# 13

# Post-Medieval to Modern Environmental Background

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## 13.1 Introduction

This is not a full review of all the palaeoenvironmental studies carried out in the region, but a general summary with most emphasis placed on the environment in which Post-Medieval and Modern communities lived. It does not provide a comprehensive review of crop and animal husbandry in the region. Reviews of environmental archaeology carried out or commissioned by English Heritage are in progress or complete and will give an account of knowledge in these areas. Those wishing to follow this up should consult the English Heritage website (`http://www.english-heritage.org.uk` and follow the links Research & Conservation → Archaeology & Buildings → Scientific Techniques → Environmental Studies → Regional Reviews). At the time of writing, the reviews on insects (Robinson 2002) and wood and charcoal (W Smith 2002) were available as PDF files. Reviews of plant macrofossils, pollen, animal bones and geoarchaeology from southern England are in preparation and will be placed on the website when available. Rob Scaife very kindly made available a draft of his pollen review for this resource assessment. The excellent review of environmental archaeology in South West England by Martin Bell (1984) is still a very useful source of information. There are also reviews of environmental evidence in the Urban Archaeological Assessments for Bath (not yet published) and Bristol (Brett 2005), which are of particular relevance for this period. Urban deposits have not generally been referred to, but will be included in the reviews noted above. The inclusion of "grey" literature has not been comprehensive. *The Environmental Archaeology of Industry* (Murphy and Wiltshire 2003) provides a useful insight into the application of aspects of zooarchaeology and other scientific methods to understanding past industry, including that of recent periods.

With regard to climate, the period includes a significant event which must have left its mark in the environmental record, though as noted below, the environmental history of recent centuries has not been the main focus of palaeoenvironmental studies. The Little Ice Age, generally regarded to have occurred around 1590–1850 was characterised by a drop in mean annual temperature of 1°C (Roberts 1998). In marginal areas, new tree growth was prevented and the stunting of mature tree growth is seen in narrow tree-ring sequences. It has been suggested that land at the margins of suitability for arable was abandoned between *c.*1600 and 1750 (Parry 1978), however evidence from some areas such as Exmoor's southern fringe (see below, Fyfe *et al.* 2003b) suggests this was not universal, at least where hardy crops such as rye were concerned.

As for earlier in the Holocene, the coast continued to witness major geomorphological changes although relative sea level rise was minimal in comparison. Several different examples are summarised below.

The breaching of the shingle ridge on Porlock Marsh during a storm in October 1996 provides a useful example of the dynamic nature of salt marsh and associated creek development and movement. Managed realignment of the shingle ridge had been identified as a possibility, given the history of breaches causing flooding of agricultural land and the poor case for continued artificial maintenance of the ridge.

Bryant and Haslett (2002) and Haslett and Bryant (2004) examined the accounts from Instow, Barnstaple and further up the estuary, of the "wave" causing extensive flooding of the Bristol Channel in January 1607. Their 2004 paper concludes that the most likely cause was a tsunami although others (particularly metereologists) believe that a tidal surge is more likely (Richard Brunning pers. comm.).

There are numerous other examples of major coastal events in the South West, including the continued inundation of the Isles of Scilly archipelago, and loss to the sea by cliff erosion of the village of Hallsands in south Devon in January 1917. Similar events will have taken place in the more distant past without the benefit of historical documentation.

## 13.2 Palaeoenvironmental studies

For recent centuries, as well as palaeovegetation studies, analysis of plant remains (pollen, plant macrofossils and charcoal) can yield information on exploitation of plants for food and fuel, trade, introduction of exotic/alien species, plant breeding and other agricultural and horticultural innovation and landscape design.

Studies of environmental history are rare for this period. This may be because documentary history is thought to provide an adequate record, but this assumption is largely untested. The exception to this is "Garden" archaeology, which is well-established. Murphy and Scaife (1991) discuss the types of evidence that could survive. These include botanical remains from watercourses, ponds and lakes providing information on the local and wider vegetation, land use management and the types of crops grown. The survival of this evidence in useful contexts, is, however rare and there are no examples of studies from the South West where good evidence survived. Redesign or ploughing can remove early garden levels and mixing by soil fauna makes interpretation unreliable.

Wetlands, where organic deposits preserve the record of climatic and environmental change for the last few hundred years, are a scarce and diminishing resource. This record is, for the most part, to be found in parts of the uplands where the peat accumulation of recent centuries has not been removed by peat or turf cutting and drainage. The uplands may be more sensitive to climate change than the lowlands and are a valuable climate record for the last 10,000 years. The drier summers forecast by current climate change modelling would certainly slow down rates of peat accumulation and may also accelerate erosion in vulnerable areas.

Sources of evidence elsewhere are small wetlands, for example on the Culm soils of mid-Devon, where the inputs sources are local and where the history of land use and management is known. Ornamental lakes in planned landscapes, sometimes developed from Medieval fishponds, may be a very valuable data source and this needs to be given consideration when plans are advanced to de-silt lakes and ponds.

The upper parts of many published pollen profiles from the uplands of the region do include the vegetation record from the 17th century to the present day. The drawback is that the levels accumulated over recent centuries are usually very poorly dated and analysed only at a low resolution. This may be because the principle aim of a particular project was to study the vegetation history of an earlier period or because of the limitations of a radiocarbon calibration when applied to recent centuries. Calibrated age ranges after *c.*1450 do not allow detailed interpretation of vegetation change and land management. Approximate dates can be inferred by the identification of introduced species such as plantations of non-native conifers etc. More precise dating will need to rely on chemostratigraphic markers, OSL dating of non-organic sequences or very detailed radiocarbon dating designed with Bayesian modelling in mind.

A few examples of the kinds of information available from palaeovegetation studies are given below, emphasising the variation to be expected in a large and diverse region.

On the Hartland peninsula in north Devon, pollen studies from a spring peat in the Clifford valley showed that Medieval arable cultivation continues into the Post-Medieval period (Hawkins 2005). In contrast, palaeochannel sediments at Moshayne in the Clyst valley of central Devon demonstrate that cultivation of wheat or oats (pollen type *Avena/Triticum*) and rye ceased in the 18th century, but barley cultivation may have continued. There is no evidence of Post-Medieval woodland regeneration, and a pattern of land use continuity is apparent (Hawkins 2005). At Sourton Down, at an altitude of 290m OD on Dartmoor's northern edge, a small expansion in pine and then oak pollen at the top of the sequence is thought to reflect local planting in recent centuries (Straker in Weddell and Reed 1997). There are many other instances of this, for example on Exmoor's southern fringe, a rise in pine pollen which was broadly synchronous with a decline in rye at Anstey's Combe and Long Breach, is estimated to date to around 1750-1800 (Fyfe *et al.* 2003b).

Of the three major uplands in the region, Exmoor is unique in having been the focus of two studies that were designed specifically to study aspects of the environmental history of recent centuries. Crabtree and Maltby (1974; Maltby and Crabtree 1976) studied the soils (iron pan stagnopodsol and stagnohumic gley) and vegetation history (*Calluna* heathland) from the immediate pre 1833 vegetation that was buried by the construction of the Pinkery Canal. This soil also predates by at least 15 years the moorland reclamation undertaken by the Knight family. Maltby (1995) points out the importance of this sequence for scientific research, including enabling spatially separate comparisons between reclaimed, unreclaimed and reverted soil conditions and differences interpreted as a response to change over time.

In the second study, Chambers *et al.* (1999) responded to a recommendation by Straker and Crabtree (1995) for research to understand the nature of the development of heather and *Molinia* dominated landscapes, in order to be able to respond to proposals to alter land use and provide the background for management plans. Their study of vegetation history at Lanacombe (Molinia-dominated "white moor") and Larkbarrow ("grey moor" dominated by a mixture of ericaceous shrubs allegedly invaded by *Molinia*), demonstrated the recent incursion of *Molinia* at Larkbarrow, but also showed a greater antiquity and abundance of *Molinia* in both areas than hitherto appreciated. Similar studies have now been adopted in Wales in order directly to inform conservation and management policy (Chambers *et al.* 1999). This approach would certainly be applicable to other areas in the South West where management for nature conservation purposes is often driven by the need to meet biodiversity targets or achieve "favourable status" for sites of special scientific interest.

## 13.3 The agricultural landscape

There are few examples of Post-Medieval crop remains from either urban or rural sites. The plant macrofossil analyses carried out as part of the multidisciplinary and multiperiod Shapwick project, did, however, include the study of some Post-Medieval deposits. A range of samples of 17th- to late 18th-century date were analysed. The late eighteen century material came from excavation of four demolished houses which were closely dated to between 1760 and 1800. These samples consisted mainly of cleaned cereal grain (free-threshing wheat, oats and barley) with small amounts of chaff (tough rachis nodes of bread wheat and macaroni/rivet wheat) and weed seeds. The Post-Medieval fills of the moat gave similar results (Straker *et al.* forthcoming).

The UK plant record shows that the diverse wild plant (weed) flora associated with Medieval fields largely disappears in the succeeding centuries. This is in part due to the many agricultural improvements and innovations which started by the late 18th century. These included development of new varieties of cereals and use of early mechanisation. The invention of the seed drill by Jethro Tull at the beginning of the 18th century meant that weeding could be more effective. Broad-cast crops, where the grain was cast at random around the sower, were hard to weed, whereas drill-sown crops in regular rows could be hoed. In the first part of the 20th century, machine threshing and winnowing of grain lead to improved screening techniques and as a result fewer weed seeds were sown along with the crop. The *Seeds Act* of 1920 precluded the sale of seed grain containing a high proportion of impurities and the weed flora still further by the use of efficient modern herbicides (Salisbury 1964, 31–2).

At Shapwick, no clear differences were observed between the Medieval and Post-Medieval plant macrofossil assemblages. Most of the weed species noted from earlier centuries were found in the late 18th-century layers though some plants, notably thorow wax, cleavers and charlock, were absent. Whether this is the effect of the "new technology" or other factors is not clear. Research on other assemblages representing different stages of crop cleaning and processing would be useful, particularly if there is a good record of the uptake of new methods.

Research into breeding of animals has fared rather better and Davis (1987) was able to note that from the 17th century onwards, the average size of domestic cattle, sheep, pig and domestic fowl increased. There is not much published data for the South West, but assemblages from towns like Exeter, for example, (Maltby 1979) have contributed to the study of early modern animal breeding.

## 13.4 Soil erosion

The effects of ploughing on buried archaeological sites, is a constant concern. The Southern Quantock Archaeological Survey included a study (Wilkinson *et al.* 2006) of the movement modern soils using the levels of a radioisotope of caesium ($^{137}$Cs ). This is a product of fission and is discharged into the atmosphere by atmospheric nuclear weapons testing, which started in 1940 and peaked in 1963, and other licensed or accidental discharges. The application of the technique to monitor soil erosion is not new, but it has rarely been made use of for archaeological purposes. Samples were taken through the soil profiles along transect lines and subject to particle size analyses which suggested that soil redistribution was mainly as a result of ploughing. The analysis of the $^{137}$Cs levels allowed patterns of soil movement since 1963 to be reconstructed and the future risk to vulnerable archaeological sites to be assessed. The authors concluded that should present cultivation regimes be maintained, regionally and nationally important archaeological sites will be completely removed in the next 150 years.

There are many other aspects of archaeological science which would make a valuable contribution to the study of industry and lifestyle in the last 300 years (Bayley and Williams 2005). These include the potential for understanding the living conditions and diet of workers in urban and rural trades and industries. Bayley and Williams (2005) draw attention to the wealth of knowledge on human health and population movement that the application of existing techniques such as osteology and isotope analysis could

provide. Molleson and Cox (1993) demonstrate the range of information available from a major cemetery at Spitalfields in London; studies of human health and welfare of a comparable scale are still to be undertaken in the South West. At a local level, the identification of ova of human gut parasites (*Ascaris*, roundworm and *Trichuris*, whipworm) from cess-pits in 16th-century Taunton serves as a reminder that such health problems are likely to have been widespread, though possibly not regarded as serious (Greig in Burrow 1988, 139–49).

The application of scientific techniques to improve understanding of life and environment in the Post-Medieval and Modern periods has barely begun and would benefit greatly from a systematic approach.

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