Dry Valley Research: a Case Study from the Yorkshire Wolds

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Introduction
Dry valley and slope fills in the south of England contain deposits which are crucial to understanding the way the land has been used and settled, and also in understanding the formation of the archaeological record (Bell 1983; Allen 1994; Wilkinson 2003). However, Allen's prediction that "In ten years hence colluvial studies will be a standard part of the archaeological endeavour" (1994: 428) has not held true for chalklands in the northern counties of England. On the Yorkshire Wolds there has been an intensification of arable farming which has led archaeologists to concentrate on the superficially obvious and the partly destroyed: this has distorted the distribution of activity and settlement that we see, and therefore find, in our research. The key to understanding past land use on the Yorkshire Wolds lies in the dry valleys (Buckland 2002: 33) and the study of past communities, settlements and landscapes cannot be separated from the environment and land use history.

The Yorkshire Wolds are the northernmost expanse of English chalk forming an arc between the Humber estuary and Flamborough Head. The Wolds cover an area of 1350km^2 with elevations between 50cm and 200m above sea level: this creates a distinctive landscape unit compared with the surrounding vales and plain (Stoertz 1997: 3). An assessment of the Yorkshire archaeological resource has found that the Wolds landscape has large volumes of artefacts representing all periods from the Neolithic onwards (Roskams and Whyman in preparation: 39).

This short report details a case study undertaken during 2004 at Cowlam Well Dale (Fig. 1). The project aims to complement the long tradition of site-based archaeology on the Yorkshire Wolds by considering the potential geoarchaeological evidence from dry valley deposits which have not, with a single exception (Buckland 2001), been studied previously. The lack of study and understanding of landscape processes and the dry valleys on the Yorkshire Wolds has long been regarded as problematic by scholars from the earth sciences and from archaeology (Lewin 1969: 3; Manby et al. 2003: 113). A geoarchaeological approach allows us to consider landscape evolution over a long duration and to link human activity and settlement with landscape morphology without the impediment of a predefined chronological focus.

Methods
The project commenced with a consideration of the background literature and research followed by a desk-based assessment of the historiography and archaeology of the de-

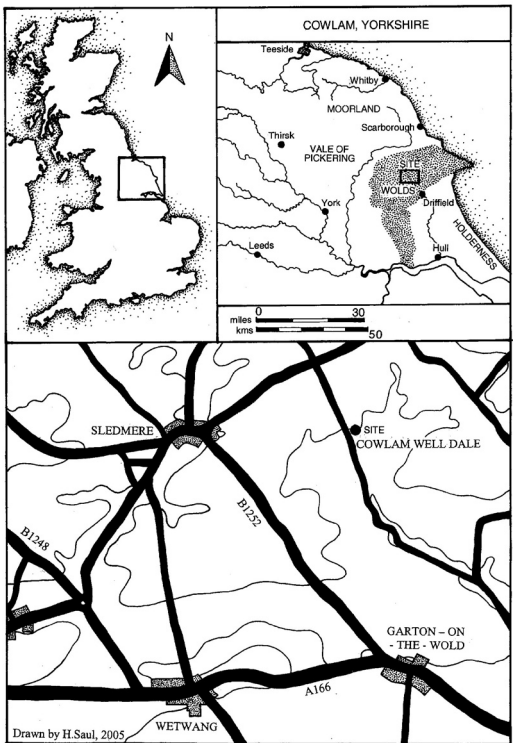

Figure 1. Location Plan. Image courtesy of Haylet Saul

fined study area. In the field the topography and morphology of the landscape was surveyed and recorded. The deposits were assessed by means of an auger survey and test pit excavations in three selected areas in the upper, middle and lower reaches of the valley (Fig. 2). The test pits were drawn, photographed and sampled at regular intervals for soil chemistry and mollusc abstraction.

Almost all the previous fieldwork in the area had aimed to elucidate specific time periods and had been directed at discrete 'sites'. The central aim of this project was to consider all time periods, up to the current day, thinking about the multiple time scales that are represented by the different processes that we encountered and investigating 'off-site' areas of the valley. A search of the Humber and East Yorkshire Sites and Monuments Record found that within a 1.6km radius of Cowlam Manor there are 45 entries. This includes four buildings and three findspots with the remaining records pertaining to monuments including a beacon site, the deserted medieval village, two Roman roads, dykes, linear ditches and a ladder settlement.

A review of the ancient, geological and hydrogeological maps found that they were at such a large scale that their application to a small, and well-defined, study area was limited. The soil survey data from field sheets revealed very shallow deposits along the

roadside and this is illustrative of the problem associated with mapping in which only the most accessible topographic units are sampled.

Results

The water sources have been managed at Cowlam by the establishment of a well and by the placement and maintenance of ponds. During the survey we were able to measure the difference in height between the extant and redundant pond, and found that the current pond is approximately 50m lower than the redundant one mapped by the Ordnance Survey in 1890. Evidence for recent environmental change was identified in the form of a water-cut gully in the woods on the eastern valley flank and an associated alluvial fan on the valley floor. The fan contained a buried 20cm deep soil.

The characterisation of the deposits at Cowlam Well Dale was striking with deep, orange loess-based sediment encountered especially in the middle section of the valley. The top of the western valley slope had a thick lobe of deposit (c.3m maximum) associated with the high plateaus of plough land above. The eastern valley flank was a complete contrast with thin rendzina soils just a few centimetres deep.

Despite a close sampling strategy and suitable soil pH, insufficient molluscs were found to warrant statistical analysis at Cowlam. The discovery of mixed, diffuse bone fragments was indicative of manuring in this landscape and the lack of concentration

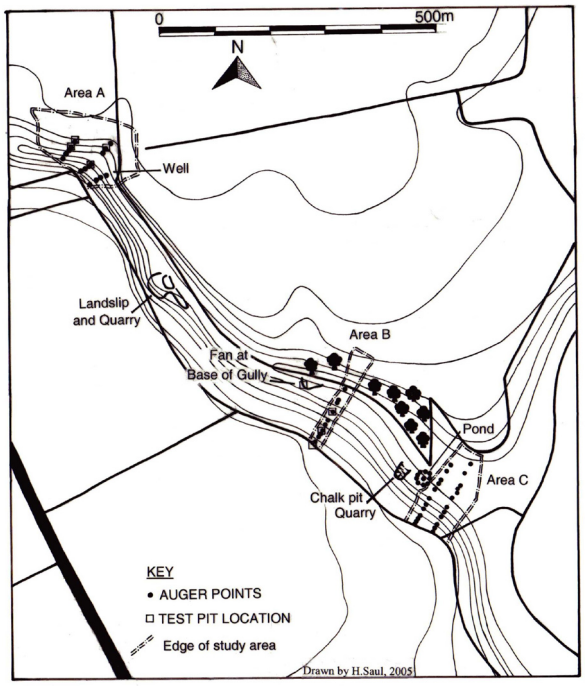

Figure 2. Interventions at Cowlam Well Dale. Image courtesy of Hayley Saul.

in specific areas would indicate that the assemblage recovered is the result of overburden erosion and colluviation from the arable land at the top of the slope. The same method of deposition is likely for the small artefactual assemblage which represented the Bronze Age through to the Modern period.

Discussion

The link between the current pond, the spring line and the redundancy of the pond, on higher ground, at the valley head corresponds to the falling groundwater levels in the chalk aquifer as described by Downing et al. (1993). It is important to recognise that the present levels of groundwater availability can be significantly different from those encountered by people in the past.

The discovery of the water-cut gully and alluvial fan correlated with the documentary sources from the 19th century for severe local flooding. The regular floods of 1888, 1892 and 1905, suggest that this type of event may have occurred regularly throughout the valley's history and could be responsible for scouring the valley floor of deposits, which would eventually be redeposited towards Driffield. The fan, dated by the farmer to a flood of 1905, has been named by local people "watterwash" and evokes a folk memory even for those born years after the event. This indicates the importance of landscape features for local people. Recent scientific evidence demonstrates a reduction in precipitation and recharge of the chalk in recent decades and an emphasis is being placed on local and historical accounts of flooding to inform current aquifer management (Downing et al. 1993: 272). In the alluvial fan the depth of deposit above the buried soil was 80cm and this gives an indication of the rate of deposition at the time of the flood and since this time. The units immediately above the buried soil exhibit sorting of the chalk inclusion size and may therefore represent a series of events of different intensity. Although not dated archaeologically this example reveals the creation and preservation of buried land surfaces on the valley floor in this area; this means that there is potential for the discovery of earlier soils. Buried soils are particularly important archaeologically, indicating periods of stability, and often contain evidence for landscape evolution and past environmental conditions (French 2003: 41).

The results from Cowlam Well Dale help us to understand the way in which the landscape has evolved, beginning with the formation of the valley itself by periglacial activity, the deposition of a blanket of loess which helped to improve soil quality, and the periglacial features which preceded the earliest cultural deposits discovered. The orange loess-based deposit is *in situ* at the top of the slope suggesting some degree of stability and this is important if we recognise that the colluvium found on a slope generally represents the minimum quantity derived from a higher point (Goudie 1994: 251). Downslope from the lynchet deposit there was either a decrease in the depth of deposits encountered, or a continuation of depth formed by solifluction debris in lobes. The difference in the valley deposits from west to east and the discovery of a primary loess deposit are evidence for the aeolian loess deposition which we know occurred on sloping plateau surfaces on the Yorkshire Wolds in a thin, continuous sheet (Catt 1978: 19).

The preservation of Mollusca on the Yorkshire Wolds is highly variable and this mechanism is poorly understood. Significant assemblages were recovered at Birdsall (Milburn 1992) and at the recently excavated ladder settlement feature at Wharram Crossroads. At Cowlam two *sols lessives* were encountered and solifluction gravels were common so this accounts for the paucity of shells in some of the sedimentary units (Evans 1972: 289). The recognition that the bone fragments and artefacts were reworked and redeposited meant that we were unable to use them for absolute or relative dating purposes but they at least indicate land use practices such as manuring and the continuity of human activity over long periods of time.

In addition to evaluating the archaeology and landscape processes of dry valleys this study is situated within the wider context of the past perception of land use in what is today a sparsely populated area. The issue of past and current perception can be examined by considering archaeological theoretical perspectives and the change in social theory that now regards human activity and landscape development in a dynamic, and mutually contingent, relationship (Thomas 2001: 166). Environmental determinism and marginality are frequently invoked in the Yorkshire Wolds as an explanation of the archaeological evidence (Manby 1977: 67; Dent 1998: 8). This usually refers to thin soils and a lack of surface water and results in the ascription of 'settlement corridors' that run along spring lines or seasonal river valleys (Hayfield and Wagner 1995: 51). Although not situated in a 'settlement corridor' the evidence from Cowlam indicates that the valley had thick fertile soils in the past and also a spring, ponds and a well, with a long history of archaeological evidence for continued settlement. Marginality is a culturally determined concept that arises from human perceptions, both in the past and today (Young and Simmonds 1995: 12). An awareness of such perceptions, in the context of wider social theory, is therefore central to the scientific analysis of dry valley sequences within an archaeological framework. Environmental archaeology can contribute towards a phenomenological approach by emphasising that past landscapes are often significantly different from those encountered today within the same physical space (Wilkinson 2003: 265).

Conclusions

The results of the fieldwork at Cowlam Well Dale demonstrate widespread evidence for erosion caused by human activity and natural processes working in concert. The features revealed include periglacial features, gully formation, faunal disturbance and the management of woods, ponds and tracks. The deposits were successfully characterised in three reaches but the lack of dating evidence is a key issue both for this project and for future research. Mollusc preservation was poor, limiting the opportunities for environmental reconstruction.

This research informs current perceptions of environmental and social marginality; the documentary and archaeological evidence all points to a landscape that was settled and productive, with a reasonable degree of continuity, several water sources and a relatively deep fertile soil.

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