Chapter 2

An introduction to the geo-archaeology, palaeo-environmental and archaeological science of the Solent-Thames sub-region

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Introductory comments

Understanding and defining the human lived-in landscape, its natural and humanly exploited resources and economy, farming and food production (i.e. the discipline we sometimes call 'environmental archaeology' – see Luff and Rowley Conwy 1994) must not be divorced from aspects of cultural, artefactual and social archaeology (Bradley 1978, 2; Allen 1996). Nevertheless, because of the number of specialists involved, and the fact that environmental archaeology has been considered an 'interest group' of its own, both environmental archaeology and archaeological science have sometimes been given research agendas in their own right. For environmental archaeology these have included Hampshire (Allen 1996) and the South West (Wilkinson & Straker 2008); for archaeological science see Bayley 1998. In this research framework, these topics will be fully covered within the successive chronologically-organised chapters.

Some topographical zones of the Solent-Thames corridor are distinctly more conducive to preservation of palaeo-environmental information or macrofossils than others (see Allen 1996). These topographic zones will be dealt in summary below, but in terms of 'environmental archaeology' nevertheless there are some comments of an introductory nature that are over-arching and embrace all periods. Certainly Luff & Rowley Conwy (1994) dislike the term 'environmental archaeology', but its longevity of use and the wide umbrella nature of the term are useful. In this review the broad 'environmental' discipline is divided into two distinct, but not wholly separate themes: land-use and landscape on the one hand, and economy and diet on the other, as has been done previously (eg Hampshire Environmental Archae - ology review; Allen 1996). In general the focus is more directed on the former (i.e. land-use and landscape) than the latter in this paper, as archaeologists engage with information about diet and economy more readily, and the information is often more readily digestible or accessible.

Chronologically environmental archaeology is clearly more heavily (and integrally) involved with the earlier periods; of necessity, prehistorians have long had to deal with issues of landscapes and land-uses that differ markedly from those we engage with today. In the historic periods environmental and scientific archaeology are more concentrated upon issues of diet and economy. In the latter periods these disciplines should be engaged much more fully than is regularly the case, although this engagement should always be within a directed research framework, whether the project is undertaken for commercial or purely archaeological reasons, rather than being just a data-gathering exercise. Studies of landscape and land-use development have often been far more efficacious and productive in terms of results that are immediately understandable and usable to the archaeologist leading a project, though interpretations provided by the component specific scientific analyses have not always been so readily accessible or immediately evidently relevant. Nevertheless there are a number of environmental and scientific themes that are generally applicable, regardless of the period, and these are set out below in summary:-

- During all periods we need to define, at a much higher spatial resolution than before, the nature of the local landscape and land-use than hitherto, and then use these site-specific data to re-evaluate and redefine regional and chronological trends.

- Our understanding of food procurement economies is generally woefully poor except at the general level. If we are to advance in our understanding of communities and society in the past then this is an area that requires concerted attention.

- Advances in archaeological science are now having earth-shattering effects on our comprehension of diet, mobility and origin. Isotope analysis is isolating main dietary components (meat, plant and fish/marine composting) while other isotope suites are defining the high state of mobility within what may be large portions of prehistoric communities, as seen in the case of Cranborne lady and children found on the chalk at Monkton-up-Wimborne in Dorset (Green 2000), but who were brought up on, and revisited, Mendip (Montgomery *et al.* 2000).

- Chronology. No longer are radiocarbon dates needed to confirm the longevity of an established chronological epoch, and rarely to confirm that any item or event merely belonged to that period. Recent advances using Bayesian analysis now allows us to examine events at the generational scale in the Neolithic (Bayliss & Whittle 2007), and the results are destroying long-held assumptions of longevity of monuments or social activities.
- Spatial awareness. Developer-funded applied research archaeology is confined by the spatial parameters of the development threat. Most research-led archaeological fieldwork is however also spatially constrained by the assumptions of the researcher or pre-conceived framework of spatial distribution of activity. Commercial archaeology does however produce the opportunity for serendipitous discovery. Development is often in areas where no archaeology is known, and where the lack of recorded finds in a topographical zone may have led to a view that such areas were empty, ensuring that such areas were considered of low priority. Chance finds in dry valleys (eg Allen 2005) and concerted research on the slopes of the Thames valley (Yates 1999) have now allowed these to be added to prehistoric settlement and land-use patterns, and have forced us to re-evaluate these regions and topographic zones.

Although research themes can be addressed and specifically targeted, commercial archaeology is innately prone to unforeseen and unexpected finds despite the highly computerised and numerous SMR or HER records held by development control authorities. For instance, the location of a commercial archaeological project is precisely defined by the developer and development needs. Where these coincide with areas of few archaeological records we assume little or no archaeological return, and we must be acutely aware that this lack of records may result from a deficiency of former archaeological investigation and enquiry. Thus areas of the interfluves of the Kennet valley now seem to be the location of a number of later prehistoric sites, and are often charcoal-rich and associated with industrial activities. Only recently have these areas been recognised as of archaeological value, and our comprehension of the commensurate evidence of palaeo-environmental, landscape, land-use and the wider farming economy of these areas is even more tardy. Lacunae such as these need identifying, targeting and reviewing to ensure that such areas or topographical locations are rapidly highlighted in the HER records, and are fully accounted for in development control decisions.

Physiographic and topographic zones

Although the period by period review adequately covers the main points of future research and attention, from the environmental and geo-archaeological perspective in particular, the main building blocks or topographic zones have distinct and separate characteristics in terms of sedimentation and their potential to preserve environmental information. These factors are directly relevant to the nature of the available environmental data, and to its acquisition. Further, in some areas burial beneath colluvial, alluvial and marine sediments removes sites, cultural evidence and palaeo-environmental evidence from our immediate reconnaissance, and should not be overlooked. Both long- and short-term projects have clearly demonstrated the highly biased nature of the immediately available archaeological resource (eg Allen & Gardiner 2000; Allen 1988), and are starting to indicate patterns where whole classes of human activity are specifically located in areas that have been subjected to such burial. Recognition of this can radically change our view of activity in entire epochs, eg the Beaker/Chalcolithic period (see Allen 2005).

The Solent-Thames corridor has been divided into six basic crude topographical zones (Fig. 1.4), in which some of the principal topographic forms, characteristics with regard to palaeo-environmental preservation and geo-archaeological potential are summarily outlined.

Chalklands (Hampshire, Berkshire Downs, Chilterns)

Topography, Form and Palaeo-environmental preservation and geo-archaeological potential

The chalklands generally form one of the most significant 'uplands' of these parts of lowland Britain. They typically comprise a scarp edge or scarp slope and more gently dipping or plateau upland, bisected by a dendritic pattern of dry valleys of varying size, form and amplification. In places the chalk is mantled by drift deposits of clay-with-flints or Tertiary Clays and gravels, which give rise to locally more acidic soils (eg brown earths or argillic brown earths), rather than the characteristic calcareous rendzina- form soils that mantle much of this landform. The calcareous nature of the chalk, and thus the soils and deposits derived from it, provide potentially ideal preservation for bone and shell including land snails. In contrast, its free-draining nature leads to generally dry and heavily bioturbated soils and deposits in which pollen preservation is sparse and waterlogging rare, and thus the preservation of insect remains is extremely rare, if not unknown. Geo-archaeologically, understanding the soil history of these areas has been demonstrated to be of crucial importance (French *et al.* 2007), and the presence of localised calcareous colluvium provides significant palaeo-environmental opportunities as well as sealing and masking key locations in the landscape, often burying archaeological sites and evidence.

The Hampshire chalklands surprisingly have had relatively little palaeo-environmental attention in comparison with the central Wessex chalklands (eg Dorchester, Cranborne Chase, Stonehenge and Avebury), yet these may form the boundary between two major ecological and cultural zones. To the west are areas

rich in henges and henge-type monuments and with Grooved Ware, while, in contrast Sussex contains few or no incontrovertible henges on the chalk, and Grooved Ware is conspicuous by its absence. At the same time the early woodlands are seen to differ; those in the Wessex region contain a mosaic of woodland and woodland openings, whilst Sussex seems to contain a more uniform woodland cover (Allen & Gardiner 2009). Clearly the boundary between these zones, if such exists, lie within the Solent-Thames region; indeed the Solent-Thames region *is* that boundary.

In contrast the Berkshire Downs and Chilterns (eg Whiteleaf Hill) have seen some major single-site palaeo-environmental studies, and a number of small-scale projects, but the density is generally low and synthetic overviews are almost totally absent. The chalklands are considered to be well-studied, but this is not always true (see major new interpretations of the Wessex chalk and South Downs, Allen & Scaife 2007; Allen & Gardiner 2009), particularly as regards the Berkshire Downs, Marlborough Downs and Chilterns.

River Valleys/Corridors (Class I rivers: Avon, Thames, Kennet, Thame, Colne, Test, Itchen, Great Ouse)

River valleys by their very nature often cut though, or provide a division between, physiographic and topographic zones; they are both boundaries and corridors. Individually they are largely defined by the geology through which they cut and over which they run; this circumscribes the shape and form of the valley, as well as bed form and load and the nature of any resultant alluvium.

Often rich soils may be found on the floodplain. There is water to drink from the river and pools on its margins, food (fish and fowl) and other resources (reeds, clay, gravels, flint) are plentiful, and the topography forms a natural corridor. These features attracted past human populations to visit, exploit, and utilise them. Such human activity varied from periodic short-term visits, through seasonal use, to long-term non-settlement activities, and in places, to longer-term settlement.

In economic terms, therefore, the significance of these areas is clear. In palaeo-environmental and geo-archaeological terms these are potentially very rich and highly significant. River valleys provide two main landscape elements: the former channels and the channel itself, and the floodplain and floodplain islands. River courses and channels wander across floodplains stripping out sediment and archaeological activity, sorting and transporting elements of them downstream. Unless channel avulsion (rapid channel abandonment and creation of new channels) occurs, channel forms may be tens or hundreds of metres across, cutting on one side and infilling on the other. Abandoned and infilled channels provide long sedimentary and palaeo-environmental records of the watercourse itself, and of the local and wider environment, via a combination of the sediments, land and fresh-water mollusc, plant and insect remains, and pollen (eg Anslow's Cottages (Butterworth & Lobb 1992), and Testwood, Hampshire (Fitzpatrick *et al.* 1996).

The floodplains may provide long sequences through overbank floodplain and alluvium, and in areas of high water table these may be waterlogged (containing waterlogged plant remains and insects, as well as pollen and land and fresh-water Mollusca, or even peat). The latter can vary from small local buried 'pools' to wide and complex expanses, such as at the Denham, Colne and Rushbrook valleys in Buckinghamshire. Peat provides not only the opportunity for waterlogged remains and very good, long and detailed pollen sequences, but also the potential to date the onset, changes within and the demise of these landscape events. With their potential to reflect local, extra-local and sub-regional land-use and environment, the palaeo-environmental evidence in these locations can be of major regional or national significance. This is further heightened by the potential for human activity to be present, exceptionally well-preserved and interstratified in these sequences (eg at Runneymede).

Stream courses and valleys

Stream courses and other valleys provide similar opportunities to those in the major (class 1) river valleys, but just on a smaller scale. That does not mean that the potential for palaeo-environmental preservation or presence is any less, nor that deep and long palaeo-environmental sequences do not exist; more that the scale of human activity may be smaller. On this basis alone, this is considered to be a separate, sub-group of the major river courses.

Claylands and 'upland' gravels (New Forest, North Oxfordshire and North Buckinghamshire Vales, Thames basin)

These form large expanses of undulating ground along the coastal fringes of the Solent and New Forest to the London Basin and the Vales of Central and North Oxfordshire and North Buckinghamshire (Northamptonshire Vale, Upper Thames Vale, White Horse Vale etc). These are on varied geologies ranging from clays to sands and gravels, but generally provide low relief landforms, although varying considerably in drainage and water retention properties. Nevertheless, these zones are characterised by their heterogeneous low relief and relatively acid soils, often related to the presence of former major drainage systems. In general bone and shell survival is variable and (with local exceptions) land and fresh-water molluscan survival is poor. Nevertheless charred remains are often present, and the potential for highly localised waterlogging preserving waterlogged plant remains, insects and pollen sequences is high. These areas provide one of the widest expanses of long and intermittent use through prehistory and early history. As zones, however, we have little synthetic work on each of these regions as a whole, even if specific long-term and large research projects, for example in the Vale

of the White Horse, Oxfordshire, have studied one part of a specific area (see Tingle 1991; Miles *et al.* 2003).

Limestone ridge (Cotswolds)

The Cotswolds running east-west through Oxfordshire and Buckinghamshire provide a unique and distinctive stony hard landscape. They form upland with higher relief than the surrounding areas, and sharper forms than many other zones in the Solent-Thames corridor. Today the slow-weathering Inferior and Great Oolitic limestone give rise to relatively thin, non-calcareous soils, but have been proven to generate moderate thickness of non-calcareous colluvium in dry valleys and at the foot of hill slopes, especially in Gloucestershire and West Oxfordshire. The preservation of bone and shell is moderate; land snails are poorly preserved as a result of the slow weathering and release of calcium carbonate of the limestone. On the whole, like the chalklands, these are freely to moderately freely draining with little potential for waterlogging (except in local and exceptional circumstances). Consequently insects and waterlogged plant remains are scarce except in streams and watercourses traversing or draining from the Cotswolds. Our economic information in terms of animal bones and charred seeds is moderate compared with other zones, but that of the specific landscape character and land-use is generally sparser.

Intertidal (coastal margins of Hampshire and Isle of Wight)

Topography, Form, Palaeo-environmental preservation and geo-archaeological potential

The present intertidal zones are low-lying areas poorly surveyed in archaeological terms, in which the potential for exceptional palaeo-environmental and archaeological preservation exists. Recent work in the Severn Estuary and on the Welsh coastline for example, has recovered lines of prehistoric human footprints and animal tracks (eg Bell 2007). The potential for these certainly exists along the Solent margins, but the resources needed to find these, and other important finds, have not yet materialised. High water tables provide the possibility of preservation by waterlogging, as well as the presence of most other proxy palaeo-environmental indicators. Some of these currently low-lying marine environments were completely different landscapes with fundamentally different environmental characteristics in early historic and prehistoric periods. Although coastal today and in recent historic times, in many cases these may once have been dry land. The natural inlet of Langstone harbour, for instance, was once open dry lowland, with small freshwater streams flowing across a wider and deeper coastal plain (Allen & Gardiner 2000).

Surveys of the largely muddy foreshores around Langstone Harbour (Allen & Gardiner 2000) and between Wootton and Quarr, Isle of Wight (Tomalin *et al.* 2012) are the only significant coastal margin surveys to date. The potential of other inter-tidal foreshore areas has yet to be explored from both an environmental and palaeo-environmental perspective. This zone is a narrow and temporary physiographic zone that does not necessarily represent that of the past, nor future, landscape. The potential for finding evidence of submerged forests and nationally significant palaeo-environmental and palaeo-economic evidence is high. These areas also contain the potential to obtain dated sea-level index points to refine the Solent sea-level curves (eg Long & Tooley 1995; Long *et al.* 2000) and general sea-level curves specific to defined study areas.

Current Marine (Solent)

The current sea bed is an under-explored archaeological and palaeo-environmental resource, largely due to the difficulty and expense of obtaining access to these benthic landforms and landscapes. In the Palaeolithic and through to the end of the Mesolithic periods, however, a large part of the Solent was dry land or lowland with high groundwater tables. Recent sub-bottom profiling and coring off the West Sussex coast has revealed peats and land surfaces of Mesolithic date under 30 m or more of water. There is no reason why such preservation should not occur in the Solent or off the Isle of Wight coast. In geo-archaeological terms, defining the nature and altitude of the benthic landscape in relation to known sea-levels demonstrates that there is a large landmass that was once habitable. We have yet to get to grips with this landscape conceptually, let alone define the clearly rich palaeo-environmental and palaeo-economic evidence that will be preserved there.

The sea bed also provides the last resting place of a number of land-based artefacts washed out to sea, as well as larger artefacts and marine vessels such as the *Mary Rose* dating to AD 1545 (eg Gardiner with Allen 2005) and the *Invincible*, which sank in AD 1758 (Bingeman 2010). Whilst a detailed strategy and huge effort in sampling and analysing the waterlogged palaeo-environmental remains and other scientific data was expended, with huge rewards from the *Mary Rose*, (Gardiner with Allen 2005, 302-650) the same potential was not exploited for the excavations of the *Invincible*. The potential for recovering good palaeo-economic evidence relating to food-production in southern English is high, but so too is the potential, in time, to recover early historic or prehistoric vessels – see for instance the Dover boat. The endeavours on the Mary Rose, essentially a project of the 1970s and 1980s, showed the huge resource scarcely tapped in terms of palaeo-environmental and palaeo-economic data.