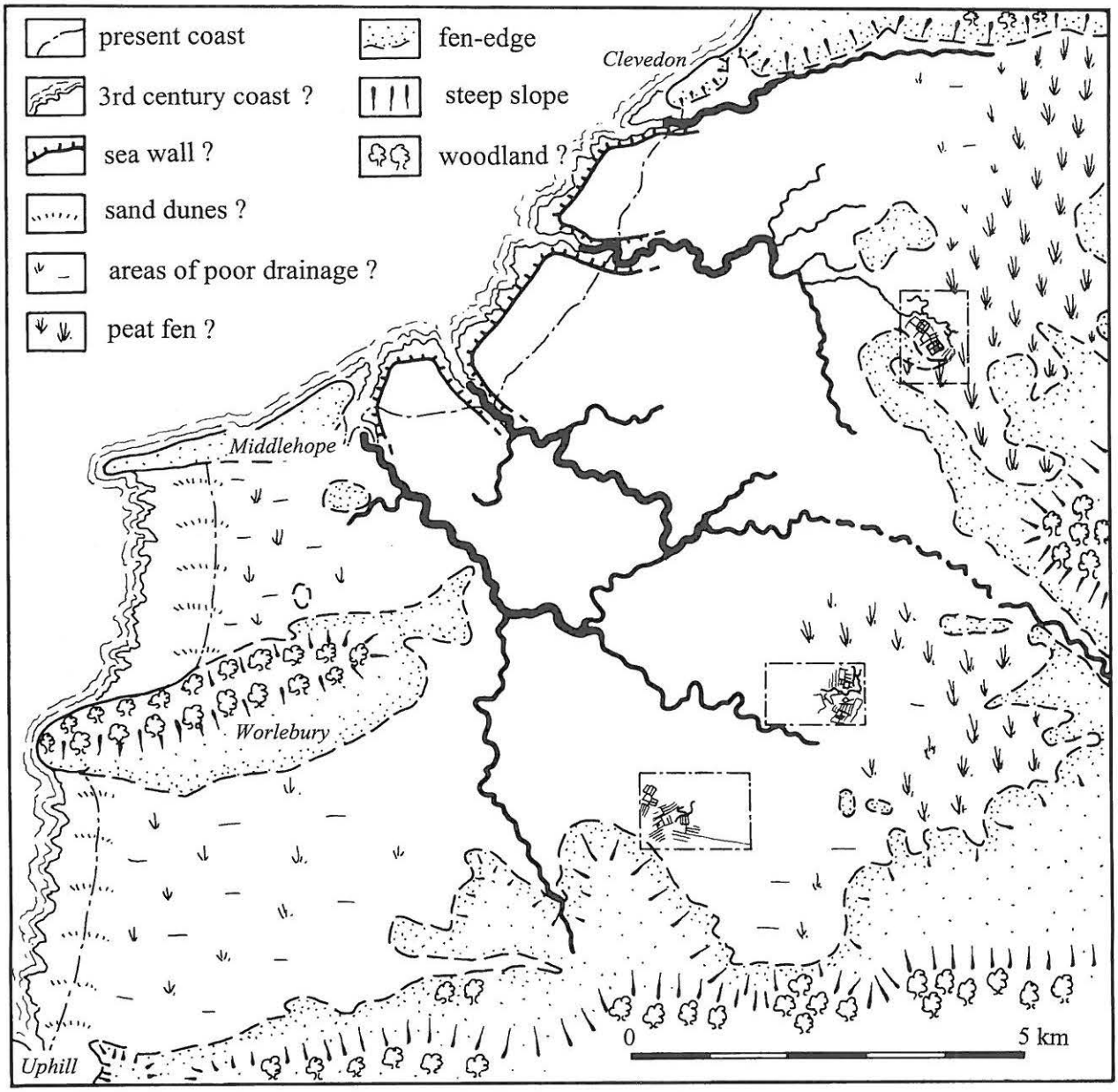


Figure 2: A tentative reconstruction of the North Somerset Levels during the Roman period (later 3rd century AD). Note that the position of the coastline is unknown, as by analogy with the Welsh side of the Estuary, it is likely to have been lost to later erosion (Allen and Rippon 1997; Nayling 1999). Overlying alluvium and the ravages of later agriculture mean that the detailed layout of individual settlements and their associated field systems is only known for three areas (inset: Banwell Moor, Kenn Moor and Puxton Dolmoors: see Rippon 2000b).

of agricultural production. Beans are an ideal crop for such environments since they prefer heavy soils and are relatively salt-tolerant (in the medieval period they were even cultivated on high intertidal marshes: Crowson *et al.* 2000; Insole 1999; Murphy 1993; 1994). The high percentage of ground put down to beans on the Somerset Levels could, therefore, reflect regular flooding, though the same account rolls show so little expenditure on drainage works, and had so few labour services devoted to main-taining flood defences, that the area can hardly have been regularly inundated. Rather than simply being a response to environmental conditions, it would appear that certain estate managers were making a positive decision to grow beans.

Beans are a protein-rich source of food for both humans and animals that can easily be stored dry or turned into bread/cake, and in a number of medieval accounts, it is specifically mentioned that beans were fed to pigs (see Rippon forthcoming). Glastonbury Abbey's bean-growing manors on the Somerset Levels certainly had large herds of pigs, the largest of all being located at Sowy (Keil 1964, 81, 125). However, the preferential growing of beans on certain manors may also have been associated with the raising of horses. Glastonbury Abbey's only stud farms in Somerset were located at Brent and Sowy (Keil 1964, 81), and a tradition of horse breeding may be evident in Domesday, for manors in the Brent Marsh area had a relatively high number of horses, including unbroken mares (Round 1906, 423). Of all Glastonbury's manors, the three largest herds of cattle were also located on the manors of Brent, Withy and Sowy which all contained extensive tracts of marshland, and practised extensive bean cultivation (Keil 1964, table 19). Added to fertile meadows and pastures it seems that medieval estate managers were making careful choices as to how they could most effectively utilise these distinctive environments. The perception of landlords such as Glastonbury was clearly that the high, particular pastoral, productivity of their Brent estate justified the costs and risks of reclamation.

Reconstructing past landscapes around the Severn Estuary

Understanding the patterns of agriculture in the reclaimed coastal wetlands is important, but what did these landscapes look like? A number of seminal studies have now been published that have attempted to reconstruct prehistoric landscapes, notably around the Glastonbury 'lake village' in Somerset (Coles and Minnitt 1995) and the Goldcliff settlement off the Caldicot Level (Bell *et al.* 2000). Several studies have also been made of the diverse Romano-British landscapes ranging from salt production in the Brue valley of Somerset (Rippon 1995; 1997a), agriculture on a high intertidal saltmarsh at Nash on the Caldicot Level (Meedens and Beasley forthcoming), the relatively localised enclosure and drainage within a reclaimed marsh on the North Somerset Levels (Figure 2: Rippon 2000b), through to the large-scale reclamation of the Wentlooge Level (Fulford *et al.* 1994). However, in all cases the windows of opportunity for exploring these landscapes were limited by the later deposits that almost invariably overlie them. If we really want to understand how human communities exploited, modified and eventually transformed these landscapes, we must focus on the most recent occasion when this occurred and which led to the creation of the present, or 'historic' landscape. The articulated landscape elements which need to be considered include:

- the natural environment (landform, drainage systems etc)
- settlements (where people lived and worked)
- agriculture, including fields (in which agriculture was practised) and other areas of landed resource (such as meadow and woodland)
- non-agricultural resources (raw material procurement and manufacturing)
- roads and other communication routes (which linked communities living in settlements with each other and with their resources)
- ritual foci (where religion and burial were practised)
- social structures (including kinship groups)
- territorial structures (economic and tenurial units within which all the above were articulated)
- demography (including the racial origins of the people who lived in this landscape)

Sources and methods in understanding the historic landscape

The key to understanding the historic landscape is the careful integration of a wide range of source material that relates to these various articulated components. The richest record of all is the very fabric of the historic landscape itself: the individual field boundaries, roads and settlements, and the patterns they form when mapped. Two techniques provide the key to unravelling these landscapes:

historic landscape characterisation and retrogressive analysis. A basic characterisation has now been achieved for all the Severn Estuary landscapes (Rippon 1997a, fig. 39), with more detailed studies of several areas (Musgrove 1997; Rippon 1996). Historic landscape characterisation is now being applied throughout the country (Dyson Bruce *et al.* 1999; Fairclough 1999), and can play an important part in the elucidation of how landscape evolves, but in itself is simply a morphological classification. For it to fulfil its true potential one must add time-depth, in which retrogressive analysis plays a vital part (Williamson 1987).

The process of retrogressive analysis is now well known. Starting with the most recent map of a particular area, one works back through a sequence of progressively earlier maps of the same area until the earliest is reached (which can be termed a base map). This reveals how landscapes evolve, such as the way in which farmers will gradually adjust a field boundary pattern following the superimposition of a feature such as a road or railway (or set-back sea wall: e.g. Rippon 1996, fig. 4). Even within the few hundred years for which we have good cartographic sources it may be possible to identify certain chronologically-distinct landscape forms, which can then be recognised in less well-documented areas. In this way, one can then deconstruct the base-map, identifying certain landscape forms that are later than others, allowing one gradually to move towards the earliest layout of that landscape. Recovering information from air photographs enables features to be restored to this early pattern, which have since been lost, while the integration of topographical references in early documentary sources can add further time-depth to these landscapes (Musgrove 1997). In addition to saying that a particular landscape feature existed by a particular time, field-names, for example, can give an indication of how the land was formerly managed, for example on common or enclosed fields (for an example see Cutt Furlong below). Morphology can similarly give clues to former landuse, such as strip-like fields that fossilize open-fields, and the funnel-shaped droveways that allowed the movement of livestock from settlements, through agricultural areas to common grazings. In the Gwent Levels, for example, both field- and place-names give clear evidence for the colonisation of certain places by English peasants in the 12th century, which hints that the area may have been subject to a similar process plantation to that which is well-documented in South West Wales (see below).

The natural landscape

Much of the work that has been carried out on the historic landscapes of the Severn wetlands has focused on the process of reclamation, drainage and enclosure that created the essential fabric of the historic landscape. This emphasis on cultural processes is quite justified, for these landscapes as they are today are almost wholly the creation of human communities. However, coastal wetlands are such dynamic environments that it is all to easy to forget that, whilst presenting a series of possibilities, human activity was at times also heavily constrained by nature: we need to achieve a far greater understanding of what the natural landscape looked like, and how it evolved.

On the ground, the various wetlands that fringe the Severn Estuary can appear as flat and featureless, but there are a number of important elements of the natural environment that have come to shape the cultural landscape notably relief, watercourses and coastal barriers. The least obvious is relief: none of the Severn Levels are in fact flat and more frequent inundation and hence sediment deposition leads to those areas closest to the coast and major tidal rivers being the most elevated. It was these areas that were settled first when human communities came to colonise the marshes (Figure 4). The dominance of fine sediment within the Severn Estuary, however, means that there are no sand-filled relict creek banks (roddens) as are found in Fenland.

Coastal marshes are also crossed by two types of watercourse: rivers and streams flowing off the adjacent uplands to the coast, and a network of creeks which drain these marshes of tidal waters. This natural patterns of watercourses that traversed the intertidal area came to be incorporated within the post-reclamation historic landscape. Once tidal inundation had ceased the network of tidal creeks no longer had a function, and many appear to have been used as field-boundaries in the newly enclosed post-reclamation landscape. The major rivers flowing off the uplands remained active and having been embanked provided important means of communi-cation between the coast and inland. The larger rivers often supported important port towns such as Bridgwater on the Parrett, Bristol on the Avon, Newport on the Usk, and Cardiff on the Taff. Even the lesser tidal inlets supported small ports and landing places such as Rooksbridge on the Axe (Russett 1991, 62-4) and 'Abergwaitha' on Magor Pill (Allen and Rippon 1997). These rivers could also be used to power watermills, as at Rooksbridge on

the Axe (Holt 1987; Naish 1968) and Kingston Seymour in North Somerset (Gardner and Rippon 1997), while a canalised upland stream powered the mill at 'Abergwaitha' (Calendar of Charter Rolls III, 88-89; Rippon 1996, 79). Clearly, these tidal inlets, particularly where they crossed the higher, coastal parts of the Levels, were important long-term foci for human activity and the mapping of buried palaeochannels is an important challenge for the future (see Locock, this volume).

The least understood elements of the natural environment are the belts of sand dunes that protect much of the Somerset coast. These dunes must have played a critical role in the evolution of the Somerset Levels. They would have provided very effective protection from tidal flooding and as such could have aided or encouraged reclamation, although a continuous natural coastal barrier also disrupts the discharge of freshwater. The breaching of a belt of sand dunes may, therefore, increase the risk of occasional tidal flooding whilst reducing the risk of regular freshwater inundation.

Despite the potential significance of these dunes for the evolution of the Somerset Levels, very little work has been carried out into their origins and development; Kidson and Heyworth (1976, fig 12) even omit the dunes from their palaeogeographical reconstructions of the Somerset Levels. The belt of dunes south of Worlebury certainly existed by the Roman period, as several occupation layers of that date have been recorded stratified within the dunes at Weston-super-Mare (Rippon 1997a, 35). The excavations at Brean Down established that the dunes there started to accumulate during the early 2nd millennium BP (Bell 1990). The occurrence of intercalated freshwater peats and estuarine clays in the present intertidal zone might suggest that the dunes have periodically migrated out into the estuary, though in the Roman period at least, intertidal marshes appear to have built up on the seaward side of the dunes (Allen and Ritchie in press; Bell 1990, 258; Druce 1998). During the medieval period, the presence of dunes further south can be inferred by the place-name Berrow, first recorded in AD 973 and meaning 'place at the hills' (presumably referring to the dunes: Costen 1992, 114; Mills 1991, 32). The earliest reference to dunes at Burnham is in AD 1301 (Nash n.d., 21), and the furthest south that the sand appears to have extended is the Lighthouse Inn in Burnham (Rippon 1995, 103). Although there

Figure 3: Berrow church and the coast sand dunes of the central Somerset Levels, looking north towards Brean Down (top). This 13th century church, and its associated settlement was consumed by drifting sand, probably in the late medieval period.

is now a continuous barrier between Brean and Burnham, this cannot always have been the case as at least one major river – referred to in a Saxon Charter as the *Siger* in AD 693 – is now blocked by the dunes, though when this occurred is unclear (Rippon 1995, fig. 2). The migration of the dunes during the late medieval period is indicated by the partial burial of the medieval settlement at Berrow, and probably reflects the increased storminess known to have occurred at this time (Figure 3: Nash n.d., 21; and see Nash 1972/3; Rippon 1995; 1997, 242-5; Toft 1988).

Case-study: a new landscape reconstruction of the Caldicot Level

The maps created through historic landscape characterisation are very general, and do not show what a particular landscape looked like at any one particular time in the past. However, when combined with the techniques of retrogressive analysis and documentary research, it is possible to produce speculative maps of different periods. Whilst these maps are in themselves useful, the very process of their creation is in itself a valuable exercise in that it raises problems that require further research. In the following case-study I return to the Caldicot Level, which has seen the most detailed historic landscape analysis of all the Severn Estuary Levels, including a characterisation (Rippon 1996, figs 16-20), hypothetical models of how the landscape could have evolved (Rippon 1996, figs 4 and 25), and outline maps suggesting how the landscape may actually have developed (Rippon 1996a, figs 23, 33 and 34). Since then, little further work has been carried out apart from an analysis of the area around Magor Pill (Allen and Rippon 1997) and small-scale excavations at Broadstreet Common (unpublished) and Redwick (Yates 2000). However, work on analogous wetlands around the Estuary, and indeed more widely, has provided new information, notably through further theoretical modelling on how reclamation proceeded (Rippon 1997a fig. 7; 2000a), and detailed fieldwork on one of the primary settlement foci ('infields') at Puxton on the North Somerset Levels (Rippon 1997b; 1998; 1999).

Figure 4 is a new attempt to reconstruct in general terms how the historic landscape of the Caldicot Level may have evolved. It is not just an indication of how our understanding of this specific landscape emerged, but also a reflection of how the author's thinking has changed. There is, perhaps, a tendency to see ideas, once published, as cast in stone: in fact, the publication of research should often be the starting point for achieving something better. Therefore Figure 4 is very much a working model, and much of the detail is speculative and based on evidence already published. However, it raises a number of importance issues with regards to how far our understanding of this and similar landscapes has come. What follows is a brief commentary on some of the key issues that preparing these maps raised, with particular reference to the range of evidence used, and some of the major unresolved issues.

Figure 4.1: the early medieval period

Recent archaeological observations have confirmed that an extensive phase of post-Roman flooding affected much if not all of the Caldicot Level (Rippon 1996, 35; and see Locock 1997; Locock and Walker 1998; Meddens and Beasley forthcoming; Rippon 2000b). Palaeoenvironmental and sedimentological studies indicate that the Romano-British landscape was buried under saltmarshes and mudflats. The position of the early medieval coastline is not known but Allen and Rippon (1997, 356) have established that at the end of the Roman period it was not less than 0.8 km further out into the Estuary than the present sea wall.

The Caldicot Level is not crossed by any major rivers, though a number of streams flow off the adjacent uplands (Rippon 1996, fig. 3B). Their pre-reclamation courses across the Levels are in most cases unclear, but they have a high archaeological potential and their mapping must be a high priority.

Figure 4.2: turn of the millennium?

There is no evidence within the historic landscape to suggest that the Caldicot Level was ever enclosed by more than a single sea wall (ie there are no embankments rooted on the fen-edge that extend to the coast, other than along the Usk and Collister Pill: Rippon 1996, 68, fig. 25). Based upon this observation, it was previously assumed that the sequence of reclamation was as follows: the entire area of marsh was embanked, and then small areas were enclosed in the form of 'infields', and that as more land was required, enclosure and drainage expanded from these initial foci. Analogy with the continent, however, suggests a potentially different sequence. Experiments have shown that it is possible to grow certain crops on a high intertidal marsh, though the seedlings in particular are vulnerable to freak summer storms. The solution of marshland communities in the Netherlands and Germany was to enclose small areas of marsh with a low

embankment – or 'summer dike' – that was designed simply to protect these crops during the growing season, rather than provide year-round protection: the landscape was being modified but not transformed (Bazelmans *et al.* 1999; Rippon 2000a). It was only later that permanent protection was provided through the construction of a more substantial sea wall along the coast.

For the Caldicot Level it can now be suggested that the earliest features in the historic landscape was not a continuous sea wall along the coast, but a series of roughly oval-shaped enclosures which have been termed 'infields' (Rippon 1996, 42-5, 72-3). This hypothesis must be tested through fieldwork, and work on the North Somerset Levels at Puxton has established that one of these 'infields' was indeed an area of agricultural land, protected by a low embankment, and associated with an adjacent settlement (Rippon 1997b; 1998; 1999). That these enclosures appear to represent individual attempts to improve the agricultural productivity of quite small areas of marsh, suggests that this initial phase of colonisation was a piecemeal affair, undertaken by individual farmers who invested limited resources, in what remained a risky environment.

On the Caldicot Level, in addition to those 'infields' identified in 1996, further possible examples may now be recognised at Burnt House and Farmfield in Nash, and to the south of Whitson church. It is not known whether any others existed closer to the coast which have been lost to later erosion.

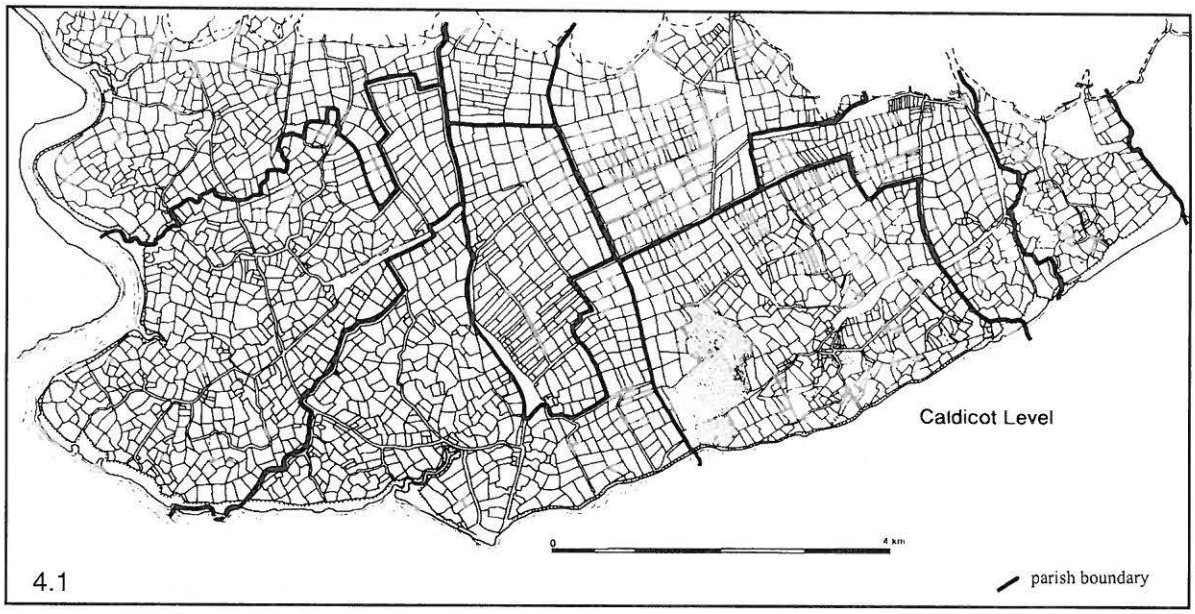
Figure 4.3: early 12th century?

The date when a sea wall was first built along the coast is unclear. The foundation grant of Goldcliff Priory in *c.*1113 refers to a church at Goldcliff and a chapel at Nash, and since it is highly unlikely that such structures would be constructed on an intertidal saltmarsh, it can be assumed that the Caldicot Level had been embanked by that time. This must have been a major undertaking – an enterprise far greater than the creation of the 'infield' enclosures – which suggests the work of a powerful individual lord, or considerable co-operation between many communities. The construction of a coastal sea wall is, however, relatively cost effective as the length of embankment per area protected from flooding was very favourable. This act, along with the foundation of Goldcliff Priory, may represent part of a policy of investment and estate improvement on the part of the new Anglo-Norman Marcher lords, that elsewhere in south Wales is reflected in the creation of a landscape dominated by English-style nucleated villages and open fields (Rippon 1996, 61-8; Davies 1987; Sylvester 1969). In contrast, the area east of Collister Pill (Caldicot Moor) was left as an intertidal marsh, and used as a common pasture by a series of fen-edge communities, which reflects the different policies towards landscape management adopted by these lords and their tenants (Rippon 2000a). Whether there was a conscious decision to 'reserve' this area for its natural resources, or the lack of enclosure was simply the result of communal inertia is unclear, though the latter would appear more likely as there is no evidence that Caldicot Moor was used for anything other than grazing.

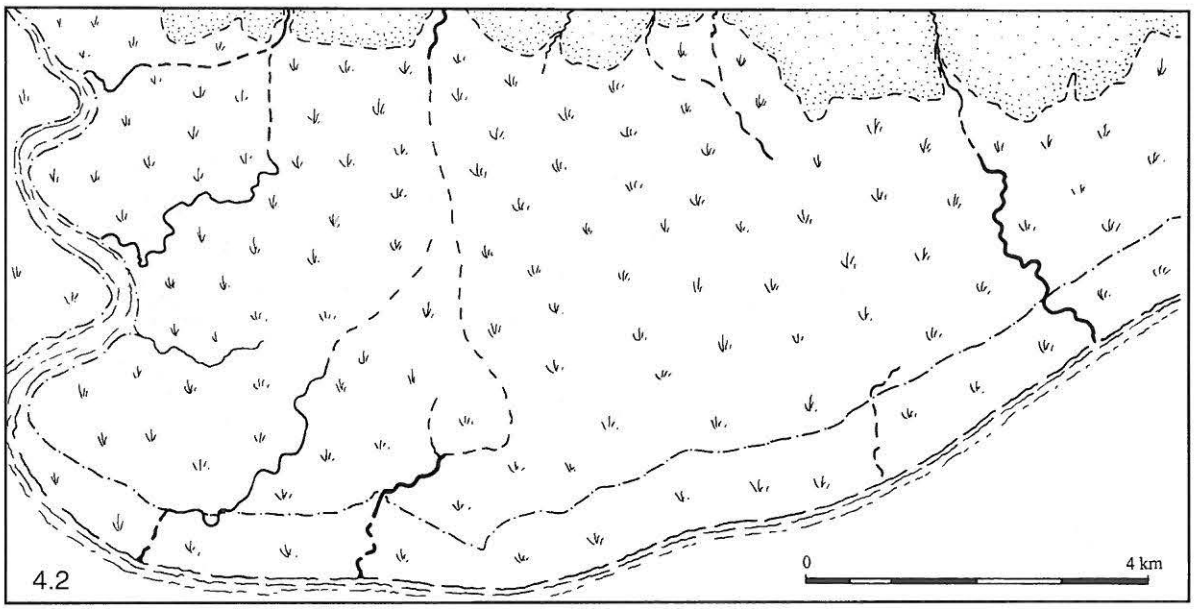
Having protected the area of former saltmarsh from tidal inundation, the threat of freshwater flooding had to be addressed by embanking the larger streams that flowed off the adjacent uplands (Monksditch and Mill Reen). A third major artificial watercourse (now called Elver Pill Reen, but formerly Earls Reen) is something of an enigma. It carries the upland stream known as the Llan Allen Winter Sewer, whose small catchment, and the name itself, suggests may have been largely seasonal. On this basis, such a major artificial watercourse would appear to have been unnecessary, although the stream's significance as a landscape feature is reflected in its inclusion as an estate boundary in the 8th-century charter of Bishton (Evans 1893, 373-4). It may be no coincidence that it also marks a pronounced division within the historic landscape between Redwick and the parishes to the east, with their largely nucleated settlement and mostly common fields, and Goldcliff, Nash and Christchurch to the west which had a more dispersed settlement patter and mostly enclosed fields.

Over time, the landscape started to evolve around the primary 'infields'. Settlement would have expanded, and in a number of instances, 'lobe-shaped' enclosures adjacent to the infields would appear to represent the second stage of agricultural expansion (one such example has recently been surveyed at Puxton on the North Somerset Levels). In a number of cases, notably in Redwick and Undy, these areas were still common fields in the 19th century, and their field-names, strip-based morphology, and documentary references in other cases also suggests that these secondary enclosures were once open fields. The degree to which land was held in severalty at this time, and the extent to which these field systems extended towards the coast is unclear.

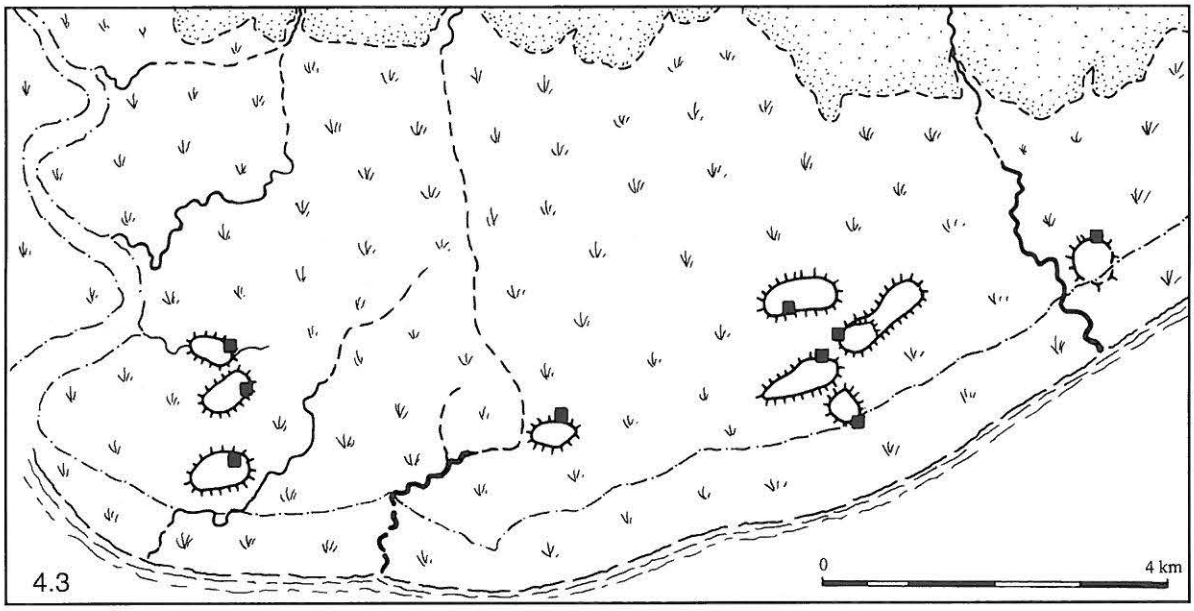
These early settlement foci also came to be linked through a network of droveways. There



4.1



4.2



4.3

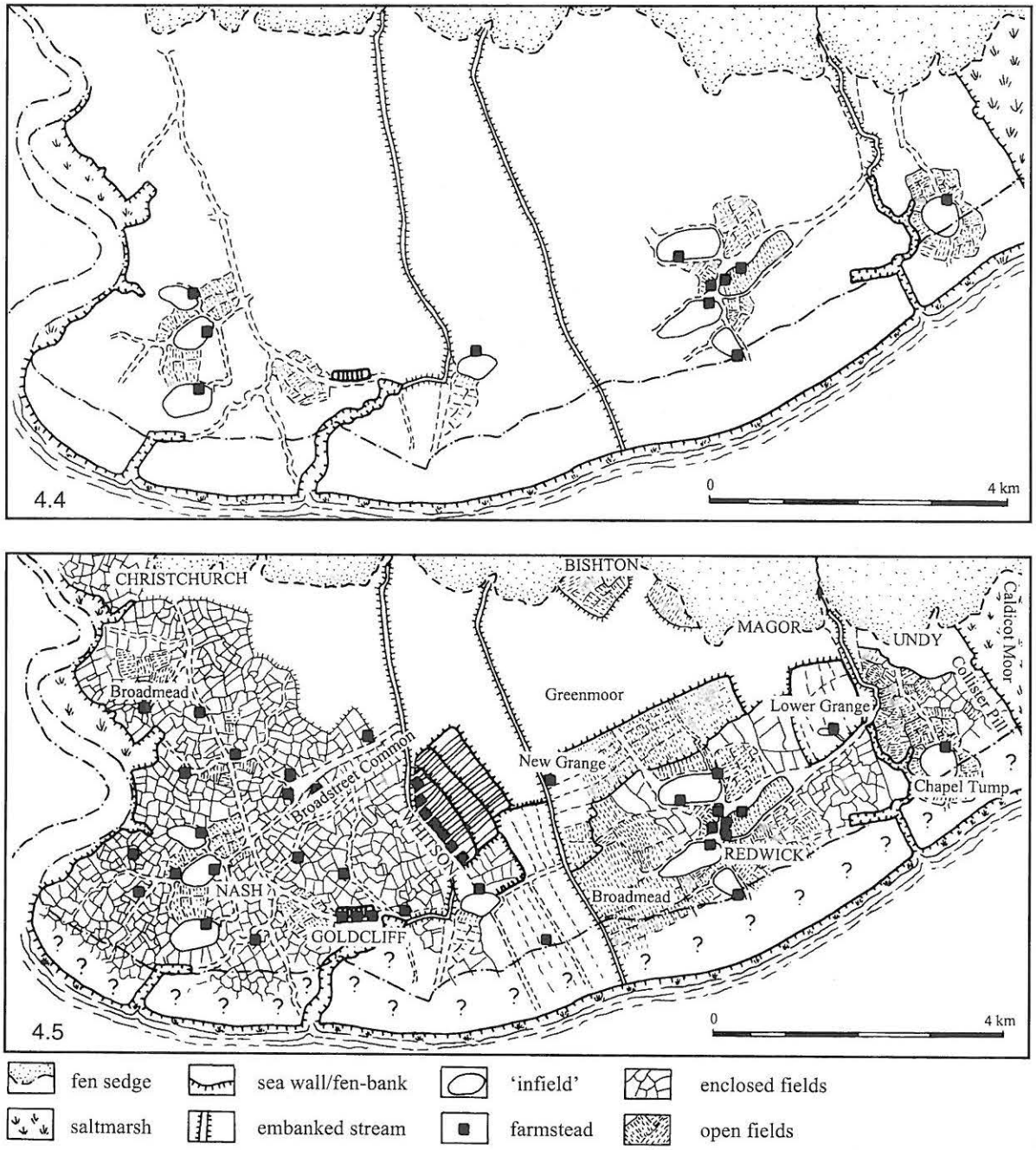


Figure 4: The Caldicot Level in 1831 (based on the Commissioners of Sewers maps: Gwent Records Office D.1365/2: see Turner et al. this volume figure 3), and a model for the development of the Caldicot Level during the medieval period.

appears to have been two primary axes of communication, one leading from Liswerry on the fen-edge down to Nash and Goldcliff, and the other leading from Magor to Redwick.

Figure 4.4: colonisation of the coastal zone

As the higher coastal areas were gradually enclosed, areas of common pasture came to be restricted to the backfens. In order to link the coastal settlements with this valuable resource, a series of funnel-shaped droveways extended through the enclosed lands to the backfens, which themselves eventually became foci for settlement. This is most noticeable along Whitson Common and Broadstreet Common in Nash (see Figure 4.5).

Three very contrasting landscapes emerged. In *Undy*, the only marshland settlement appears to have been at Chapel Tump (the medieval character of which is ill-understood), and otherwise that part of the parish that lay on the Levels appears to have been exploited by the community living on the fen-edge. Field-names and morphology suggest that the

drained land appears to have been arranged in mostly common fields. The same applied in *Magor* (until the monastic grange at Lower Grange was founded: see below). *Redwick* (see Turner et al. this volume, fig. 3), by contrast, was a wholly marshland community and it can be hypothesized that the present village is of polyfocal origin, emerging through the gradual coalescence of the earlier foci adjacent to the 'infields' (Taylor 1983, 131-3). This model could be tested through limited fieldwork as is occurring at Puxton on the North Somerset Levels, where an expansion of the settlement from its early 'infield'-edge location into the surrounding areas has been detected through test-pitting and gardens surveys. Once again, much of the agricultural land appears to have been arranged in common fields. As the drained land extended further into the backfen, the risk of freshwater flooding increased, leading to theconstruction of a fen-bank along Mere Reen ('Mere' means 'boundary: Field 1993, 64).

In contrast to Redwick, the settlement pattern in *Nash* and *Goldcliff* was largely dispersed. Some degree of English colonisation is suggested by the predominance of '-ton' place-names, though there are also a number of Welsh place- and field-names. Apart from the common meadow at Broadmead in Christchurch, documentary evidence supports the impression gained from the historic landscape that this was an area without extensive common fields. There is little evidence for fen-banks at this period, similarly suggesting less communal regulation of this landscape. It is possible that there were some intakes in the backfen by fen-edge communities in Wilcrick and Bishton at this time (Rippon 1996, 75-7).

Figure 4.5: expansion into the backfen

In Redwick, an area of former common backfen pasture beyond the Mere Reen fen-bank was enclosed by the Green Moor Wall. The survival of unenclosed strips into the 19th century, and documented field-names (e.g. Cutt Furlong: 'cutt' refers to a parcel of land in a shared meadow: Field 1993, 23), suggest that the newly reclaimed land became common fields (Rippon 1996, 74-5). The western part of this newly reclaimed area was occupied by Tintern Abbey's 'New Grange' (now Grangefield Farm: Rippon 1996, 80-81), and in Magor, a large tract of the backfen was similarly enclosed and drained during the 13th century by the monks of Tintern through the creation of their Lower Grange.

Another discrete episode of backfen colonisation is represented by the village at Whitson

Figure 5: Redwick, from the east. The polyfocal village lies at the centre of an area of former open fields (and see Turner et al. this volume, fig. 3).

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Stephen Rippon
University of Exeter
Department of Archaeology
School of Geography and Archaeology
Laver Building
North Park Road
Exeter
EX4 4QE