From the *Transactions* of the
Bristol and Gloucestershire Archaeological Society

The Landscape Archaeology of the Lydney Level, Gloucestershire: natural and human transformations over the last two millennia

by J. R. L. Allen

© The Society and the Author(s)
The Landscape Archaeology of the Lydney Level, Gloucestershire: natural and human transformations over the last two millennia

By J.R.L. ALLEN

Introduction

The Lydney Level (c. 720 ha) is one of the lesser of the detached outcrops (Fig. 1a) of Holocene estuarine alluvium (c. 8 km²) underlying the Severn Estuary Levels (c. 840 km²) on the margins of the inner Bristol Channel and Severn Estuary in south-west Britain (Allen 2000a, 2001). These levels arose because the post-glacial sea-level rise of many metres allowed silt to accumulate to a thickness limited only by the altitude of the highest astronomical tides. Deposition occurred on extensive coastal marshes, becoming the sites from time to time of peat accumulation when the rise of tidal levels halted or was reversed. The rich resources of these marshes were exploited by prehistoric peoples (e.g. Bell et al. 2000), but it was not until Roman times that they were affected by land-claim (Allen 1997a; Rippon 1997), the process of embanking, draining and, very commonly, permanently settling a coastal wetland.

The process of exploitation on the Lydney Level was not only long but also episodic and hesitant, affording a model for landscape development in other, similar parts of the Severn Estuary Levels. Whereas some natural changes over the last two millennia provided fresh opportunities for human exploitation of the level, others partly destroyed and reversed attempts by people to control and profit from the environment. This paper aims to describe the chief physical evidence—geological and archaeological—for natural and human alterations to the landscape of the level, and to integrate that evidence, over the later part of the period examined, with important written sources (Smith 1972; Herbert 1996a, b). These complementary clues tellingly reveal the development of an estuarine wetland where man has proposed but nature, disastrously and often, continues to dispose. At the time of writing, part of the coast of the level is being eroded back at a rate of about one metre each month, and is the subject of further setback schemes.

Methodology

Landscape elements were mapped, and any arable field-walked, on a field-by-field basis using the 1879–80 Ordnance Survey map (6″, Glos. XLVII.SW.), 1945–6 air photographs of the Royal Air Force (3006–8, 4107–11, 7062–3) and the 1969 Ordnance Survey air photographs (058/016–7, 023–5). Reference was also made to historical maps dating from 1682. These and other assembled data are illustrated in the figures which follow on a base map showing the coast largely as it appeared in 1945–6 at its maximum recent extent.
Fig. 1. The Lydney Level: (a) setting; (b) natural features, main settlements, communications, sites of stratigraphic sections; (c) details of stratigraphic sections.
The landscape features and field monuments (Allen 1993, 1997a) chiefly mapped were (a) ridge-and-furrow, (b) seaward-facing clifflets or ramps indicating abandoned shorelines, (c) functioning seabanks, (d) redundant seabanks surviving as upstanding monuments, (e) redundant seabanks surviving only as landward-facing ramps, (f) drains and ditches, and (g) stanks (water-table controls) and outfalls. Because tidal levels have continued to rise in the Severn Estuary, an embanked salt marsh will be lower in altitude than the surface immediately outside it, which survived as an active marsh and continued to accrete tidally. Accordingly, wherever practicable, levellings were taken across selected seabanks or ramps, in order to confirm their presence and obtain a relative age (Allen and Fulford 1990a; Allen 1991).

Soil samples were collected and their colour estimated from 288 locations at a depth of about 0.15 m. The grain-size distributions of a representative 114 (40%) of the samples were measured using a Coulter LS130 laser granulometer. As dispersed for analysis, all the samples included sub-populations of particles with modal sizes at c. 5 µm (fine silt), c. 20 µm (coarse silt) and in the range of very coarse silt to very fine sand range (31–125 µm). Minor modes in coarser sand grades occurred in many samples. The results appear graphically in terms of clay (<2 µm)-silt (2–63 µm)-sand (>63 µm) triangular graphs (Fig. 2b–i). In these features, the soils, derived from estuarine muds, resemble estuarine deposits recorded elsewhere on the Severn Estuary Levels (Allen and Rippon 1997a).

Providing vital clues to the dating of events on the level, stratigraphic sections in the alluvium were measured at 23 places on the coast as it was at the time of the survey. At four sites the alluvial sequence was analysed geochemically (x-ray fluorescence) for anthropogenic heavy-metal contaminants (Zn, Pb, Cu) which provide a well-tested, further indication of age (Allen and Rae 1987; Allen 1987a, 1988; French 1996). For example, elevated levels of these metals begin to appear about 1840–50 reaching peaks up to several times above background values in the middle decades of the 20th century.

Geology, Watercourses and Communications

(a) Geology and soils
The largely estuarine Holocene alluvium beneath the Lydney Level (British Geological Survey, sheets 233, 250; Welch and Trotter 1961) occupies a shallow embayment on the south-eastern flank of the Forest of Dean (Fig. 1b). To the north-east the outcrop is bounded by cliffs of Old Red Sandstone and, to the south-west, by the low promontory ending in Guscar Rocks. The alluvium, as exposed on the bold coastal cliffs, compares with the widely recognised Upper Rumney Formation (17th-century inception) and Lower Rumney Formation (medieval inception), in erosively related parts, succeeded by the Awre Formation (late 19th-century inception) (Allen and Rae 1987; Allen 1997b). In the interior the Wentlooge Formation (Allen and Rae 1987) is probably present, judging from the distribution of grey-green soils and a borehole record figured by Lucy (1877) from near the inner basin of Lydney Harbour, probably on or close to one of the railway lines. The latter shows 2.1 m of gravel and sand over rock, succeeded by 1.4 m of peat overlain by 5.5 m of shelly ‘blue clay’ and soil. Inland, the ground rises steeply to c. 200 m over chiefly Old Red Sandstone and then Carboniferous beds. Pleistocene fluvial terrace gravel and alluvial-fan deposits form small outcrops on the lower and middle slopes. Centrally placed in the level lies a low ‘island’ of terrace gravel.

Figure 1c summarises the 23 stratigraphic sections and Fig. 10b the four geochemical profiles measured from the Holocene alluvium. Only the uppermost beds are accessible behind the armourstone defending the long cliff between Lydney Harbour and Warth Brook. Yielding normal background levels of Zn, Pb and Cu, pale brown silts attributable to the Upper Rumney
Fig. 2. Soils of the Lydney Level: (a) colour. Textural trend in (b) areas of red soil, and within enclosures formed by (c) seabank I, (d) seabank II west of Cone Pill, (e) seabank II between Cone Pill and Stockwell Brook, (f) seabank II north-east of Stockwell Brook, (g) seabank III, (h) seabank V, and (i) active saltmarshes.
Formation (Allen and Rae 1987; Allen 1987, 1988, 1997b) are widely present, but are mainly succeeded with a depositional break related to engineering work by the metal-contaminated grey silts (with broken stone and other debris) of the Awre Formation (Allen and Rae 1987; Allen 1988; French 1996). Locally, however, the brown and grey deposits appear to merge (sections D, G, H and I; profile A), suggesting the unbroken deposition of the Rumney Formation. Lydney Pill (section F), silted-up with the Awre Formation, is at one place cut by the coast. Tall cliff exposures in the metal-contaminated, brownish grey to grey silts of the Awre Formation occur from the near the site of Warth Brook to the mouth of Aylburton Pill II (sections J–M; profile B). The millimetre-scale clay and silt laminae present through much of the sequence at section M (only partly shown) group into complex, probably annual, centimetre-scale bands (Tessier 1998), suggesting exceptionally rapid deposition. The Awre Formation is further exposed along Aylburton Pill II, erosively following pale brown silts assigned to the Rumney Formation (sections N, O). Near Cone Pill the coastal stratigraphy is very variable from place to place. Sections P, Q, S, U and V and profile C expose only the Rumney Formation. The Lower Rumney Formation consists of pale brown silts capped by a laterally extensive horizon of deep, silt-filled desiccation cracks, the walls of these fractures and the eroded, dried surface of the deposit having been post-depositionally hardened with microcrystalline siderite during a substantial hiatus. Pale brown grading to grey silts constitute the overlying Upper Rumney beds. In sections R, T and W, and in profile D, the Awre Formation rests erosively on probably the Lower Rumney Formation. The silts at R infill Aylburton Pill I, the erosive, bouldery base of the deposit lying several metres below the marsh.

The colour of the alluvial soils on the Lydney Level (Fig. 2a) depends especially on the time elapsed since the deposition of the parent material (Allen 1986a; Allen and Rae 1987). Broadly, those incorporating grey-green silt with orange mottles are likely to date back over roughly more than 1000 years. Pale brown soils are likely to be more than 150 years but less than c. 1000 years old. The grey soils date from less than c. 150 years ago. In the reddish brown to dark red soils tidal mud is mixed with sediment introduced by streams and hillwash from the adjoining Old Red Sandstone outcrop, and are likely to be wide-ranging in age. These soils (av. mean size 36.3 µm) cluster on a distinctive steep trend across the clay-silt-sand diagram (Fig. 2b).

The broad pattern of soil colour-zones (Fig. 2a) suggests that the parent estuarine silts become progressively younger outward across the level. Grey-green soils, mainly confined to roughly the inner half, are surrounded outward by pale brown and brownish grey soils, giving way chiefly near the coast to grey soils. There is a generally good correlation, as in Lydney Marsh and the New Grounds, between soil colour and the alluvial formation that is otherwise expected to lie beneath. The red soils are found chiefly around the Cone, Ferneyley, Stockwell and Plummer’s brooks where they debouch on to the level. A few of their now inactive branches or distributaries are evident on the ground as narrow, sinuous bands of red coloured soil, but are not separately shown on the map.

**(b) Watercourses**

Watercourses both natural and artificial pervade the Lydney Level but, after centuries of landscape modification, including many deliberate changes to the drainage, the different kinds are not always distinguishable. As on the embanked Wentlooge and Caldicot Levels of the outer Severn Estuary (Allen and Fulford 1986; Rippon 1996), some of the natural creeks, probably the larger, survive in the modern agricultural landscape as irregular to meandering drainage or field ditches. There is little in this landscape to prevent artificial ditches or drains from being cut straight.
The chief freshwater streams entering the level (Fig. 1b) are the Cone Brook, the Ferneyley (or Colliers, Sandfords or Woodwards) Brook, the Stockwell (or Park) Brook, Cannop Brook (the Lyd or Newerne Stream) and Plummer’s (Woodfield or Nass) Brook. Judging from the distribution of red soils (Fig. 2a), Cone Brook could originally have run straight across the level for a few hundred metres before turning south-eastward at a relict creek (Fig. 1b) and eventually flowing into Cone (or Corn, Colne) Pill by way of the hitherto un-named watercourse here for convenience called Alvington Pill. The drainage ditches which denoted the old parish boundary between Alvington and Lydney (Herbert 1996a) may mark the first part of this course. Hence the comparatively straight south-eastward channel below the abrupt right-angled bend at Mickla Bridge may be either artificial or the result of the capture of one watercourse by another. The large meander at the confluence with Alvington Pill—perhaps originally the most downstream of the bends on Alvington Pill—was cut off some time between 1945 and 1969, judging from air photographs. The Ferneyley and Stockwell Brooks, together with an un-named but locally tortuous and clearly natural drainage line to the east, join toward the coast to form Warth Brook, the site of Herbert’s (1996a, 1996b) Wose Pill in the late 13th century, presumably Hart’s (1971, fig. 2) port called La Werne (apparently a misreading of la Wose), before draining south-westward into Aylburton Pill I and II. Wose Pill was a minor port, at which dues were at times collected, from the 13th until the 16th century (Herbert 1999b), but it has no known archaeological record. As on the Caldicot Level (Rippon 1996), the Ferneyley Brook and a number of the other watercourses are partly canalised and raised above their surroundings where they cross the alluvium. The present Stockwell Brook may also be partly artificial, for it pursues a curious course across the embayment at Aylburton and along the foot of the slope before striking out over the level. Possibly the un-named watercourse that skirts the gravel island originally carried the flow.

Alvington Pill also has a complex history of development (Fig. 1b). Upstream from the confluence with Cone Pill this relict feature records a mature, tidal watercourse with well-developed meanders of north-eastward declining wavelength. North-east of Mare Ley, however, across the line of the present Warth Brook, there is a similar watercourse of identical alignment. This watercourse, receiving from the north-west the un-named drainage that skirts the gravel island, also has well-developed meanders, which continue the decline in wavelength observed from the watercourse to the south-west. Hence the Ferneyley, Stockwell and un-named streams could all have once fed Alvington Pill and Cone Pill, the present direct course of Warth Brook toward the coast resulting from either capture, natural breaching or human diversion. The two parts of Alvington Pill, amounting to a creek 1.5 km or more long, follow a gently curving line broadly parallel with but concave to the estuary.

The largest stream in the area is Cannop Brook (Fig. 1b), which since 1813 has drained to the coast through the various basins of Lydney Harbour (Green 1997). Previously, the brook became tidal, taking the name Lydney Pill, just north-west of the present Lydney railway station, and the pill continued from there to the coast by courses that changed over time, the most recent surviving as a conspicuous relict feature on the New Grounds. The main north-eastern tributary of Lydney Pill is Cross Pill, the tidal lower reaches of Plummer’s Brook. An un-named but tortuous and probably natural watercourse enters Lydney Pill from the west roughly opposite Cross Pill. This watercourse heads inland toward the Romano-British Park Farm ‘villa’, just outside the alluvial outcrop, a complex of buildings excavated by C. Scott-Garrett (Hart 1967; Fitchett 1986). Field-walking on this site during the present survey yielded Old Red Sandstone and Jurassic oolite building stone, ceramic roof tiles, iron ore (goethite), abundant tap slag and other iron-making slags, and large lumps of iron (blooms/billets). The pottery is of the 2nd to the mid 4th century, including much Oxfordshire and late South-east Dorset wares.
The lower Cannop Brook (Fig. 1b) was much affected by post-medieval industrial and commercial activities (Hart 1971; Herbert 1996b). A canal known as the Cut, drawing some water from Cannop Brook, was dug between 1778 and 1790 by an ironmaster operating at the head of Lydney Pill, and this canal is now linked to the harbour. Over the centuries, Lydney Pill followed lengthy courses which took it to a mouth far to the south-west on the shores of the level. A rigorously straight and supposedly lesser, but perhaps partly or wholly artificial, channel known as the Eastern Way for a time offered a shorter route in and out of Lydney Pill (Fig. 1b). Still a recognisable feature on the ground, the Eastern Way appeared in a map of 1682 (Glos. R.O., D 421/L 8), at which time the longer branch of Lydney Pill had been bridged in at least two places, and apparently survived at least until the time of Isaac Taylor (Map of Gloucestershire, 1777). By 1830 it was silted up, appearing only as a blind-ended gut in the Ordnance Survey map of that date (1″, sheet XXXV). In this map Lydney Pill follows essentially the modern course. Isaac Taylor’s map is not planimetrically accurate, but it also seems to show Lydney Pill, called the Gut, on this course.

(c) Communications

Several lanes and tracks—Church Lane, Mead Lane, Stockwell Lane and its branches, Mare Ley Lane, Kerrin Lane and branch, and Plusterwine Lane—connect the Lydney Level with the main coast road and the settlements to the north-west (Fig. 1b).

The head of Lydney Pill, with shipyards and wharfage near the parish church, was accessible since at least the late 13th century on a route on the line of today’s Church Lane (Harris 1945; Herbert 1996b; Green 1997). A survey in the final quarter of the 18th century found four vessels—a trow and three sloops—associated with Lydney Pill (Gloucester Library, Box 8.57). Church Lane probably also served East Marsh. Mead Lane, depicted in 1830 (O.S. Map 1″, sheet XXXV), linked Lydney Mead and Lydney Marsh with the main road at Aylburton. Stockwell Lane followed the brook of that name across the level to Mare Ley. It is first recorded at the start of the 17th century (Herbert 1996a, b) and is shown, together with a branch south-westward to Alvington Court (manorial site), and a shorter one to the gravel ‘island’, in 1830 (O.S. Map 1″, sheet XXXV). Mare Ley Lane was fully present by the mid 16th century (Herbert 1996a), but the section below Alvington Court appears much the younger (see below). Kerrin Lane linked the main road with Cone Brook, which it crossed at Mickla Bridge, recorded as a footbridge in 1681 (Smith 1972) and again in 1830 (O.S. Map 1″, sheet XXXV).

Plusterwine Lane was significant in the economic life of the Lydney Level, but not to the extent of Church Lane. Connecting the main road with the alluvial outcrop on the right bank of Cone Pill, it appears on maps of 1769 (Glos. R.O., D 2700), 1815 (ibid. Q/RI 144) and 1830 (O.S. Map 1″, sheet XXXV). A sloop was built at Cone Pill in 1794 (Farr 1954) and a naval frigate is said to have been launched there in 1646 (Scott-Garrett 1938). Rights of access, landing and loading were being exercised in 1708 (Smith 1972), and the status of Cone Pill as a full market port was asserted in 1719 and again in 1742 (Hart 1967; Smith 1972). The survey made in the final quarter of the 18th century, however, found Cone Pill to have ‘no trade’ (Gloucester Library, Box 8.57).

Plusterwine Lane has left an archaeological record. Coastal erosion over the last two decades has driven the right bank of Cone Pill inland over many metres, exposing in a retreating cross-section the lower end of Plusterwine Lane (Fig. 3), buried as deep as 2 m in the Upper Rumney Formation. The sequence of natural sections showed that this part of the lane was reset and repaired on a number of occasions. The most elaborate roadway consisted of brushwood and straw, into which a cement-like material had been poured, that overlay a layer of quarried stone, set in turn on bundles of willow. Other sections revealed simpler foundations, such as piled-up
Fig. 3. Section through buried roadway at Plusterwine Lane where it passes among bedded, pale brown silts of the Upper Rumney Formation (spade for scale 0.94 m tall).

bundles of furze and sticks, or quarried stone blocks and haphazardly arranged roundwood, or closely packed bricks, broken roof tiles, occasional roundwood and lumps of stone. The most inland exposures and a ditch section showed a buried gravel hard-standing at least 10 m wide to the north of the roadway. The retreating cliffs near the end of Plusterwine Lane also exposed long, gently sloping bedding surfaces densely covered in tracks showing that cattle in considerable numbers, together with their drovers, had passed from the roadway down the muddy banks of Cone Pill (Allen 1997b), probably to waiting boats or a ford on their way to eastern markets.

Various artefacts came from the roadway sections and hard-standing. They included fragmentary pancheons and deep basins of North Devon Gravel-tempered Ware of the mid to late 17th century (Grant 1983; Allen 1984), a range of other early modern earthenwares familiar in the region, an early 18th-century Bristol tobacco pipe of R. Tippet with neither heel nor spur (Jackson and Price 1974), a Bristol/Staffordshire tin-glazed plate of the early 18th century, and a mid 18th-century Bristol/Staffordshire shallow dish with a notched rim and combed decoration through white over brown slip. There was much pale green, glassy tap slag of the kind found at local charcoal-fired blast furnaces of the 17th and 18th centuries (Hart 1971). Also present was the copper-smelting slag known as black metal, containing in a dark, glassy base much partly
reacted quartz sand and gravel used as a flux and occasional insoluble droplets of unconsumed iron-copper sulphide ores. This while still molten had been cast in moulds to form large building blocks suitable for footings and quoins (e.g. Whitebrook, Redbrook, Newnham, Berkeley Castle outbuildings and village). These fragmentary to whole blocks (Fig. 4A) cannot be earlier than the very late 17th century (Hart 1971; Day 1973, 1974–76; Hughes 2000) and are most likely to be of 18th-century date, although their exact source has not been identified. Also present were fragments of tobacco-pipe stems, haematite-goethite iron ore (some from veins in a sandstone formation), coal (especially associated with the hard-standing), and a clinker-like material. Iron ore was exported from Cone Pill in the 17th century (Hart 1971), and the pale green slag, used in bottle-making, may also have been intended for shipping out.

How much of this material is contemporaneous with the roadway and hard-standing is uncertain. Plusterwine Lane could have been used by heavy wheeled and animal traffic destined for the landing place at Cone Pill as early as the mid 17th century. Written sources imply that the road remained open for a substantial period, and the artefacts suggest that use could have continued at least into the middle of the 18th century.

Physical evidence has survived for boat traffic into Aylburton Pill I, probably related to livestock farming on the level north-east of Cone Pill. Recent exceptionally rapid coastal erosion has partly exhumed from within the Awre Formation filling the lower course of the pill two contrasting timber structures thought to be jetties (Fig. 1b). They most probably date from either late in or to around the end of the 19th century, judging from the construction materials and context.

Structure 1 (Fig. 5A), at the confluence with Cone Pill, consists of four parallel rows of closely spaced, upright sawn planks (0.08 × 0.23 m section) and poles (0.07–0.13 m diameter) attached to a few stout horizontal members. Against one row upright sheets of corrugated iron had been placed. The rows, jutting south-westward into the former course of the pill, are spaced c. 1.75 m, c. 2.5 m and c. 1 m apart. Their tops lie at a uniform height of c. 2 m below the present surface of the adjoining marsh, but there was some evidence that the silts in which the structure was embedded had begun to slump down the bold cliff. No evidence remained of any decking that might have lain across the tops of the uprights, but the design suggests that boats may have been moored between the widely spaced inner rows. Stacked bundles of coppiced hazel and furze, together with occasional pieces of sacking, had been placed deep down between the rows, possibly to give the builders a firm footing on the mud. The silts between and around the rows yielded many sheep and cattle bones, but no artefacts.

The other possible jetty (Fig. 5B) occurs c. 325 m to the west, where shoreline IVa cuts the course of Aylburton Pill I (Figs. 1b and 10b). Jutting out southward from the line of the creek bank, the exposed part of structure 2 consists of an elaborate, three-dimensional, bolted framework c. 2.75 m wide of cross-braced, slightly squared poles 0.20–0.25 m in diameter. The tops of the visible uprights lie at about 0.95 m below the marsh surface. Several centimetres below the top of each upright a shallow slot had been cut on the inner face, possibly for a light hand-rail. About 1.75 m below the tops a deck had been constructed by laying 0.30–0.35 m planks transversely across four longitudinally arranged, roughly squared tree trunks (side 0.25–0.30 m). A long revetment of upright poles (0.14 m diameter) extended south-eastward from the end of the framework. The nearby silts yielded only a few fragments of stone and brick.

Two main railways (Smith 1972, Herbert 1996a, b) cross the Lydney Level (Fig. 1b). The South Wales railway, opened in 1851, has the greatest importance for the physical development of the area, since its embankment gave protection against marine floods, limiting the inland spread of silt when seabanks became defective (see below). The other (defunct) is the Severn and Wye railway, opened in 1872 and extended in 1879 across the Severn Estuary.
Fig. 4. The Lydney Level (spade for scale 0.94 m tall). A: cast blocks of copper-making slag, embedded in Upper Rumney Formation and contributing to roadway, lower end of Plusterwine Lane. B: air photograph (c. 400 × 500 m, north toward upper right) showing shoreline III (arrows) and seabank II to north-east of Warth Brook (Crown copyright reserved). C: air photograph (c. 400 × 500 m, north toward top) showing shoreline IVa (arrows) and seabanks III and IV near Warth Brook (Crown copyright reserved). D: brick outfall on Warth Brook. E: 19th-century stone-built stanks at the confluence of two drains, New Grounds. F: 19th-century stone-built outfall where a reduced Lydney Pill passes beneath seabank VI, New Grounds.
Fig. 5. Probable jetties, site of Aylburton Pill I (spade for scale 94 m tall). A: structure 1, view to north-west. B: structure 2, view to south-east.
Early Fields

Despite two centuries of industrial and commercial development associated with Lydney Pill, and the remodelling of fields and widespread resumption of arable farming in modern times, much physical evidence remains of the character of early agriculture on the Lydney Level. It resides chiefly in the earlier air photographs.

Traces of medieval ridge-and-furrow (Hall 1982, 1995) survive over about half of Lydney Level (Fig. 6). These long, arable strip fields (lands), arranged in parallel sets (furlongs), here occur in a range of continuously varying states of morphological development or modification (Figs. 6 and 7). Many furlongs enclose ridge-and-furrow developed under the impact of ploughing to its mature, classical form (Hall 1982, 1995). These lands are bold, convex-up in section,
of variable width, especially between individuals, and distinctly flexed either near their ends or overall. Grading from the classical form are lands at an intermediate stage of development or maturity. These strips are unflexed and less bold, although distinctly convex-up and commonly differing from each other in width. The most immature form of ridge-and-furrow is straight, unflexed, and flat-topped to only slight convex-up.

In places, around Lydney Pill and especially south-east of the South Wales Railway, the ridge-and-furrow is occluded as the result of the renewal of tidal siltation subsequent to cultivation (Fig. 6). The present relief in these areas is low, faint and spatially very variable, with traces of ridge-and-furrow unevenly disappearing and reappearing within the bounds of former furlongs. As can be seen at Frampton on Severn (Allen 1986b, 1988) and Oldbury Pill (Allen 1988), the effect of renewed tidal siltation on ridge-and-furrow is gradually to smother and soften the plough-related topography. The surface relief gradually diminishes as the overburden thickens, because water depths and, therefore, the total amount of sediment deposited from the tidal waters, are greatest above furrows and least above ridge crests. Larger-scale variations in surface height, perhaps related to differential sediment compaction of the Holocene sequence beneath
(Allen 1999), may also contribute to the patchiness evident within occluded areas. On present evidence, the deposition of about 0.5–1.0 m of silt is enough to eliminate all surface traces of classical ridge-and-furrow. A few decimetres of silt might suffice for ridge-and-furrow that was moderately mature or immature when tidal conditions returned. Judging by the surviving traces, the occluded ridge-and-furrow was immature to moderately mature.

The lack of soil or crop marks and features of relief from large parts of the Lydney Level implies that these were never under ridge-and-furrow (Fig. 6). Inland, such tracts appear to represent grasslands, perhaps including some waste, contemporaneous with the arable fields. Chief among these, as the names of some indicate, are parts of East Marsh, Lydney Mead, Aylburton Mead, Rodmore Mead, and an un-named area, eventually including a possible duck decoy (Aston 1985; McDonnell 1984; Green 1994), east of Mickla Bridge. The coastal grasslands are chiefly marshlands created in recent centuries.

There are two main areas of ridge-and-furrow, each roughly zoned in terms of maturity (Fig. 6), and a third, subordinate area of uncertain status west of Cone Pill. The smaller of the chief areas lies either side of Lydney Pill (Fig. 8), in the south-eastern part of East Marsh and opposite on the right bank. Except for a few furlongs, partly at the foot of the rising dry ground, the

Fig. 8. Air photograph (c. 1.2 × 2.6 km, north toward upper right) of the area around Lydney Pill (Crown copyright reserved). See also Figs. 6, 10 and 13.
ridge-and-furrow is mature. The extensive grasslands of Lydney Mead and Aylburton Mead divide this area of ridge-and-furrow from the much larger development to the south-west. With Stockwell Lane as its axis, the core consists of compact set of 25 furlongs of mature ridge-and-furrow. Several of these, including Herbert’s (1996a) Great Furlong, clearly represent the transverse division into two, usually by a drain, of an originally much larger furlong, each part thereafter developing separately. To the north-east of the core, and especially to the south-west (Fig. 7), occur less mature lands which in total area substantially exceed the core.

Arable cultivation on the level apparently spread gradually outward from two centres, judging from the zoning of the furlongs (Fig. 6). The mature ridge-and-furrow implies prolonged cultivation from an early date over the period of arable farming. Cultivation of the less mature fields, further invading the grasslands, probably began later and was sustained for shorter intervals. The immature ridge-and-furrow seemingly represents the youngest encroachments and was ploughed for the fewest seasons. It seems less likely that cultivation collapsed centripetally under the impact of worsening drainage as compaction of the Holocene sequence underlying the level lowered the alluvial surface and sea level rose further. The main objections are two-fold. Firstly, compaction after embanking tends to create a surface that is concave-up overall (Allen 1997a, 1999, 2000b) and, therefore, most poorly drained centrally. Secondly, the arable fields would have had to have been laid out in full, and at much the same time, early in the period of activity, a movement that is not evolutionary.

Chronologically, the creation and use of these early fields is poorly constrained. No written sources date to before the early 13th century (Herbert 1996a, b) but it is likely on general grounds (Hall 1982, 1995) that arable farming began at least one or two centuries earlier. In 1229 Aylburton Marsh was being farmed as common meadow and open field, one of the furlongs in 1322 being called Shortlands (Fig. 6). Grasslands are recorded in the early 13th century at Aylburton Mead and Rodmore Mead, and there is a mid 16th-century reference to meadow in East Marsh. There was arable farming on the Stirts, recorded again as a locality in 1318, in the early 13th century and on land bordering Rodmore Mead in the 13th and 14th centuries. The arable on the latter was seemingly abandoned by the mid 16th century, but parts were known as Little and Great Furlong as late as 1814. A substantial change of land use is clear in the centuries following these records. By the early 17th century land on the left bank of Cone Pill as far as Mare Ley was common meadow. As recorded in the mid 18th and mid 19th centuries, grassland had also replaced the formerly largely cultivated fields on the right bank (Smith 1972). The chiefly mature ridge-and-furrow south-west of the head of Lydney Pill was a well-established grassland by 1793, when two sets of furlongs either side of a relict branch of the pill were respectively called Great and Little Cowleaze.

Some archaeological evidence bearing on the fields resulted from field-walking where cultivation had been resumed (Fig. 9), but neither Romano-British nor medieval pottery has so far been recorded from the alluvium. The core of mature ridge-and-furrow between Ferneley Brook and Stockwell Lane showed very light scatters of mid 17th- to mid 18th-century pottery (including North Devon Gravel-tempered Ware and Ashton Keynes Ware), and some dating from the mid 18th century (especially Bristol/Staffordshire plates, stonewares). An outlying mid 17th- to mid 18th-century scatter occurred near Mare Ley Lane. Much similar pottery was found, however, on Aylburton Mead, apparently always grassland. Nineteenth–twentieth-century scatters are limited to north-east of Stockwell Brook. Hence the scatters, probably representing manuring, seem unrelated to land use. In a hedge near the gravel ‘island’ was a stone slab inscribed WW, possibly William Winter, a substantial landowner of the mid 17th century (Herbert 1996b). Blocks of Old Red Sandstone and cast black-metal slag (Hart 1971; Day 1973; Hughes 2000) were used to bridge a number of field ditches in this general area. A date some
Fig. 9. The Lydney Level: (a) artefact distribution (field-walking); (b) regional distribution of Romano-British villas.

time after the very late 17th century, and probably in the 18th, may therefore be suggested for these structures, which suggest an episode of estate improvement. A 19th/20th-century stoneware ink bottle was found sealed in the Awre Formation on the coast west of Cone Pill.

Shorelines

(a) Distribution

Identified in the field as described above, several shoreline features survive on the Lydney Level, the younger being either active or recently active and now stabilized by engineering work. The
more conspicuous formed on the open coast, but a number are traceable inland as the banks of contemporaneous tidal creeks.

Bearing out the stratigraphic evidence and the pattern of soil colours (Figs. 1c, 2a and 10b), the distribution of these features (Fig. 10a) shows that, over at least the second millennium A.D., the level was progressively but episodically enlarged as the result of tidal sedimentation. Growth
of the alluvial outcrop into the Severn Estuary occurred in steps. Each episode of shoreline retreat at eroding mud cliffs was followed by the abandonment of the coastline marked by those cliffs and a phase when a new body of alluvium arose as sand shoals and then mudflats built up into new salt marshes in front of the cliffs (see Allen and Rae 1987). As a consequence, the cliff faces became obscured by the upward-growing body of sediment, except for the uppermost few decimetres, which remained visible at the ground surface. In addition to a surviving clifflet, an abandoned shoreline can often be identified, in both air photographs and on the ground, by the difference in the vegetation across it, for the two bodies of sediment differ in age and degree of compaction and, in some cases, in texture.

Typically, the shoreline features are arcuate in plan. Active coastal cliffs, many metres in height, and those recently stabilized by engineering work, descend to a wide, low-tide channel and embrace beyond within their arc the whole or part of an emergent sand shoal. In their abandoned, inactive state, shoreline features are normally accompanied, on the fresh marshland to seaward, by a parallel slough or depression which had attracted drainage entering at a high angle from the hinterland. At least on the Lydney Level, this drainage is invariably deflected sharply toward the south-west, in the ebb-tide direction.

The physical evidence for shoreline I, the oldest and most inland, is a mere hint but from a substantial part of the area (Fig. 10a). Alvington Pill with its growing meanders ranges from just seaward of the gravel ‘island’ to Cone Pill, which partly extends to the south-west the same drainage line. Although no residual clifflet is recognisable today in the largely once-cultivated fields (Fig. 6) immediately to the north-west of the two pills, it seems likely from its long, gently curving trend that the watercourse had formed to seaward upon the abandonment of a bold, roughly parallel mud cliff (see Aylburton Pill I below). Hence the Lydney Level at the time of shoreline I may have been little larger than half its present size. Shoreline I probably cut back into the Wentlooge Formation, judging from the prominence inland of grey-green soils (Fig. 2a).

The physical evidence for shoreline II is an inconspicuous feature apparent on the ground and in air photographs, together with the parallel course of most of Aylburton Pill I (Fig. 10a). Expressed by a low clifflet grading to a steep ramp (Fig. 11), this feature extends for about 1.5 km across the Stirts from Warth Brook to near Cone Pill, apparently over most of this tract truncating occluded ridge-and-furrow, shortening the lands considerably (Fig. 6). At Warth Brook and east of Cone Pill it is cut by shoreline III (Figs. 10a and 12). This shoreline also cuts a tortuous course westward from Cone Pill, marked by a gentle ramp. Shoreline II is also seen as a steep ramp to either side of Lydney Pill south-west of Lydney Harbour, where it is cut by both shorelines III and IVa. The ramp on the right bank truncates a little occluded ridge-and-furrow (Fig. 6). Judging from sediments exposed along the left bank of Cone Pill, shoreline II at the Stirts severed deposits that included silts of Rumney Formation type, although the occurrence inland of grey-green soils (Fig. 2a) suggests that the Wentlooge Formation was also present.

Shoreline III occurs chiefly where shoreline II is no longer recognisable (Fig. 10a). The main development is as a gentle but distinct ramp, faintly seen in air photographs, which courses as a great arc for almost 2 km through the modern arable along the landward side of Lydney Marsh and Aylburton Marsh. It is clearest, as a grassed-over clifflet or steep ramp 0.10–0.15 m high, in the meadow south-east of the gravel ‘island’ (Fig. 4B). At each end of the feature, a wide, damp, parallel depression to seaward, corresponding to Lydney Pill in 1682 (Glos. R.O., D 421/L 8), can be mapped for several hundred metres. The soil distribution (Fig. 2a) suggests that, like shoreline II near by, the Wentlooge Formation was exposed along part of its length. A lesser development of shoreline III is seen as an arcuate clifflet traceable in air photographs and on the ground for about 500 m to the east of Cone Pill (Fig. 12). Parallel with and north of the
Fig. 11. Air photograph (c. 1.0 × 1.25 km, north toward upper right) showing Alvington Pill and seabank II (just below upper edge), the Stirts with occluded ridge-and-furrow, repositioned seabank III and shoreline II (single arrows), and the New Stirts with seabank IV and shoreline IVa (double arrows), and Aylburton Pill II (Crown copyright reserved). See also Figs. 6, 10 and 13.

Eastern Way is a short development of shoreline III that cuts occluded ridge-and-furrow. The pale brown silts at depth here and on the opposite bank of Lydney Pill suggest that the Rumney Formation was affected.

Shoreline IVa is present throughout the area (Fig. 10a). Defining at marsh level a channel about 50 m wide, it ranges as a bold, tortuous feature along each bank of Lydney Pill as far as the coast (Fig. 8). A low clifflet marks its course along the right bank of Cone Pill below the confluence with Alvington Pill, where sections U and V and profile C reveal that both the Lower and Upper Rumney Formation were exposed on the shoreline (Figs. 1b and c and 10a). The position on the open coast between Cone Pill and Warth Brook is shown by a well-defined clifflet, cutting in places the course of Aylburton Pill I (Figs. 4C, 11 and 12). In much of this sector shoreline IVa is a shallow arc concave toward the estuary. Sections P, Q and S, toward the south-west, point to the exposure of both the Lower and Upper Rumney Formation on the cliff (Fig. 1b and c). Judging from section I, the Rumney Formation also appeared near the north-eastern limit.

Shoreline IVb, lying outermost on the level, is active in some places but recently stabilised by engineering work in others (Fig. 10a). It consists of a number of concave, intersecting, arcuate
Fig. 12. Air photograph (c. 1.2 × 1.5 km, north toward upper right) showing shorelines II (single arrows), III (thick arrows) and IVa (double arrows) in the vicinity of Cone Pill and Aylburton Pill (I and II), together with seabanks II, III and V (Crown copyright reserved). See also Figs. 6, 10 and 13.

features up to 1.5 km across. Between Lydney Harbour and Warth Brook there is much evidence that the Rumney Formation was exposed on the cliff (Fig. 1b and c; Fig. 10, profile A), although thick grey silts of the Awre Formation (section F) occurred locally. South-west of Warth Brook the cliff passed on to a thick development of the Awre Formation (Fig. 1b and c, sections J, K, L, M; Fig. 10, profile B) which, in Aylburton Pill II, sharply overlies the Rumney beds (sections N, O). Along shoreline IVb in Cone Pill the Rumney Formation is erosively overlain by generally thick Awre beds (Fig. 1b and c, sections T, W; Fig. 10, profile D).

(b) Chronology and development
A date within the first millennium A.D. seems most likely for the putative shoreline I (Fig. 10a). Its inferred line is overlain by ridge-and-furrow, including mature developments, and Alvington Pill, which formed in the new marsh to the south-east, is the relict of a considerably evolved tidal creek. The severing of the pill into two parts probably dates from later in this general time, since the medieval furlongs adjoining Warth Brook respect the line of that watercourse. The most likely explanation for the severance is that Alvington Pill, at that time carrying drainage from the north-west into Cone Pill, was captured by a tidal creek, the Wose Pill of 13th-century
accounts (Herbert 1996b), advancing headward (Allen 2000b) toward the north-west across the growing marsh. The new marsh is unlikely to have been less than several hundred metres wide.

Shoreline II post-dates occluded ridge-and-furrow on the banks of Lydney Pill and south-east of the Stirts (Figs. 10a and 11), and on general grounds (Hall 1982, 1995) is likely to have stabilised in later medieval times. A more precise date is suggested by a document which records in 1312 a pasture, said to be of 30 acres (12.1 ha in today's measure), called the New Stirts (Herbert 1996b), implying an embanked area on new marsh. This land-claim is here identified with a long, narrow strip of ground of almost identical area lying between two seabanks (see below) south-east of the Stirts, shoreline II passing along it. If this identification is correct, the shoreline was stable and already fronted by a new, growing marsh by very early in the 14th century. That part seaward of the outermost bank, called Aylburton Warth, was common pasture in 1565 (Herbert 1996b). Aylburton Pill I, its course followed closely by the embankment, flowed south-westward through the marsh, keeping within 100 m or so to seaward of the abandoned shoreline. Later erosion has rendered unknown the full extent of this phase of marsh growth.

All that can be confidently said about shoreline III is that by 1682 (Glos. R.O., D 421/L 8) it was present on the north-eastern part of the Lydney Level, and that, like shoreline II which it cuts, it post-dates (mature) ridge-and-furrow (Figs. 8 and 10a). Given that the New Stirts is correctly identified, shoreline III is unlikely to have been present in the early 14th century. By 1682, however, the shoreline had probably been stable for a substantial period, to judge from the marsh up to 800 m wide depicted at that date to seaward. This marsh, containing the earlier course of Lydney Pill together with the Eastern Way, is shown in the south-west with an uneven coastline of finger-like promontaries and embayments, suggesting that in the late 17th century mudflat and marsh was continuing to grow outward and parallel to the coast.

The stabilisation of shoreline III was followed by prolonged siltation on the shores of the Lydney Level, some aspects of which remain obscure. Salt marsh built upward and outward by several hundred metres in front of the shoreline to the east of Cone Pill (Figs. 10a and 12). Aylburton Pill I, its mouth having been trimmed back as the shoreline retreated, was reformed within this new marsh 100 m or so in front of the cliff, so that it extended westward to join Cone Pill. In 1840 (G.D.R., Gloucester Diocesan Records in Glos. R.O., T 1/117) the pill was a deep channel 30–40 m wide. Events in the area that came to be known as Lydney Marsh and the New Grounds are less clear.

The written sources (Glos. R.O., D 421) linked to a dispute between the Lydney and Nass estates over the ownership of this area (Figs. 8 and 10a) would seem to imply that the 800 m wide marsh of 1682 (Glos. R.O., D 421/L 8) had by 1730 been largely eroded and then replaced by another marsh (Herbert 1996b). The physical evidence points, however, to an alternative view. Firstly, although Lydney Pill had a new course in 1777 (Isaac Taylor, Map of Gloucestershire; see also O.S. Map 1", sheet XXXV, 1830), the Eastern Way continued to be present, apparently in its 1682 position. Secondly, the 1682 course of Lydney Pill in front of shoreline III remains recognisable as depressions among the fields (Fig. 10). Thirdly, the implied rate of cliff retreat, measuring tens of metres annually, is unprecedented in the Severn Estuary, and is approached only by the extremely local, monthly retreat of about one metre observed in recent years from the site of the jetties described (Fig. 5). Fourthly, a feature indicative of an internal shoreline has not been observed on Lydney Marsh and the New Grounds, which geomorphologically appear homogeneous (Fig. 8). The uniformity is especially clear from the character of the relict minor creeks, which are of a similar character (allowing for catchment size and shoreline III) along the Eastern Way to those draining into Lydney Pill and the main tributary creek (Figs. 1b and 8). Finally, the soils of the area form a single textural group, homogeneous in all essential
respects (see below). What may instead have been at the root of the dispute between the estates was a question of access, arising because on the developing marsh a tidal creek by rapid headward growth (Allen 2000b) toward the north-east captured Lydney Pill and diverted it into its later course, thus separating the New Grounds, on the Nass side, from the Lydney Marsh on the Lydney side. Whichever interpretation is correct, much young salt marsh undoubtedly existed by the beginning of the 19th century in the north-east of the area.

Over roughly the ninety years covered by planimetrically accurate maps, the cliffs eroding chiefly into the Rumney Formation that stabilised as shoreline IVa (Fig. 10a) were either essentially neutral or retreating. Neither the date of the start of retreat nor the maximum extent of the alluvium affected are known. The right bank of Cone Pill changes very little in the sequence of maps from 1815 (Glos. R.O., Q/RI 144) through 1830 (O.S. Map 1", sheet XXXV), 1841 (G.D.R., T 1/202), and 1879–80 (O.S. Map 6", Glos. XLVII.SW.) to 1901 (ibid.). In the same sequence, the shore extending from the left bank, first depicted in 1830 and 1840 (G.D.R., T 1/117), is shown to be gradually eroding. By 1901 (O.S. Map 6", Glos. XLVII.SW.) the shore was stable, having retreated by 100 m over the interval. A similar retreat had occurred on the coast to the north-east as far as Warth Brook. In 1830 and 1840 the course of Aylburton Pill I toward Cone Pill was about to be captured where it turned to meet the eroding cliff. A coastal retreat of up to about 100 m is also seen along the New Grounds (see also O.S. Map 6", Glos. XLVII.S.E.;) Lydney Pill emptying close to Warth Brook. However, by 1879–80 (O.S. Map 6", Glos. XLVII.S.W.), a section of this cliff between two outfalls had been stabilised by engineering work (Fig. 10a).

After the natural stabilisation of most of shoreline IVa in about 1900, mudflat and then salt marsh began rapidly to form again along the south-western coastal sector above a platform cut into the Rumney Formation (O.S. Map 6", Glos. XLVII.S.W., 1920). It is this phase of siltation that overwhelmed the two possible jetties on Aylburton Pill I (Fig. 1b and 5). By the time of the R.A.F. survey (1945–6), a marsh up to 400 m wide had grown around the mouth of Cone Pill, and a comparably extensive marsh, together with Aylburton Pill II, lay to the south-east of the New Stirts (Figs. 10–12). Erosion thereafter set in. By 1965–75, two arcuate cliffs were in swift retreat, one centred on the mouth of Cone Pill and the other on the entrance to Aylburton Pill II (O.S. Map 6", sheet ST 69 NW.). These cliffs have bitten back even more rapidly and deeply since the late 1980s, forcing a repeated, slight inland repositioning of the seabank around Plusterwine Lane, and a deep set-back on a 700-m frontage on the New Stirts (1995–6). An even deeper set-back, bringing the seabank partly along the railway line, is currently being engineered in this part of the Lydney Level.

The north-eastern coast of the level up to the harbour was artificially stabilised using armourstone over a roughly 20-year period beginning between 1940 and 1945. As seen in 1965 (O.S. Map 6", sheet SO 60 SW.), it consisted of two arcuate cliffs separated by the section assigned to shoreline IVa (Fig. 10), the longest ranging from where the coast breaches Lydney Pill to the south of Aylburton Pill II. A retreat of up to c. 200 m occurred after 1840 (G.D.R., T 1/117).

Seabanks
At least six episodes of land-claim involving seabank construction affected the Lydney Level, allowing the fields described to be created. Many of these engineered structures survive as upstanding field monuments, although some can be recognised only as ramps, especially where arable farming has been resumed and they have been ploughed out, and others are either partly degraded or partly buried.
Recognisable only as a ramp overlain by ridge-and-furrow, seabank I encloses a restricted area (c. 50 ha) inland of shoreline I up to the rising dry ground (Figs. 6 and 13). The ramp (av. height 0.26 m) which defines it can be traced just to the south-west, where there is a sharp change in soil colour (Fig. 2a), and then to the north-west of Mare Ley Lane. Near Ferneley Brook, blocks and fragments of Brownstones (Old Red Sandstone) strew the ramp, perhaps material used in building either the bank itself or an outfall on the brook. The ramp extends to the right bank of Stockwell Brook but seems to fade out upstream. That a right-bank barrier once existed along the entire stream is, however, suggested by the restriction of red soils to the east (Fig. 2a). The soils enclosed by seabank I are relatively fine grained (av. mean size 24.3 µm), and in the clay-silt-sand diagram (Fig. 2c) define a gentle trend similar to that of the coarser-grained muds (av. mean size 36.3 µm) of the active marshes (Fig. 2i). Seabank I could date from the first millennium A.D., given the relationship to it of the ridge-and-furrow. Seabanks II–IV which follow are on various grounds medieval.

Seabank II ranges chiefly as a ramp or degraded bank from end to end of the Lydney Level, lying seaward of shoreline I and cutting the former course of Alvington Pill (Fig. 13). It encloses a further 361 ha, by far the largest land-claim in the area (see also Figs. 8, 11 and 12), and it is rooted almost entirely in high ground. The bank appears in three sectors, separated by Cone Pill and by the Stockwell–Warth brooks.

In its western development, the structure ranges along the west bank of Cone Pill where, near Plusterwine Lane, it was probably replaced after the stabilisation of shoreline II and, at the long meander in Cone Pill, it was set back after meander cut-off (1945–69). In the central sector, the seabank follows the left side of Cone Pill before pursuing a tortuous course up the left bank of Alvington Pill, having crossed the pill at a place where the channel is narrowed by a partly surviving stone-built outfall. Water from Alvington Pill now drains into Cone Pill at a brick outfall similar to one on the New Grounds (see below). Another outfall appears to have existed about half-way up Stockwell Brook. In its eastern development, seabank II lies set back across ridge-and-furrow behind shorelines II and III on Lydney Marsh and into Lydney Pill, where south of the gravel ‘island’ it survives with its accompanying back-ditch as a low ridge and depression (Allen 1997a, illus. 6). As Herbert (1996b) noted, it was here by 1322 that a field secured the suggestive name Shortlands. In this general sector, the lands immediately inland of the bank are little if at all flexed against it and much shorter than is typical of unaffected furlongs (Figs. 6 and 8). North-east of Lydney Pill, seabank II ranges along Plummer’s Brook and into old ground south-west of Lydney Harbour, where it lies set back across ridge-and-furrow behind shorelines III and IVa. The seaward rise in ground level across seabank II averages 0.18 m on the west bank of Cone Brook (after renewed tidal siltation), 0.41 m on Lydney Marsh, and 0.26 m on East Marsh. Except where there was set-back, the lands and furlongs in the two core areas of medieval fields respect seabank II, which therefore either antedates or is contemporaneous with them.

The tripartite seabank II is apparently the second oldest in the area, but need not be everywhere of exactly the same age, even where there was no set-back. The soils enclosed in the western (av. mean size 27.4 µm) and central (av. mean size 31.3 µm) sectors are coarser grained than those in the eastern area (av. mean size 24.8 µm), and define similar but gentler trends in the clay-silt-sand diagrams (Fig. 2d–f). Hence the construction period of these banks seems to have been long enough for there to have been a change in the estuarine sediment regime. It should be noted, however, that the trends in the western and central sectors resemble those for the areas enclosed by both the earlier seabank I and the later structure III.

Springing from the second bank, seabank III is a low feature or ramp which expresses as a kind of afterthought the net addition of 19.1 ha of arable land to that already under cultivation.
Fig. 13. Seabanks on the Lydney Level (for clarity, minor additions and modifications dating from later in the 20th century are not shown).

Known as the Stirts, of disputed ownership in 1318 (Herbert 1996b), the ridge-and-furrow here is both truncated and occluded (Figs. 6 and 11). The date of set-back cannot be later than 1312, when the New Stirts to seaward was recorded as a pasture (Herbert 1996b). A seaward rise in ground level averaging 0.31 m was found. The soils are the finest textured on the level (av. mean size 23.8 µm), plotting on a gently sloping trend across the clay-silt-sand diagram (Fig. 2g).

By 1312 the New Stirts (13.0 ha) had been created beyond seabank III, enclosing truncated ridge-and-furrow from the original Stirts but also some fresh marsh (Figs. 6 and 11). Seabank IV (Fig. 13) survives as a low feature which closely follows the right bank of Aylburton Pill I, having cut shoreline II (Figs 4C, 10a and 11). Except where there was further tidal siltation in modern times, the ground rises seaward across the structure by about 0.24 m. Where it is now
cut by the coast, dark soil horizons displayed internally show that the bank had been raised and widened at least twice since construction.

In the centuries that elapsed before further attempts at land-claim, a number of changes were effected in the area enclosed by seabank II. Chief among these was the early conversion of probably most of the open strip fields to grassland in small hedged enclosures. This process had begun by the mid 16th century (see above), and where there had been arable there are records, in the early 17th, mid and late 18th, and mid 19th centuries, of extensive grasslands. The New Stirts, embanked by 1312, was used only as pasture (Herbert 1996b), offering no field evidence for a return to cultivation on the (by then) truncated and occluded lands first enclosed by seabank III. Inclosure by Act of parliament or private agreement between 1814 and 1864 completed the changes, including the subdivision of the old grasslands (Herbert 1996a, b). There apparently were some accompanying significant alterations to drainage and communications. The extended route of Mare Ley Lane below Alvington Court, with an associated drain, clearly cuts across the strip fields, exploiting the higher ground lying outside the line of seabank I (Figs. 6 and 7). It is unrecorded before the mid 16th century (Herbert 1996a), making it likely that the Rodmore Mead area was previously reached by the track along the alluvial edge (Fig. 1b).

Seabank IV, embracing the New Stirts, was affected by a major change in the internal drainage. Between 1879–80 and 1900–01 (O.S. Map 6″, Glos. XLVII.SW.), the main outfall at the mouth of Warth Brook was abandoned in favour of one at the head of a deeply embayed, repositioned section of the bank (Fig. 13).

Seabank V is a low, locally breached feature that follows the tortuous courses of Aylburton Pill I and Cone Pill, and it seems originally not to have been linked to banks III and IV (Fig. 13). It encloses an area of 10.0 ha on ground that includes shorelines II and III and subsequent new marshlands (Fig. 12). The bank existed by 1879–80 (O.S. Map 6″, Glos. XLVII.SW.) but may be no older than the 18th century.

There is no evidence of a seabank in the area of Lydney Marsh and the New Grounds in 1682 (Glos. R.O., D 421/L 8), and seabank VI, in full evidence by 1840 (G.D.R., T 1/117), is most probably an 18th- or early 19th-century construction (Figs. 8 and 13). It ranged along the coast from Lydney Harbour to seabank IV at Warth Brook. Today the bank survives on its 1840 line only over a short middle section, where it crosses and then closely follows the second course of Lydney Pill, and accumulation of the Rumney Formation was generally uninterrupted (Fig. 1b and c). Here the ground rises seaward across the bank by an average of 0.49 m. Elsewhere the bank was set back landward by upward of 200 m, first by 1920 (O.S. Map 6″, Glos. XLVII. SW.) and again about 1945 (R.A.F. photographs), visibly truncating minor creeks entering Lydney Pill. An area of c. 130 ha is enclosed by the present bank (Fig. 13), including beside Lydney Pill a considerable but ruinous sheepcote and fold of Pennant sandstone with some Brownstones (Fig. 14), dating to between 1840 and 1880 (O.B. Hepworth, pers. comm. 2000). The soils of this area are texturally uniform (av. mean size 27.1 µm), being slightly coarser along the seaward frontage and the line of the former course of Lydney Pill. On the clay-silt-sand diagram (Fig. 2h) they plot on a much steeper trend than the active marshes (Fig. 2i) but in a similar way to the soils enclosed by the eastern part of seabank II (Fig. 2f). A further change in estuarine sediment regime is implied.

Outfalls and other control works are associated with seabank VI on the New Grounds (Fig. 13). Warth Brook had, on a set-back part of the bank, a brick and concrete outfall, abandoned by 1900 (O.S. Map 6″, Glos. XLVII.SW), consisting of a circular metal plate raised and lowered on a screw thread (Fig. 4D). Associated with the 1840 bank across the New Grounds are structures at two places. Ruinous stanks of mortared Penant sandstone blocks occur at the (artificial) confluence of the two relict creeks now detached from Lydney Pill (Fig. 4E). On the pill itself
Fig. 14. Nineteenth-century stone-built sheepcote and fold, Lydney Marsh, adjoining Lydney Pill, viewed from the south-east.

is a well-preserved outfall of mortared, dressed Brownstones and Pennant sandstone with tall slots for planks to control water level (Fig. 4F). Another stank lies near by.

We may now refine the possible date of seabank I. This structure antedates medieval strip fields and so, as noted, could be of the first millennium A.D. Is the first land-claim on the Lydney Level therefore of Romano-British date, like so many others on the alluvium of the inner and middle Severn Estuary (Allen and Fulford 1987, 1990a, b, 1992; Allen 1997c)? An answer follows on the basis of the cumulative change in land level to currently active marshes across seabank I (av. 0.26 m), seabank II (av. 0.41 m, Lydney Marsh), and seabank VI (0.49 m), amounting to 1.16 m in total. Allen and Fulford (1992, illus. 13) plotted the height difference across known Romano-British seabanks in the inner and middle Severn Estuary as a function of down-estuary distance measured along the channel. The rise at Warth Brook, 46 km by river below Over Old Bridge (Gloucester), should from their regression be 1.01 m, the cumulative measured value of 1.16 m slightly exceeding this estimate. Hence seabank I could be Romano-British.

Discussion

The landscape of the Lydney Level, underlain by Holocene alluvium, evolved in a complex way over the last two millennia. A change of estuarine regime encouraged an underlying tendency
for a roughly two-fold expansion of the area occupied by high-intertidal salt marsh. The growth was, however, episodic and took place from at least three abandoned, outward-stepping, cliffed shorelines, each of which had been formed during a temporary phase of coastal retreat (Fig. 10a). Locally, the retreat was very substantial. Against this background of natural change, people embanked and drained increasingly large parts of the marsh—the process of land-claim—although not without at times losing temporarily to the sea some previously enclosed ground (Figs. 10a and 13). Although no settlements seem ever to have been created on the alluvium, in sharp contrast to most parts of the Severn Estuary Levels (e.g. Rippon 1997), changes to the natural drainage and to communications were made, land use was transformed, and commercial and industrial developments occurred on the larger tidal creeks. Exploitation of the resources presented by the alluvial area, whether or not embanked, seems at all dates to have been exclusively from settlements on the neighbouring slopes of the Forest of Dean to the north-west.

It is unsurprising that there should be evidence, albeit at present indirect, for Romano-British embanking on the Lydney Level, inland of the oldest inferable shoreline (Figs. 10a and 13). This can be seen as a local expression of a more general movement, associated especially with the later period, toward the creation/reorganisation of large villa estates in the Severn Vale (Fig. 9b) that drew on both dryland and wetland resources (Allen and Fulford 1990a; Fulford and Allen 1992). The Park Farm ‘villa’ (Fitchett 1986) lies near by just off the alluvial outcrop and only 1 km downslope from the Lydney Park religious complex (Wheeler and Wheeler 1932; Casey and Hoffmann 1999). The making of iron seems to have contributed to its economy. Sited within the ambit of the Boughspring villa, the alluvium (Allen and Fulford 1987) and nearby cliff-top at Horse Pill some 5 km downstream has yielded Romano-British pottery and also evidence of iron-making. Between the Lydney Level and Horse Pill lies the Chesters villa (Scott-Garrett 1938; Fulford and Allen 1992), on sloping ground overlooking the estuary, where iron-making was on an industrial scale. On the opposite bank of the inner and middle estuary, with its larger outcrops of estuarine alluvium and several villas (Ifold, Frocester, Stancombe, Priest Wood, Tockington, King’s Weston) on the dry ground beyond, there is much more substantial and extensive evidence for Romano-British embanking and settlement. Large assemblages of wide-ranging occupation debris are known from the alluvium at Elmore and Longney (Allen and Fulford 1990a, b), Arlingham (Allen 1990; Allen and Fulford 1990a), Hill (Allen and Fulford 1987, 1996; Allen 1997c) and Oldbury (Allen and Fulford 1987, 1992; Allen 1997c; Allen and Rippon 1997b). Iron-making seems to have occurred at all of these sites, and at Oldbury may have matched the Chesters in scale. There also seems to have been Romano-British embanking in the Moreton Valence area where, at Packthorne Farm, an early Roman settlement lies just off the alluvial outcrop (Allen and Fulford 1990a).

It is curious, however, that the inferred Romano-British land-claim lies not directly opposite the Park Farm settlement but almost 2 km to the south-west, around the Ferneley Brook. Either Park Farm was reached from this well-watered site by a route along the alluvial edge, or the enclosure was tied to a settlement at present unknown. Alternatively, speculating with Scott-Garrett its excavator (Fitchett 1986), agricultural development of the alluvium around Park Farm may have been deliberately avoided in the interests of shipping and related activities on a now lost creek.

Whether the modest Romano-British enclosure later experienced decay and inundation like some in the outer Severn Estuary (Rippon 1996, 1997) is not known, but a considerable growth of the alluvial outcrop in the later half of the first millennium can hardly be doubted. This advance allowed the embanking in medieval times of an area of salt marsh roughly seven times larger than the Roman enclosure (Figs. 6 and 13). However, the builder(s) of seabanks II, III and IV and the precise construction dates are obscure. Spanning four present-day parishes, the
main enterprise (seabank II) was a considerable one and may in conception represent a collaborative venture. This possibility is supported by the pattern of later agriculture, although there are textural differences between the several parts of the enclosure suggesting that the banks are not wholly synchronous. Several holders of large estates in the area are known from the likely general period of the work (Smith 1972; Herbert 1996a, b), but it remains for future research to identify how any of these—Brictric (mid 11th century), William FitzOsbern (late 11th century), the earls of Warwick (early–mid 12th century), Tintern Abbey (12th century) and Llanthony Priory (12th century)—might have acted (Smith, 1972; Herbert 1996a, b).

The agricultural development of the new land-claim was gradual and incomplete. In contrast to left-bank enclosures, where there is evidence for the evolution of the ploughed fields but little alluvium was finally left uncultivated (Allen 1990, 1992; Allen and Fulford 1990a), only about 62% of the total area within seabanks II, III and IV was eventually ploughed (Figs. 6 and 7), the remainder presumably being kept for grazing and other purposes. Of the furlongs, a mere one third, in core groups at Lydney and Aylburton, were ploughed long enough to achieve the maturity of classical ridge-and-furrow. Seabanks II and III eventually came under attack, as renewed coastal erosion created shoreline II by the early 14th century and shoreline III by the late 17th century (Figs. 10a and 13). West of Cone Pill, sections of the bank appear to have been replaced, but not before the ridge-and-furrow became heavily occluded by renewed supplies of tidal silt. East of Cone Pill lengths of bank were set back, with tidal mud again smothering the ridge-and-furrow on abandoned parts of the enclosure. Only the Stirts (seabank III) and New Stirts (seabank IV), of trifling area, stand for revived medieval ambitions.

There was another, archaeologically demonstrable contrast in land use in medieval times between the Lydney Level and the much larger and wider embanked outcrops of Holocene alluvium on the left bank of the estuary. Field-walking on the left bank has shown that, in the 11th to 13th centuries, there were scattered farmsteads on the alluvium that eventually were abandoned and subsumed into the general arable (e.g. Allen 1997c). On the Lydney Level no evidence of habitations on the alluvium has so far been discovered.

The renewal of coastal instability in the 19th century or so came only after a considerable tract of tidal alluvium—Lydney Marsh and the New Grounds—had accumulated in front of shoreline III in the north-east of the area (Fig. 10a). This great area, embanked in the 18th or early 19th century (seabank VI), preserves the freshest topography on the Lydney Level indicative of an origin as a tidal marsh dissected by creek networks (Figs. 1b and 8). Until recent decades, it was kept as rich pasture, in harmony with the ploughlands converted to grass in late medieval and early modern times. The New Stirts, in existence by 1312, was enclosed as a pasture, and thus in the uses to which it was put resembles the marshland Thomas Berkeley III embanked in 1335–6 on the opposite shores of the estuary (Allen 1986b).

The agricultural and pastoral Lydney Level was not left untouched by the growth of forestry, mining and other industries in the drylands of the Forest of Dean to the west (Hart 1971). From at least medieval times (Smith 1972; Herbert 1996a, b; Green 1997), the tidal creeks of Cone Pill, Wose Pill and Lydney Pill which penetrate the level were used for the export of such characteristic Dean products as timber, iron ore and coal and, in early modern times, for ship-building. Agricultural products from the Lydney Level itself may have left by the same routes, as is suggested by the private jetties emerging from the silts that smothered them in Aylburton Pill I. Beginning in the 17th century, many industrial and commercial developments have now encroached on the alluvium around the head of Lydney Pill, of which the most spectacular is perhaps Lydney Harbour (1813), illustrating a trend widely expressed today in the Severn Estuary Levels.
The Lydney Level exemplifies the way in which, over the last millennium or so, a landscape developed on an outcrop of Holocene estuarine alluvium can evolve and be exploited as the result of an interplay between human and powerful natural forces. Coastal instability has been the main natural determinant of change, creating opportunities for renewed land-claim, but at other times forcing set-back. In this respect the area does not stand alone among the numerous outcrops which compose the Severn Estuary Levels as a whole. Over the last millennium there has been much coastal advance and retreat in other parts, at recorded rates up to a few metres annually, for example, at Hills Flats in the middle estuary (Allen and Fulford 1996) and in the Gwent Levels further to the south-west (Allen 1987b; Rippon 1996; Bell et al. 2000). Coastal erosion and regrowth is becoming more evident at prehistoric horizons in the Severn Estuary Levels, as analyses of borehole records provide increasingly detailed insights into the character of the buried landscapes preserved among the Holocene deposits. These events too would have affected the human population in the area at the time. In the Wentlooge Level, for example, buried shorelines created by erosion occur at at least two mid-Holocene horizons (Allen 2001). The causes of shoreline instability are, however, various and not easily identified. They range from local channel shifting, as was probably the case in the Lydney Level, to regional secular changes in windiness and wave activity.

Acknowledgements

I am greatly indebted to the farmers of the Lydney Level—Messrs. Biddle, Guest, Hunt, Rogers and Williams—and to the Lydney Park Estate (managing agent Mr. O.B. Hepworth, farm manager Mr. G. Towns) for their interest and help, and for the opportunity to examine their land. Siegbert Otto generously helped me with the levelling. A day in the field with Dr. N.M. Herbert is remembered with particular gratitude. Franz Steel kindly provided the geochemical analyses and David Thornley the textural data.

References


