5 A sheep's eye view

Land division, livestock and people in later prehistoric Somerset, UK

Clare Randall

Fields and field systems in later prehistoric British archaeology have generally been discussed in relation to territory or land tenure. They are also frequently assumed to relate purely to arable agriculture. Alongside this, we also tend not to situate livestock animals within landscapes. Increasingly, morphological features of fields can be identified as having use in animal handling. Consequently field system morphology, and changes to layouts over time, enable their re-examination in relation to pastoral and arable husbandry (and the interplay between them), and consideration as to why differing approaches may have been adopted within the same landscape at different times. This provides models which, focussing on pastoral husbandry, are potentially applicable to a range of places and periods.

The second and first millennium BC bounded landscapes surrounding the hillfort at Cadbury, Castle, Somerset, UK, reveal an intimate relationship between the occupiers of the hillfort, sites in its environs, livestock, and the landscape. A series of different forms of land division and organisation from the earlier Bronze Age onwards can be compared with both faunal and plant macro-fossil data from within that landscape. Different forms of layout appear to reflect different types of strategy and approach in later prehistoric farming. During the second and first millennium BC changes can be observed between different forms of highly extensive pastoral farming and closely integrated and intensive systems. The explanation would seem to be more social than practical in origin, but discerning this is reliant on large scale field survey, and integration of multiple strands of information.

Keywords*: Fields, livestock, prehistoric, landscape, husbandry*

Introduction

In southern Britain, in common with neighbouring areas of northern Europe, the landscape has been structured and demarcated in a variety of ways from the later prehistoric period onwards. British fields have tended to be discussed as evidence of the relationship between social control and subsistence, and in relation to issues of tenure and territory (e.g. Barker and Gamble, 1985; Breen, 2008; Chadwick, 2008; Evans, 2008; Fowler, 1978; Johnston, 2000; 2001; Kitchen, 2001; Yates, 2007), although consideration of Bronze Age divisions on Dartmoor in particular has included the interplay between tenure and land use (Fleming, 1978a; 1978b; 1983; 1985; 1988; 1998; Wickstead, 2008). As Løvschal (2014: 728) notes, perceived and socially accepted boundaries are different from physical, dividing structures, which adds nuance to the issue. In addition, whilst we should not deny physical demarcation of spaces as relating to concepts of ownership and land holding, and see them purely in terms of functionality, we should reconsider their role in the lived experience of those who constructed and used them.

Fields have often tended to be assumed to be the arena of production of arable crops, with the management of livestock a lesser issue, although new interpretations are beginning to be adopted (e.g. English, 2013; Evans 2009; Masefield, 2015; Pryor, 1996). The necessity of pulling together more diverse lines of enquiry has been proposed in order to enhance understanding of people's everyday lives (Chadwick, 2008: 205). This paper seeks to consider how land division might be structured around what went on within spaces, by relating the evidence from faunal assemblages to the evidence

of the fields. This paper discusses the needs and preferences of the animals, the parameters offered by grassland and its management, and identification of features within fieldsystems which relate to the practicalities of livestock handling and management. A selection of various likely physical manifestations of different approaches to husbandry methods provides a series of possible models. These are applied to one example in south-west Britain, where contemporary faunal assemblages and landscape could be compared.

The environs of Cadbury Castle, Somerset, UK, is one location where a series of fieldsystems have been examined in some detail (Tabor, 2008), and there is both a large faunal dataset (Randall, 2010a) and archaeobotanical data (De Carle, 2014) available for comparison. A series of bounded systems commenced some time after *c*. 1700BC with subsequent landscape reorganisation throughout the 2nd and 1st millennium BC and into the 1st millennium AD. The morphology of these various arrangements has commonality with examples of similar dates across the south-west of Britain and beyond, but the South Cadbury environs offer an opportunity to examine a sequence spanning more than a millennium. The topography, elevations, and soils are variable within a relatively small area, and offer a range of agricultural possibilities. Faunal remains from Cadbury Castle, a hill which attracted activity from the early Neolithic including the creation of a hillfort in the 1st millennium BC, and sites examined as part of the South Cadbury Environs Project, date from the second half of the 2nd millennium BC to the 1st millennium AD.

Background

Aside from considerations of 'design' (such as co-axial or irregular examples), fields possess an inherent utility. Consequently, whilst acknowledging the different likely combinations of topographic and environmental influences, we should rehabilitate the practicality of fields. We may then more readily identify the aspects of organisation and use which inform more nuanced understandings of their social role. Likewise, we need to challenge our assumptions about livestock animals. Most people in the developed world have little experience of cattle, sheep, goats and pigs, which means that most archaeologists encounter them generally as datasets which may say more about how they were consumed and deposited than how they lived. Zooarchaeology focuses on attempting to identify the mechanisms and strategies utilised to achieve 'products' – primary products (meat) and secondary products (e.g. milk, hides, horn). However, animals had their own lives, their own relationships with landscape and people. We should therefore accept livestock as social actors alongside people (Chadwick, 2008: 205; Giles, 2012). By situating animals within the landscapes they inhabited, and have been altered for them, we may gain some insight into the broader motivations of the people who shaped those places. Whilst boundaries may have a range of socio-conceptual meanings to the people who constructed them, it is their physicality with which livestock animals interact. Also in regulating the movement of livestock, contingent changes occur to the movement and perceptions of space by people. Consequently, where boundaries were organised with the needs of livestock husbandry in mind, changes in organisation over time are of interest where the inherent physical parameters remained largely unaltered. As Brück (2000) indicates, alterations in subsistence practice were not necessarily the cause of change but contingent upon it. A reflexive relationship exists between choices of the organisation of the pastoral landscape and other social factors.

We should also consider matters of intensity and scale. We should be careful of our use of the term 'intensification', as it is often used in place of what might more properly be called 'expansion' (Morrison, 1996: 587). In simple terms 'intensive' approaches seek to produce as great, or greater, production from a smaller area (Netting, 1974: 39; Tiffen *et al.*1994:29), whilst 'extensive' livestock production relies on fewer animals per hectare. The definition needs to take into account the changes to labour input, depending on the type of activity undertaken (cf. Leach, 1999; Wickstead, 2008: 74). Extensive cultivation and animal husbandry are complementary as both involve larger areas of land, infrequent cropping or less intense management (Bogaard, 2005:179), whilst intensive systems are likely to be highly controlled, complex and integrated with arable cropping. The drivers for these two differing approaches (and a range of variations in between) are likely to be highly specific to time and

place, but relate to the inherent carrying capacity of land, land availability, availability and distribution of labour, and a range of socially derived preferences and factors. However, understanding the scale of an individual system, and how it relates to other neighbouring systems depends on being able to propose an entire 'unit', with the problems of identification which that entails (cf. Evans, 2009: 61). It should also be pointed out that, contrary to some suggestions relating to the shape and regularity of systems being associated with chronology or seasonality of use (Fowler, 1983:128-9; Harvey, 1980:44), even 'planned' systems may involve a long period of development, alteration and accretion (cf. Chadwick, 2008b; Barnatt, 2008: 50), and the explanation for form is as likely to be rooted in their use as any chronological assumptions or aesthetic principles.

Livestock in the landscape – understanding the needs of the animals

Despite the perceptions engendered in the modern developed world which treats livestock as a commodity product, livestock are not, and probably never have been, walking larders; neither are they an assemblage of potential handbags, knife handles or clothing. The practice of zooarchaeology encourages us to view the data in terms of products and consumption, but we also need to consider livestock as living entities, occupying and moving through space. In order to understand their full role in ancient societies, we should think of them as not purely a means to an end, a product, but a living creature with a range of needs and preferences. People in the past, in common with modern farmers, would have had a detailed knowledge of those needs, and will have responded to them. Therefore, the choices surrounding husbandry are likely to have reflected far more nuanced considerations than our somewhat crude approaches to identifying the aims of livestock production. Also, by understanding the practical necessities of husbandry we gain a greater appreciation of the expertise required to create management systems. This provokes greater consideration of the range of choices and decisions open to people. If we make the assumption that daily care for animals, and inhabiting landscapes alongside them, was an almost universal experience for people in the past, this potentially changes the way in which we understand how expertise in animal husbandry may have been viewed, and how the associated tasks may have had a profound role in structuring society.

On the surface of it, livestock have fairly straightforward needs, primarily food, water and, dependent on location and climate, a degree of shelter. However, different species are better suited to particular environments. Whilst past domesticated animals probably differed in some respects to modern livestock, and data on analogous rare breeds, such as soay sheep (Ryder, 1981:184) are limited, the fundamental aspects of biology and behaviour are likely to have been similar (Randall, 2010a:29-30). Tolerances for climate, reproductive cycles, herd structures, animal behaviour, availability of fodder, and other aspects of management, would immediately impose an annual seasonal and daily rhythm on communities.

Access to water is crucial but differs by species. Cattle consume more water than pigs, goats or sheep, which obtain most of what they require from vegetation (Goodwin, 1973; Goodwin, 1979; Salmon, 1981; Reynolds, 1987). This affects the numbers and location in which they can be kept, or how often they need to be moved. Livestock need a constant supply of fodder year round, with particular needs at certain times of year (e.g. tupping, lambing and calving (Fraser, 1947: 40; Goodwin, 1979: 84-5; Henderson, 1944: 82-3; Smith Thomas, 2005: 125)). Foddering and grazing are also different for each species. Cattle and sheep are primarily grazers but will tolerate a range of other feed, whilst goats thrive on a range of browse. Pigs can graze, but as omnivores will also turn over the soil in search of tubers, invertebrates and small vertebrates, will forage for nuts and seeds, and can be fed on waste (Allen, 1910; Goodwin, 1973; Manolson et al., 1988; Masseti, 2007; Papachristou et al., 2005; Ross, 1989; Seymour, 2003; Smith Thomas, 2005). This in turn affects the location of suitable grazing. In addition, different herbivores have different methods of eating. Cattle eat longer grass than sheep, wrapping their tongues around it to rip it up; sheep nibble, so prefer shorter, refined species (van Wijngaarden-Bakker, 1998: 176; Blake, 1990: 18), which manifests as grazing preferences (Putfarken et al., 2008). Goats can assist in reclamation of scrub, grazing more marginal land whilst

leaving the grass (Bryce and Wagenaar, 1985: 94; Halliday and Halliday, 1988, Papachristou et al., 2005: 146; Morland-Fehr, 2005: 27).

Topography, exposure, soil types and rainfall provide broad parameters which influence plant communities, choice of livestock species, and matching these to the available grazing. This seems to be reflected in regional patterns in British prehistoric faunal assemblages (e.g. Hambleton, 1999; Serjeantson, 2011). In addition, a wide range of livestock diseases are related to grazing and other husbanding practice; parasites and some infections are directly related to re-infection from pasture due to the life cycle of the organisms as well as damp ground conditions (Fraser, 1988: 213-4; Salmon, 1981: 146-7; Manolson et al., 1988: 187-9). Some conditions can be managed with simple treatments, for example foot cleaning and fleece clipping, which are assisted by pens and stalls. On the other hand, close housing of stock can have implications for respiratory illness and infectious diseases (e.g. Bryce and Wagenaar 1985; Defra, 2002; Fitzherbert, 1534; Olmos et al., 2009;Schütz et al., 2009; Street, 1942; Wall et al.,1993).

These considerations immediately bring about decisions regarding the stocking density for any given area, suitability or possibility of winter grazing, foddering with crop by-products or on stubbles, or the development of other strategies, including which landscapes were exploited or not. Choices are not necessarily environmentally determined, but are framed by the parameters which the physical landscape provides. The range of possible choices might include high degrees of mobility and utilisation of highly extensive approaches (smaller numbers of animals grazing over a wide area), utilisation of crop residues or fodder storage, or selective seasonal culling to conserve fodder. All have possible repercussions for other economic activities (arable cropping, exploitation of wild resources), organisation of labour and mobility (mobile and transhumant lifestyles), settlement, tenure, territory and society.

Managing grazing – understanding the contribution of the land

Management of grassland is an area of considerable expertise for modern livestock farmers and crucial for animal health and yields. However, we have not tended to consider it as an area of technical expertise for ancient farmers. We cannot assume that prehistoric farmers did not understand the nutritional and health related differences between different forages and pastures. Pasture is not just ‘grass’ but a complex mixture of grasses and herbaceous species, each with its own range of ecological preferences. Some assist fertility by fixing nitrogen or concentrating minerals and nutrients, whilst others are unpalatable and invasive (Bryce and Wagenaar, 1985: 12). Acid soils and wet land favours grass species which are nutritionally poor (Houghton Brown and Powell-Smith, 1984: 167; Seymour, 2003: 166). It is possible to manage some of these problems by relatively simple technologies such as burning dead grass, repeated mowing, ploughing up, cutting or pulling weeds before they seed, encouraging drainage, or marling with chalk if available (Archer, 1988: 25). However, strict management of grazing itself can manage invasive weeds, and prevents development of coarse and unpalatable clumps (Bryce and Wagenaar, 1985: 13-15). Spring grazing encourages a wider range of palatable species to produce more foliage when grazed (Gibson et al., 1987: 42). It can be used to target specific weed types (de Bruijn and Bork, 2006; Harrison and Bardgett, 2008: 208).

Grassland varies in its components not only by climatic region and within specific topographical/geological landscapes, but highly locally, over a matter of meters. Grazing herbivores interact with the sward depending on palatability and accessibility, selectively grazing out their preferred plants, as well being influenced by elevation, exposure and distance from water (Frame, 1992: 176-7; Fraser, 1946: 103; Ganskopp and Bonhert, 2009: 110-111; Searle and Shipley, 2007; 2008: 128-9). On the other hand, over-grazing can lead to reduction of grazable perennial plants, poaching, soil erosion and run-off (Jones and Dowling, 2005). This is particularly exacerbated if pigs are grazed (Allen, 1910: 118; Goodwin, 1973; Hodgkinson et al., 2009: 222, 225). Due to the differing grazing preferences of the species, and consequential varying degrees of localised nitrogen input, different combinations of livestock can cause highly variable changes to the sward (Esmail, 1991; Harrison and Bardgett, 2008: 205; Prins and Fritz, 2008: 192), which may require management.

Grazing practice also has an important role in managing parasite problems, as some parasite lifecycles occur partly on the ground (Salmon, 1981: 146-7). Animals lose weight or do not thrive with a parasite load, and the loss of condition is quite visible, enabling an association between a particular area of ground and poor stock condition. Management can include regular rotation of grazing, allowing animals onto fresh, rested pasture (Fraser, 1947: 157-8; Salmon, 1981: 49, 146-7; Walker et al., 1989), mixed grazing of cattle and sheep, or alternate grazing between species, as different parasites attack different livestock. Reducing the stocking density reduces the likelihood of re-infection (Alderson, 1988: 136). Liver fluke in particular are persistent, but prefer wet locations, so restriction to seasonal use might be sufficient to avoid re-infestation, whilst saltmarsh is beneficial in deterring both liver fluke and foot rot (Salmon, 1981: 146-7; Stallibrass, 1996: 59). All of these issues were open to observation by ancient farmers, and the development of expertise to respond to it, including arranging the spaces used for husbandry to facilitate a style of management.

Fields as Infrastructure

A selection of ethnographic and modern developed world approaches to livestock husbandry were used in considering the use of physical changes to the landscape for animal management (e.g. Albarella *et al*., 2007; Amorosi *et al*,.1998; Chang, 1993; Chang and Tortelotte, 1993; Doyle, 1870; Fitzherbert, 1534; Frame, 1992; Frazer, 1947; Goodwin, 1979; Haas *et al*.,1998; Halstead, 1996; Henderson, 1944; Kelly, 2000; Lake, 1989; Lewthwaite, 1981; Rasmussen, 1993; Street, 1942; Tani, 2002). Structures are generally associated with close handling (assisting with calving/lambing, managing injury or disease, slaughter), grazing management and movement through spaces. In crude terms, most animals in highly extensive and mobile pastoralist and transhumant systems require a near constant human presence at close quarters (Chang and Tortellote, 1993; Kelly, 2000; and Lewthwaite, 1981). Using physical infrastructure (fences, hedges, ditches, walls) can prevent animals from straying, provide water, and manage grazing with reduced human presence; labour is invested in the structures themselves, and therefore activity can be more episodic (Randall, 2010a; cf Wickstead, 2008: 74). However, management of grazing in a more restricted space (assuming a concern for future resource availability), would have required different types of intervention, either in directing livestock to particular areas, and providing an infrastructure to manage their grazing behaviour. Fields by themselves do not indicate intensification (Wickstead, 2008) but reflect changes in the deployment of human effort. Optimisation of labour was an underpinning feature of 18th century developments in farming in Britain which led to radical reorganisations of fields into the 19th century (Taylor, 1975: 119, 140), but need not be the case in all examples.

Fields obviously had a role in arable cropping. Indeed, maximisation of grazing quality, fodder and arable crops for human consumption leads to greater demands for manure, so intensive cultivation is complementary with intensive livestock management (Bogaard, 2005: 179). However, specific elements indicate animal handling, but have little benefit in arable cropping. If land boundaries, fields, gates and pens are seen as equipment, integrated husbandry practices to provide a system, we can regard them as a form of technological choice (cf. Pfaffenberger, 1988; 1992) or as Løvschal (2014: 727) describes it, spatial technology. Fields can be agricultural 'fixed equipment'. Components of field systems can be understood as practical devices directly related to parts of the process of livestock production, tailored to the localised requirements of livestock, provision of water, management of grazing and fodder, handling and shelter.

So, how to identify 'infrastructure'? Firstly, it needs to adequately and reliably control the movement of animals, primarily to contain them. Consequently stock-proof boundaries are a necessity (Alderson, 1988: 117; Bryce and Wagenaar, 1985: 95; Hart, 1994: 38; Smith Thomas, 2005: 14). These might take a number of forms but essentially need to be of a certain height/width and robustness, to control access and egress. Whilst the features we excavate may not fulfil those criteria we should be wary of dismissing them. The original height of stone walls, and very existence of hedges and fences can be very difficult to discern, and lack of this has been used to interpret boundaries in conceptual terms (e.g. Johnston, 2005: 219). The most frequently excavated later

prehistoric boundaries in southern Britain are ditched, although earthwork banks are also frequent. Some ditches would in some places be crucial for drainage, for both arable and grassland as well as provide an effective barrier to livestock, especially when flooded. Where this was not the case, ditch digging would also provide material for a well drained bank needed for the establishment of hedge plants (Pryor, 2006: 84; Maclean, 2000: 47). Narrowly separated and concentric ditches may well, as suggested for Fengate, East Anglia, represent embanked hedge lines (Evans, 2009: 245). Traditional modern laid hedges are stock proof when maintained with simple equipment. Suitable hedge species readily establish from cuttings (Seymour, 2003: 138), and these are frequently identified in preserved wood assemblages. Convincing evidence for the presence of hedging associated with later prehistoric fields and enclosures is now being identified from a variety of south-western British sites, including Hillfarrance, Somerset (Jones, 2006). Woodland management would provide wood for suitable post and rail fencing and wattle hurdles. There is evidence for fences in various contexts across the south-west of Britain throughout the Bronze Age and Iron Age, including fence lines and wood from possible post and rail fences at Wotter Common, Shaugh Moor (Orme and Morgan, 1982; Smith *et al*., 1981: 269). Lynchets on hillsides are a by-product of ploughing and a useful indicator of arable cultivation, (Fowler and Evans, 1967: 298) but fences or hedges would render them stock-proof, and assist and explain the locations of soil accumulation.

'Infrastructure' also includes stock handling equipment. These components can be regarded as diagnostic to a system designed around the needs of livestock. It has been argued that rectangular spaces relate to cross-ploughing with an ard (Harvey, 1980: 42-3), but cultivation marks have also been identified in non-rectilinear spaces (Fowler, 1981: 19). Whilst gates positioned in the corners of fields make no practical difference to arable cropping, in rectilinear fields the sides of the land parcel create a funnelling effect useful in stock handling (Pryor, 2006: 101). The provision of angled field sides, facilitate handlers to work effectively with the visual parameters and flight response of the animals to move them with ease (Grandin 1980; Grandin and Deesing, 2008; Randall, 2010a: 108). Gates in field corners are therefore a compelling indicator of pastoral use, albeit with the caveat that curvilinear systems can also be utilised effectively, as evidenced by modern work on low stress livestock handling (Grandin and Deesing, 2008; Weller, 1982: 67). Races, sorting gates, and close handling pens (Figure 1) have a recognisable morphology (Randall, 2010a: 105-112) and can be related to the physical size and numbers of the primary livestock species (Grandin and Deesing, 2008; Pryor, 1996; 2006). Where buildings occur in association, their use for animal housing should be considered (Randall, 2010a: 109-111).

FIGURE 1 Commonly seen stock handling features. A = corner gate B = funnel entrance C= track D pen E = race F = sorting/drafting gate

The arrangement of enclosed spaces can also directly relate to use. Grazing management presupposes that a series of parcels will be available, and animals easily transferred from one space to the next. In modern British livestock farming this is referred to as paddock grazing, with 'creep' grazing a variant which allows lambs first access by use of variable sized gates/barriers (Goodwin, 1979: 97-8, 173-4, 191-98). In recent years the method has been reintroduced in large fields as 'strip' grazing which controls sequential access to a fodder crop across a field by use of a moveable barrier. In modern systems this is generally an electric fence, but is achievable using wood hurdles.

Fields also provide the possibility of 'aftermath' grazing of stubbles after cropping (Forbes, 1998: 30) and reintroduction of highly valuable nutrients (Bakels, 1997; Barker, 1985: 51; Guttmann, 2005). Sheep in particular are a very efficient converter of plant matter to dung (Lewthwaite, 1981: 61). Whilst livestock can utilise spaces used for arable cropping without stock proof boundaries, via tethering, this is only suitable for management of small herds. Cattle are often tethered individually on cultivated ground in modern Greece, and goats in Britain and northern Europe are generally tethered due to their capacity to eat through fences and hedges (Bryce and Wagenaar, 1985; Goodwin, 1973). In both cases these animals are kept in small numbers. The variable application of medieval southern English strip farming provided a number of integrated functional attributes, including regulation of

grazing and cropping (Campbell, 1981: 113-4; Campbell and Godoy, 1992: 100), with spatial arrangements complemented by social practices. The relationship of livestock husbandry and arable cropping can be potentially complex, given the possibilities of deliberate production of cut fodder (e.g. hay) for seasonally housed animals, or 'zero grazing' systems (which involves keeping animals separate from the land which produces the fodder, and in the past might apply particularly to pigs), which reduce waste (Salmon, 1981: 51). Neither is the distinction between crops for food, fodder or fuel straightforward, with the potential for arable crops to be food for people, fuel, or animal feed dependent on crop, plant part, quality, available quantity, and time of year (e.g. Jones, 1998: 96).

With regard to nutrients, we should also consider the relationship of the 'inside' and the 'outside' of a system. Historically in Britain, and into the modern period, moors, commons, woodland grazing, wetlands and flood meadows have been important (Poulsen, 1997: 119). In the modern period, the integration of these elements is best exemplified by upland hill farms which utilise a combination of 'inbye' land (smaller areas of better quality lower lying land capable of an arable crop), 'outfields' (providing managed grassland), and the 'common' grazing where there is generally free rein at low stocking densities over a wide but defined area. Allowing animals access to wider areas not only provides additional grazing at times when fields might be being used for arable crops, but also potentially enables a transfer of nutrients from 'outside' to 'inside' especially where livestock are penned overnight on arable stubbles and grazed 'outside' during the day. This introduces not only the possibility of a number of daily, weekly and seasonal movements between the enclosed and unenclosed space but has implications for the diurnal or seasonal deployment of labour. Where movement of animals around and beyond a system of land parcels is frequent, the appropriate infrastructure is likely to be designed for it, not only via tracks and droves allowing access to the land parcels themselves, but also in the form of funnel-shaped entrances into the field system to facilitate the seasonal, periodic or even daily, movement of stock (Randall, 2010a: 108).These types of arrangements have been recognised in various places, being discussed with respect to the Dartmoor Reaves (Wickstead, 2008). In Yorkshire the later Bronze Age/Early Iron Age linear earthworks defined areas of high pasture, with an interest in regulating movement between it and land at lower elevations, which continued as a seasonal practice into the recent past (Giles, 2012: 56-7). Related to the daily or seasonal rhythm of tasks of livestock care, foddering and movement, is the relationship of settlement to fields. Housing for humans gives us an indication of the demands of labour by the system employed.

Model systems

The considerations outlined above can be distilled down to a range of model arrangements. These were prompted by a variety of modern examples from both traditional and more industrialised systems and from historical, largely European approaches. A highly simplified series of hypothetical systems for livestock management arising from these observations is shown in Figure 2. Isolated structures in an unbounded landscape (Figure 2 a) provide stock-handling facilities. The extensive cattle herding practiced by the semi-nomadic Masai, relies upon enclosures with integrated pens, paddocks and houses (e.g.Shahack-Gross et al. 2003). Transhumant cattle and sheep herders in Sardinia and the Greek Pindos mountains utilised small enclosures for milking and handling livestock, which incorporate huts and pens (Mientjjes, 2004; Chang, 1993; Chang and Tourtellotte, 1993), whilst small stock pens for sheep 'stells' were frequently used in the Sottish Highlands (Weller 1982), and small stone structures within enclosures used for lambing across the southern Mediterranean and Near East (Tani, 2002). The general absence of physical barriers, but provision of potential places for close handling of livestock suggests an open terrain and an extensive, mobile system of livestock management.

Large parcels (Figure 2 b) might encompass a range of terrain and ecological niches. This may include some stock-handling features and whilst facilitating more controlled grazing and potential reduction in day to day human input, still represents an extensive system, most likely focussed on grassland management. Large terrain oblivious areas which might include livestock handling features

cater to the range of needs outlined above but within the individual parcel. The 19th century Inclosure movement in southern Britain generally involved the creation of field boundaries, in some cases rearranging the landscape, and sometimes where none had previously existed or creating larger plots. This was prompted by changes in land holding, but produced more coherent units of land which provided of arable production and/or pastoral husbandry, dependent on location and conditions (Grigg, 1982), and reduced labour input whilst increasing rotational grazing and greater foddering potential in one parcel.

FIGURE 2 Hypothetical systems

Clustered isolated blocks (Figure 2 c) of smaller, similarly sized land parcels more suitable to arable production, with stock handling features, suggest a more tightly controlled livestock management system, which might utilise folding of animals on arable stubbles or rotational grazing. The southern British 19th century field systems often have internally coherent arrangements of land parcels and stock handling features (e.g. Doyle, 1870), and enable an integrated operation as a coherent unit, addressing a range of more specialised production goals. The temporary seasonal deployment of infrastructure can be seen in the use of temporary lambing pens and penning on arable stubbles used in lowland central southern England in the 19th and 20th century (Street, 1942, 42). Hierarchical spaces with races, runs, sorting gates and pens are common in modern industrialised systems (e.g. Grandin and Deesing, 2008). Extensive modern hill farmers in Britain utilise a combination of 'inbye' land, 'outfields' and 'common' grazing which is characterised by use of the enclosed land for arable in the summer and overwintering stock (Fraser, 1947, 84). A similar approach was utilised in the 20th century by Mennonite farms in Manitoba, Canada (de Garis de Lisle, 1982). Associated settlement, adjacent or within the system and greater evidence for arable crops suggest a more integrated arable-pastoral system, with the scale of the operation indicated by the size of the overall unit. Tracks and funnel entrances providing for movement of stock into a wider unbounded landscape indicate use of unenclosed grazing, and dependent on terrain, potential for seasonal changes in land use. This extensive grazing would require stock to be accompanied, or ownership and control negotiated in other ways, and organised around the timing of arable production.

Larger contiguous blocks of bounded land (Figure 2 d) may result from the aggregation of smaller units or exhibit coherence or planning. This on a larger scale may include a range of parcel sizes suitable for a variety of purposes, suited to the terrain or soils; stock-handling features; and buildings. Where the complexity demands tracks and droves interior to the system to facilitate movement of people and animals within and between its elements, closely managed rotational grazing and close integration with arable cropping is suggested, but on a greater overall scale.

These generalised models do not reflect the ways in which fieldsystems would respond to local topography, pre-existing anthropogenic landmarks and other places of significance. We never see the entire picture, and certainly not in sharp chronological focus. No system that lasted any duration is likely to have been static, but adapted, developed, extended, partly abandoned and reworked.

Applying the models – Cadbury Castle and its Environs, Somerset, UK

In southern Britain, later prehistoric field systems can be argued to be relatively well understood, although often their full extent, range of boundary forms (ditches, fences hedges or walls), or chronology has not been fully defined. A limited number offer the opportunity to distinguish a sequence of field systems of different forms within the same landscape throughout the Bronze Age and Iron Age. This is desirable as it addresses the issue of the morphology of a system being dictated by the form of the land itself (its geology, aspect, elevation and topography) or by a 'design' preference related to chronology. In addition, it is rare to have this information in combination with data on the contemporary animal populations which likely inhabited these field systems. Some lack, or have limited faunal data such as the mid 2nd Millennium BC fields at Bestwall, Dorset (Ladle and Woodward, 2009), Mucking, Essex (Done, 2016: 201; Rajkovača, 2016: 433) or Yarnton, Oxfordshire

(Mulville and Robinson, 2016; Mulville *et al.*, 2011; Pelling, 2011). Others have a shorter chronology, such as the predominantly Bronze Age landscapes of Fengate, East Anglia (Evans, 2009). In other cases, investigation has occurred in great detail, but over more limited areas such as Mucking (Evans et al., 2016) or Yarnton (Hey et al., 2016; Hey et al., 2011).

FIGURE 3 Cadbury Castle location, and sites mentioned in the text

Cadbury Castle, Somerset, is one location where a large area has been systematically examined, and there is both a large faunal dataset and archaeobotanical data is available for comparison for most periods (Figure 3). The site is a multivallate Iron Age hillfort, with underlying Neolithic and later Bronze Age activity, and subsequent Roman, post-Roman and medieval reuse. The hillfort was excavated between 1966-70 and 1973 by Leslie Alcock (1967; 1968a; 1968b; 1970; 1971; 1972; 1980; 1995), and analysis of the 1st millennium BC material was carried out in the 1990s (Barret et al., 2000). Re-examination of the Neolithic material was recently completed (Tabor and Randall, 2018). The South Cadbury Environs Project (SCEP) was founded in 1992 to carry out a study of the surrounding prehistoric landscape, and examined a number of sample areas within an 8km by 8km square around the hillfort. Using geophysical survey, systematic plough zone sampling, test pits and area excavation, SCEP identified a variety of previously unknown occupation, field systems, boundaries, and settlements dating from the Early Neolithic to the medieval period (Tabor, 2002; 2004a; 2004b; 2008; Tabor and Randall, 2018). Sites were both closely adjacent to, and contemporary with, the various phases of activity on the hill. A series of field systems, interspersed with phases of unbounded landscape, commenced from around 1700BC. Cadbury Castle and several of the SCEP sites produced faunal assemblages (c. 100,000 fragments from the hill, c. 20,000 from SCEP sites) (Randall, 2010a). These assemblages related to the Early Neolithic (Tabor and Randall, 2018), the Middle and Late Bronze Age and through the Iron Age, although no earlier Bronze Age material was available.

Cadbury Castle occupies a steep-sided isolated limestone hill, situated to the north of a limestone escarpment. It is surrounded by steep valleys on Yeovil Sands with a lower lying rolling landscape of heavy clay soils to the west and north, where it more distantly overlooks the wetlands of the Somerset Levels. Locally there are a number of springs feeding streams which encircle the hill and characterise the surrounding valleys, whilst 2km to the north, the River Cam runs east-west and forms a natural boundary. The topography, elevations, and soils are therefore highly variable within a relatively small area, and offer a range of agricultural possibilities. There is a notable similarity between the faunal assemblages from sites in the environs and the hillfort, suggesting that these can be regarded as closely representative of the local domestic animal populations and their consumption and disposal (Figure 4).

FIGURE 4 Relative abundance of the main livestock species, Cadbury Castle

The changing organisation of the landscape over nearly two millennia can be considered against the proposed models (Figure 5). The summit of Cadbury Castle was a focus of activity during the Early Neolithic with the digging of pits and creation of possible post-built structures. The SCEP site of Milsom's Corner on the west flank of the hill produced evidence of near contemporary use, around the 36th century BC (Tabor and Randall, 2018). The faunal assemblage from the hill was characterised by a large proportion of pig remains, which fits with utilisation of a largely wooded landscape (Randall, 2018), although general information on the local environment is limited. The earliest indication of a structure used to facilitate livestock husbandry in the Cadbury landscape is a small sub-rectangular ditched enclosure with an annexed pen and possible sorting gate at Card's Piece, Woolston (Tabor, 2008: 53) (Figure 6). This structure probably dates to before c. 1700 BC and likely existed in an area of more open landscape, although environmental information is scant. No faunal remains were available but contemporary assemblages in the region tend to reflect cattle with few sheep, although the samples are small and occur infrequently (Randall, 2016). The scale of the structure could be

consistent with cattle or sheep, and may fit with Model a) (Figure 2; Figure 6), of an extensive pastoral approach with a considerable level of mobility.

FIGURE 5 Changing models of organisation in the South Cadbury environs

FIGURE 6 Bronze Age Sites in the South Cadbury environs: Sigwells, Milsom's Corner and Card's Piece.

The first major attempt at systematic division of the landscape occurred in the later part of the first half of the 2nd millennium BC. The dating of these systems is inexact, based on relationships with later, better dated features (Tabor, 2004; Tabor, 2008: 49; 52, 61), but is consistent with an inception around 1700BC, in keeping with other examples in south-west England. Contemporary flint and pottery was generally widely distributed in the landscape (Tabor, 2008: 48-9). Linears on the high ground and lighter soils at Sigwells, Charlton Horethorne, consisted of long, straight, parallel ditches spaced c. 100m apart, across a limestone and sandstone plateau, and were traceable for at least 1km, following an apparently terrain oblivious course. Similar boundaries also occur in low-lying locations with heavy soils, such as Crissells Green in the base of the South Cadbury Valley (Tabor, 2004), Sparkford and Weston Bampfylde, on heavy clay (Tabor, 2008: 51), and at Parsonage Farm, Sutton Montis, in a low lying, wet area (Randall, 2011).Together these suggest a co-axial system aligned broadly north-west to south-east which covered an area of at least 3km around the south of the Cadbury hill, covering varied topography and soils, extending to the west and north of the hill. In all cases water was easily available within the bounded areas, reducing the need for daily stock movement. None of the excavated examples of ditches have proved particularly deep or broad, and may not have been stock proof on their own. The ditches may have provided a source of bank material for hedging as suitable scrub species were present in many locations throughout later prehistory (De Carle, 2014: 142). The Sigwells system (Figure 6), which is the best understood section, included a possible race. Tabor has suggested it could be of use in marshalling sheep (2008: 49), but the scale might imply cattle (Randall, 2010a: 143). The layout could function equally well for the extensive running of cattle or sheep, but it would enable regulation of extensive grazing. No contemporary settlement has been identified which is in itself potentially telling, and contributes to a lack of faunal material. The southern British picture is of cattle with an increasing number of sheep (Serjeantson, 2011: 96). There is little evidence for any focus on arable production. A small single Early Bronze Age sample from Woolston provided a few indeterminate cereal grains, weed seeds and nut shell (De Carle, 2014: 146). The form of this system appears of large scale, open areas, broadly suitable for either cattle or sheep, but with limited evidence for arable cropping or intensity of production and is consistent with Model b) (Figure 2; Figure 5).

FIGURE 7 Iron Age Sites in the South Cadbury environs: Sheep Slait, Cadbury Valley and Sigwells

These uncomplicated and coaxial systems which covered areas spanning kilometres were superseded by an entirely different approach. An arrangement of settlement and field systems at Milsom's Corner (Figure 6) dating from the 14th-13th centuries BC indicates a more small scale and nucleated approach. Just to the north of the earlier linears at Parsonage Farm, the arrangement was situated on well drained and fertile soil. It comprised a cluster of small fields and paddocks with buildings within it and a spinal trackway which opened via a funnel entranceway onto the lower lying wetter ground, with easy access to water. Utilisation of lower lying areas may have been limited and imply seasonal use. The small animal bone assemblage gives a relatively even abundance of cattle and sheep with some pig. This is a typical approach for the Middle Bronze Age of southern England, in which there was no specific emphasis on one species or product (Randall, 2010a: 144-5). The archaeobotanical evidence also indicates a range of crops: barley and emmer wheat as well as flax (De Carle, 2014: 76, 147). The form of fields, on better soil, and facilitation of grazing on the poorer land, appears to indicate a small scale but integrated pastoral and arable system, as suggested in Model c) (Figure2; Figure 5). A slightly later enclosure at eastern Sigwells however, appears to have existed in a largely unenclosed landscape, although it was aligned on and reused one of the earlier boundaries

(Tabor, 2008: 61). Here the faunal assemblage had sheep as the more abundant species by some margin (Randall, 2010a: 145), but the particular uses of the enclosure for metalworking (Tabor 2008) and obviously structured nature of deposition on the site may have skewed the record. Sheep were utilised in at least one specific consumption event. The enclosure itself does not fit with any of the agriculturally focussed models proposed, which supports its identification as having a particular and different purposr. This picture fits with a model of focussed areas of production within a less intensively utilised and unbounded landscape.

The earlier 1st millennium saw these systems go out of use whilst new construction of boundaries appears to have been rare. The distribution of Late Bronze Age pottery was limited to an area directly around Cadbury Castle, suggesting a focus of settlement at the time that the hillfort commenced its development (Tabor, 2008: 77-8; Barrett, et al., 2000). At Sheep Slait, to the south, during the Late Bronze Age-Early Iron Age, boundaries were associated with a ringwork enclosure, of a type better known in the Thames Valley (Tabor, 2008: 93-4; cf. Yates, 2007: 128). The boundaries enclosed large areas of land, rather than small aggregated or nucleated parcels (Figure 7). Although understanding of the full system is hampered by the effects of modern ploughing, this system in many respects fits Model b) (Figure 2; Figure 5). However, the association with settlement and the evidence of arable cropping suggests more aspects of Model c). There was a shift in the arable economy in the later Bronze Age with an increase in the importance of spelt wheat, with spring sowing indicated (De Carle, 2014: 76, 131-2). This might also allow more grazing time over winter (Jones, 1981: 104). The cropping regime suggested by archaeobotanical material from Sheep Slait is an intense one (De Carle, 2014: 158), which maximises land use, and which appears at odds with the structure of the landscape. The location of arable production may be debateable, and the morphology of the model potentially misleading. The contemporary land use around Cadbury Castle, appears to be completely unenclosed, and more in keeping with Model a), so the interaction of components over a wider area was variable. In the Cadbury Castle animal bone assemblage, cattle and sheep/goat were of similar abundance with pig a minority species in Late Bronze Age contexts and into the earlier Iron Age. A maintenance approach applied to sheep culling strategy, enabling exploitation for both primary and secondary products, at least for sheep/goat (Randall, 2010a: 150-152) and ensuring continuity in the flock/herd. However, in Early Iron Age contexts pig was particularly well represented, and this is echoed by the Sheep Slait assemblages. This probably relates to specific consumption practices, but may also fit with availability of a less regulated landscape in some areas, where pig keeping would not be disruptive.

The Cadbury Castle Early Iron Age faunal assemblage shows an increase in sheep/goat abundance at the proportional expense of cattle (Figure 4; Randall, 2010a: 159). However, the marked change came in the mid 1st millennium. The volume of faunal data was much expanded both in the Cadbury Castle and SCEP sites, reflecting both the zenith of the hillfort development but also activity at a greater number of settlement sites in the environs. The relative abundance of sheep/goat increased further, with cattle reduced, and pig a minor player. This chimes entirely with the characterisation of the period as the 'sheep age' in southern Britain (Albarella, 2007). The number of goats represented was very low, which may relate to their disruptive behaviour. There is some evidence for the utilisation of cattle for dairy production and traction (presumably related to arable production), but a notable factor is the culling strategy employed for sheep/goat. This reflected a clear herd management strategy of culling out surplus young stock to manage foddering requirements and probable deliberate selection of breeding animals for flock management reasons (Randall, 2018). Once the approach was established it remained stable until the end of the 1st millennium BC (Randall, 2010a: 166, 184-187). The landscape showed a floruit of field systems which occurred throughout the South Cadbury Valley, on the Sigwells plateau (Figure 7) to the south, as well as on the north flanks of Cadbury hill, and to the west. All areas and soils were used, including for the first time, areas of heavy clay (Tabor 2008), although there was a preference for more level ground. Each of these field systems was positioned with access to water either within it or nearby.

These Iron Age systems were extended arrangements of multiple enclosures of varying sizes and incorporating numerous stock handling features including races, droveways, as well as funnel

entrances from what appears to have been open grazing. Houses occur within the layouts, along with smaller features which appear to be pens (Randall, 2010a: 175-179), and this would fit with Model d) (Figure 2; Figure 5). The number of paths and droveways indicates that moving animals appears to have been an everyday concern, either for water or grazing management. A large droveway, 40m wide, north of Cadbury Castle which crossed a substantial tributary of the River Cam, probably had Middle Iron Age origins, and continued in use into the Romano-British period (Randall, 2014). The droveway may have been used to bring stock in from outside the system, presumably for consumption within the hillfort. This raises intriguing questions about the relationship of the hillfort with its wider hinterland and the possible seasonal grazing of the wetlands to the north-west.

The likelihood that arable cropping was closely related in systems of this type is clearly supported in this case, as the archaeobotanical data show an increase in absolute numbers of specimens, but also changes with the introduction of oat, rye, celtic bean and pea, and more emphasis on spelt at Sigwells and emmer elsewhere. The usefulness of legumes in nitrogen fixing suggests that this may have become important in the Cadbury environs in the Middle Iron Age (De Carle, 2014: 129), which supports a more intensive use for the field systems. There is a lack of flax in the Iron Age samples which fits the picture elsewhere (De Carle, 2014: 150), possibly relating to the availability of wool from the animal economy (Lambrick and Robinson, 2009), and fits with the focus on sheep seen in the faunal assemblages. The weed assemblages appear to also indicate a shift, either to autumn sown crops or a less intensive regime, although many of them are possibly associated with areas previously in cultivation or field margins and different soil types (De Carle, 2014: 124, 131). Given the other evidence however, an interpretation of a change to autumn sowing might be preferred. Autumn sown crops also tend to be more productive (Ellis and Russell, 1984). Storage capacity in the form of pits increased dramatically within the hillfort but also in several locations in the surrounding landscape, particularly at Sigwells and to the east of the hillfort at Hicknoll Slait (Tabor, 2008). The extensive areas of pits imply a dramatic change in arable production, but could also have been used for storage of animal fodder. Increasingly through the last few centuries BC, these pits became the receptacles for a range of complex structured deposits often including the articulated or accumulations of disarticulated remains of livestock animals, which suggest changes to the ideological uses of animals. In the latest Iron Age that there was an observable increase in the frequency and complexity of highly structured deposition involving livestock and other domestic animals, human remains and other artefacts and materials (Randall, 2010b; Jones and Randall, 2010). There was a clear change in the meaning of domesticated animals which went beyond their economic contribution, but may also have reflected it.

The Iron Age systems were altered, added to, with parts abandoned over time, but provide a general picture of a highly complex system which lasted several hundred years before parts began to go out of use in the decades before the Roman invasion. The stabilities in the relative abundance of sheep/goat and the culling strategy throughout the late first millennium BC are striking (Randall, 2010a: 187). However, there were nuances, such as changes in the rates of particular pathologies in sheep/goat that might have related to alterations in husbandry and a propensity to over-grazing (Randall, 2018). As fields went out of use, sheep appear to have been more prone to degenerative joint problems potentially related to walking further or standing on steep or hard ground. They were however less prone to oral pathologies caused by over-grazing. A drift towards a less intense approach might be conjectured.

Some field systems appear to have weathered the Roman invasion, but many fell out of use before the turn of the first millennium AD. Despite several settlements in the area, including Castle Farm, Sigwells, and Parsonage Farm, there is little evidence for new land division. The exception is part of the Cadbury Valley system and at Woolston. Preliminary examination of the faunal remains, however, seems to indicate a broadly similar relative abundance of species as those seen in the later Iron Age, although the culling strategies are not yet clear. The aims of production appear to have remained the same but it took place in a much more open landscape. The post-Roman period is even more elusive. Despite the clear refurbishment of the hillfort in the 5-6th centuries (Alcock, 1995), burials dating to

the 7th century at Hicknoll Slait (Davey, 2005), and likely activity of a similar date at Castle Farm (Davey, 2005: 50; Randall, 2018), no boundaries of this date have been identified (Davey, 2005). A small assemblage of material from post-Roman contexts on Cadbury may not be representative, but seems to show very similar abundance of livestock as the later Iron Age assemblages (Randall, 2018), although with the addition of slightly more wild species such as deer.

Time and Place - Discussion

Each in the sequence of field system layouts has parallels in the south-west of Britain, so the South Cadbury fields are far from unique. However, they are distinguished by the possibilities of tracing changes throughout the 2nd and 1st millennium BC, and beyond, within one defined area. The focus of activity around the Cadbury hill in the later prehistoric period was most likely a combination of the variety of opportunities afforded by the topography, soils, and water availability, combined, as time went on, with the associations of previous use. We need to consider then why the different fields (and periodic lack of them) were appropriate at different times. Some of this may be related to changing population density, both of people and animals, but in this case the evidence is elusive. The large areas of land encompassed by boundaries from about 1700 BC if understood as extensive grazing areas with as yet unidentified foci of arable production may not have supported a greater number of people than the open country approach of earlier periods. The increased evidence for fields was not matched by extensive evidence of buildings or settlement. Therefore the imperative may have been around concepts of territoriality but also with the effect of regulating the degree and timing of labour involvement. Buildings first appear around the 14th century BC but in limited locations, and associated with fields. The more localised fields with an integrated approach seen at Milsom's Corner, was more complex but small scale, focussed on one location and utilising both good arable soils and nearby probably seasonal grazing opportunities. It also seems that there were not numerous foci of this kind in the district. The scale of landscape coverage may have changed, but the level of population involved perhaps did not.

It is interesting then that the increase in evidence of people and settlement in the earlier Iron Age, nucleated on Cadbury Castle and its immediate flanks, with the beginnings of a focus on sheep production, produced little substantive land division. The effect climatic changes in the south-west of Britain during the earlier 1st Millennium BC (Christie, 1986: 105; Quinnell, 1988: 10) is debateable, but the evidence from Cadbury Castle implies a greater population in the South Cadbury landscape in this period compared with before. It was apparently possible to cater for a larger local population within a fully extensive farming system, but this would have had implications for the organisation of daily tasks such as minding animals and the relationships between those carrying them out and other members of the population, as well as the as yet unidentified location of arable production. The variation in contemporary approach within a few kilometres is indicative of social complexities associated with land holding and the emergence of the hillfort. The nature of the ringwork at Sheep Slait indicates that Cadbury Castle was not the only significant locale in this period.

The increasing intensity and integration of production visible in the faunal data from the middle of the first millennium BC is contemporary with the appearance of large numbers of boundary features. There appears to be a relationship between complexity of fieldsystems and a shift in intensity of occupation and production, but with the addition of a more defined 'product', sheep. The versatility of sheep in providing wool, enhancing manuring for cropping and potential for more storable products, combined with evidence of storage, indicates a step change from previous approaches to exploiting the South Cadbury landscape. The sense is of attempting to produce more from the same space and with a greater definition of the aims of production. The way in which labour was organised and negotiated, and land controlled or owned must have changed dramatically in comparison to the previous period. Also, the range and depth of expertise needed to maintain these transformed husbandry practices over the long term would have been considerable with greater knowledge of specific culling strategies, grazing, arable crops and soils. These changes also went hand in hand with the development of the hillfort, so the reorganisation and creation of highly integrated and probably highly productive local

fields indicates a co-dependence of the hillfort and its immediate environs, with hints of connections to a broader hinterland. This chimes with the envisaging of hillforts emerging within a landscape of fields and settlement and possibly as the foci of an integrated productive system (Barrett, 1999: 254), but also indicates a different social organisation facilitating the deployment of labour and identifying areas of responsibility for land, crops and animals. The re-orientation of the landscape at the end of the 1st millennium similarly relates to the use of the hillfort space and articulation of new structures into the 1st millennium.

Each of the approaches seen in the South Cadbury landscapes can be seen to be 'effective' ways of exploiting that landscape, dependent on the aims of those arranging them. The flexibility of mixed farming, both in terms of livestock species, and in combining arable and pastoral agriculture means that it is achievable within a wide range of scales and intensity. The Cadbury Bronze Age landscapes indicate at least two different approaches and the earlier Iron Age a third approach. Each of these would have provided much the same outputs but required differing social negotiations of rights and responsibilities. In contrast the later Iron Age landscape is oriented around highly focussed production, both in terms of scale and type, resulting in much greater complexity and regulation. The landscape reflects the greater complexity of the aims of husbandry. The social roots of this step change must relate to the consumption needs of the burgeoning hillfort in this particular case.

The series of Cadbury fields demonstrates there will always be a variety of ways of responding to the combination of possibilities and constraints supplied by the particular locale, livestock animals, and available crops. At different times within this one landscape different ways of making a living were implemented, all of them to one degree or another successful given their longevity. There was no single 'right' way of carrying out livestock husbandry integrating it with arable cropping and neither was there a chronological 'progression', an evolution from simple to complex. At different times extensive and intensive approaches were 'right', and that was something socially determined rather than dictated by the place itself.

Conclusion

The physical properties of certain elements of field systems can not only help us to appreciate the framework of the economy, but also the daily, weekly and seasonal activities associated with it and consequent ordered movement of people, animals within a space. Re-articulation of the components of the space within the landscape, responded to the natural form and opportunities of that landscape, as well as referencing natural and anthropogenic landmarks. Changes in the ways that field systems were configured in the Cadbury landscape might be thought of as transformations in practical husbandry and social husbandry. Where field systems are complex and integrate various types of highly regulated production, there is also an implication that there would be a necessity for more complex negotiation of rights and responsibilities, access to the products, control of the resource, deployment of labour, and the ways in which status might accrue through demonstrated knowledge and expertise. The attitude of people to their animals is likely to have been more complex where considerations as to the livestock's welfare was integral to the way in which the landscape was organised and structured and where most people on a daily, seasonal and annual basis inhabited that space with and because of those animals. It might offer some explanations as to why animals increasingly featured in practices in the South Cadbury landscape which resulted in highly complex structured deposition in the later Iron Age. The physical proximity, relationships and meaning of animals placed at the heart of a society will have become part of its ideology; some of the depositional practices observed may be the result of status and meaning being mediated through animals as the core of the community.

Comparison of the model landscapes with that around Cadbury Castle has demonstrated that they can be a useful tool in appreciating that their form is not necessarily dictated by landform or chronology, but assists in framing questions with respect to intensity of activity and integration with other lines of enquiry. However, examples from within the Cadbury Castle environs do indicate that form alone is not diagnostic of an agricultural approach, as the archaeobotanical data are in this example at times at odds with the model suggested by the landscape layout. This is however an

extremely useful prompt to examine more closely the potential location of activities. Nevertheless, better understanding of how a particular layout or system could be used may assist in situations where faunal assemblages are absent due to preservational conditions.

If we can understand land use and division in a more nuanced fashion, we gain a whole new perspective on the social organisation of livestock and arable production and understand fields as whole entities, including the minutiae of their inception, use, development and abandonment; we can think about what went on inside fields, not just what they looked like from the outside, and adjust our research strategies accordingly. Another implication is that we underestimate the technical knowledge and expertise needed to carry out livestock husbandry, an expertise which arguably we in the modern developed world have a tendency to undervalue. We should perhaps look for the role of past farming expertise, or even specialists, in the different approaches to dealing with livestock production apparent within landscapes and decision making evident from faunal assemblages.

Acknowledgements
Thanks are due to Prof Mark Maltby, Dr Ellen Hambleton, Dr Richard Tabor, and Dr Mike Allen for their assistance with this project, which was originally funded by a Bournemouth University Studentship award. Great appreciation goes to Tara Fairclough for tidying up my figures to far greater effect that I could ever achieve; my attempts at design constantly amuse. Dr Cheryl Green and Richard McConnell cast helpful eyes over the text, and I am indebted to the reviewers for their detailed feedback. Any lingering nonsense is entirely my own. My lasting appreciation goes to all of the volunteers of the South Cadbury Environs Project and subsequently the South Somerset Archaeological Research Group, including dear friends who have departed to fresher pastures, and without whom the data would never have been available.

Contact information : Dr Clare Randall, Department of Archaeology and Anthropology, Bournemouth University, Fern Barrow, Poole, Dorset, BH12 5BB, United Kingdom
CRandall@bournemouth.ac.uk

References

Albarella, U. 2007. The end of the Sheep Age: people and animals in the late Iron Age. In: C.Haselgrove & T. Moore, eds. *The Late Iron Age in Britain and beyond*, pp.393-406. Oxford: Oxbow Books.

Albarella, U., Manconi, F., Vigne, J-D., and Rowley-Conwy, P., 2007. Ethnoarchaeology of pig husbandry in Sardinia and Corsica. In U. Alberella, K. Dobney, A. Ervynck, and P. Rowley-Conwy, eds. *Pigs and humans 10,000 years of interaction* Oxford Oxford: University Press, pp. 285-307.

Alcock, L. 1967. A reconnaissance excavation at South Cadbury Castle, Somerset, 1966. *Antiquaries Journal*, 47, pp. 47-51.

Alcock, L. 1968a. Cadbury Castle 1967. *Antiquity*, 42, pp. 47-51.

Alcock, L. 1968b. Excavations at South Cadbury Castle, 1967: a summary report. *Antiquaries Journal*, 48, pp. 6-17.

Alcock, L. 1969. Excavations at South Cadbury Castle, 1968: a summary report. *Antiquaries Journal*, 49, pp. 30-40.

Alcock, L. 1970. South Cadbury excavations, 1969. *Antiquity* 44, pp. 46-49.

Alcock, L. 1971. Excavations at South Cadbury Castle, 1970: a summary report. *Antiquaries Journal*, 5, pp. 1-7.

Alcock, L. 1972. *'By South Cadbury is that Camelot…' The excavation of Cadbury Castle 1966-1970.* London: Thames and Hudson.

Alcock, L. 1980. The Cadbury Castle sequence in the first millennium BC. *Bulletin of the Board of Celtic Studies*, 28, pp. 656-718.

Alcock, L. 1995. *Cadbury Castle, Somerset: The early medieval archaeology.* Cardiff: University of Wales Press

Alderson, L. 1988. Sheep and Goats. In: K. Thear & A. Frazer, eds. *The complete book of raising livestock and poultry*. London: Pan Books, pp. 104-139.

Allen, T. 1910. *Profitable pig breeding and feeding.* London: Upcott Gill.

Amorosi, T., Buckland, P.C., Edwards, K.J., Mainland, I., McGovern, T.H., Sadler, J.P., and Skidmore, P., 1998. They did not live by grass alone: the politics and palaeoecology of animal fodder in the North Atlantic region. *Environmental Archaeology* 1, pp. 41-54.

Archer, J. 1988. *Crop nutrition and fertiliser use.* Ipswich: Farming Press Ltd.

Bakels, C.C. 1997. The beginnings of manuring in western Europe. *Antiquity*, 71, pp. 442-445.

Barker, G. 1985. *Prehistoric farming in Europe.* Cambridge: Cambridge University Press.

Barker, G. and Gamble, C. 1985. Beyond domestication: a strategy for investigating the process and consequence of social complexity. In: G. Barker & C. Gamble, eds, *Beyond domestication in prehistoric Europe Investigations in subsistence archaeology and social complexity.* London: Academic Press, pp. 1-31.

Barnatt, J. 2008. From clearance plots to 'sustained' farming: Peak District fields in prehistory. In: A.M. Chadwick ed. *Recent approaches to land allotment.* British Archaeological Reports (International Series) 1875 Oxford: British Archaeological Reports, pp. 41-68.

Barrett, J.C. 1999. The mythical landscapes of the British Iron Age. In W. Ashmore and A.B. Knapp, eds. *Archaeologies of landscape contemporary perspectives.* Oxford: Blackwell Publishers Ltd, pp. 253-265.

Barrett, J.C., Freeman, P.W.M. & Woodward, A., 2000. *Cadbury Castle, Somerset The later prehistoric and early historic archaeology.* London: English Heritage.

Blake, F. 1990. *Organic farming and growing.* 2nd Edition Marlborough: The Crowood Press.

Bogaard, A. 2005. 'Garden agriculture' and the nature if early farming in Europe and the Near East. *World Archaeology*, 37(2), pp. 177-196.

Breen, E. 2008. Encounters with place in prehistory: writing a case study for Shipman Head Down, Isles of Scilly. In A.M. Chadwick (ed), *Recent approaches to the archaeology of land allotment* British Archaeological Reports (International Series) 1875. Oxford: British Archaeological Reports, pp. 97-109.

Brück, J. 2000. Settlement, landscape and social identity: the Early-Middle Bronze Age transition in Wessex, Sussex and the Thames Valley. *Oxford Journal of Archaeology*, 19 (3), pp. 273-300.

de Bruijn, S.L. and Bork, E.W. 2006. Biological control of Canada thistle in temperate pastures using high density rotational cattle grazing. *Biological Control*, 36, pp. 305-315.

Bryce, D. & Wagenaar, A.1985. *Grassland smallholding.* Lampeter: Llanerch Enterprises.

Campbell, B., 1981 The regional uniqueness of English field systems? Some evidence from eastern Norfolk. *The Agricultural History Review* 29 (1), pp. 16-28.

Campbell, B., and Godoy, R.A., 1992. Commonfield agriculture: the Andes and medieval England compared. In D.W. Bromley, ed. *Making the commons work: theory, practice and policy* San Francisco: Institute for contemporary studies, pp. 99-127.

Chadwick, A.M. 2008a. Fields for discourse? Toward more self-critical, theoretical and interpretive approaches to the archaeology of field systems and land allotment. In: A.M. Chadwick, ed. *Recent approaches to the archaeology of land allotment.* British Archaeological Reports (International Series) 1875: Oxford: Archaeopress, pp. 205-237.

Chadwick, A.M. 2008b. Introduction. In A.M. Chadwick, ed. *Recent approaches to the archaeology of land allotment.* British Archaeological Reports (International Series) 1875: Oxford: Archaeopress pp. 1-24.

Chang, C., 1993. Pastoral transhumance in the southern Balkans as social ideology: ethnoarchaeological research in Northern Greece. *American Anthropologist* 95(3), pp. 687-703.

Chang, C. and Tourtellotte, P.A. 1993. Ethnoarchaeological survey of pastoral transhumant sites in the Grevena region, Greece. *Journal of Field Archaeology* 20(3), pp. 249-264.

Christie, P.M. 1986. Cornwall in the Bronze Age. *Cornish Archaeology*, 25, pp. 81-110.

Davey, J. 2005. *The Roman to Medieval transition in the region of South Cadbury Castle, Somerset.* British Archaeological Reports (British Series) 399, Oxford: Archaeopress.

De Carle, D. 2014. *Changing Arable Subsistence in Bronze and Iron Age South West Britain.* University of Sheffield Unpublished PhD Thesis.

De Garis de Lisle, D. 1982. Effects of distance on cropping patterns internal to the farm *Annals of the Association of American Geographers* 72 (1), pp. 88-98.

Defra, 2002. *Code of recommendations for the welfare of livestock Sheep.* Defra Publications: London.

Done, G. 2016. Animal bone. In C. Evans, G. Appleby, and S. Lucy, 2016 *Lives in Land Mucking excavations by Margaret and Tom Jones 1965-1978: Prehistory, Context and Summary*. CAU Landscape Archives: Historiography and Fieldwork (6/Mucking 6) Oxford: Oxbow Books, pp. 201-202.

Doyle, M., 1870 *Cottage farming: or how to cultivate from two to twenty acres, with chapters on the management of cows, pigs and poultry*. London: Groombridge and Sons.

Evans, H. 2008. After the axe: ways into the upland landscapes of Cumbria. In: A.M Chadwick, ed. *Recent approaches to the archaeology of land allotment.* British Archaeological Reports (International Series) 1875 Oxford: British Archaeological Reports, pp. 122-142.

English, J. 2013. *Pattern and Progress: Field Systems of the Second and Early First Millennia BC in Southern Britain.* British Archaeological Reports (British Series) 587 Oxford: British Archaeological Reports.

Esmail, S.H.M. 1991. Multi-species grazing by cattle and sheep. *Rangelands,* 13(1), pp. 35-37.

Evans, C. 2009. *Fengate Revisited Further Fen-edge excavations, Bronze Age fieldsystems and settlement and the Wyman Abbott/Leeds archives.* CAU Landscape Archives: Historiography and Fieldwork (1) Cambridge: Cambridge Archaeological Unit.

Evans, C., Appleby, G., and Lucy, S. 2016. *Lives in Land Mucking excavations by Margaret and Tom Jones 1965-1978: Prehistory, Context and Summary.* CAU Landscape Archives: Historiography and Fieldwork (6/Mucking 6) Oxford: Oxbow Books.

Fitzherbert, A. 1534. *The boke of husbandry*. London: Thomas Berthelet.

Fleming, A. 1978a. The prehistoric landscape of Dartmoor Part 1: South Dartmoor. *Proceedings of the Prehistoric Society,* 44, pp. 97-123.

Fleming, A. 1978b. The Dartmoor Reaves. In H.C. Bowen & P.J. Fowler, eds. *Early land allotment.* British Archaeological Reports (British Series) 48 : Oxford: British Archaeological Reports, pp.17-21.

Fleming, A. 1983. The prehistoric landscape of Dartmoor Part 2: North and East Dartmoor. *Proceedings of the Prehistoric Society,* 49, pp. 195-241.

Fleming, A. 1985. Land tenure, productivity and fields systems. In: G. Barker & C. Gamble, eds. *Beyond domestication in prehistoric Europe: investigations in subsistence archaeology and social complexity*. London: Academic Press, pp. 129-146.

Fleming, A. 1988. *The Dartmoor Reaves: investigating prehistoric land divisions.* London: Batsford.

Fleming, A. 1998. Prehistoric landscape and the quest for territorial pattern. In: P. Everson & T. Williamson, eds. *The archaeology of landscape.* Manchester: Manchester University Press, pp. 42-66.

Forbes, H. 1998. European agriculture viewed bottom-side upwards: fodder-and forage-provision in a traditional Greek community. *Environmental Archaeology,* 1: 19-34.

Fowler, P.J. 1978. Pre-Medieval fields in the Bristol Region. In: H.C. Bowen & P.J. Fowler, eds. *Early land allotment.* British Archaeological Reports (British Series) 48 Oxford: British Archaeological Reports, pp. 29-47.

Fowler, P.J. 1981. Wildscape to landscape: 'enclosure' in prehistoric Britain. In: R. Mercer, ed. *Farming practice in British prehistory.* Edinburgh: Edinburgh University Press, pp. 9-54.

Fowler, P.J. 1983. *The farming of prehistoric Britain.* Cambridge: Cambridge University Press.

Fowler, P.J. and Evans J.G. 1967. Plough marks, lynchets and early fields. *Antiquity,* 41, pp. 289-301.

Frame, J. 1992. *Improved grassland management.* Ipswich: Farming Press Books.

Fraser, A. 1947. *Sheep production.* Edinburgh: Thomas Nelson & Sons.

Frazer, A. 1988. Horses. In: K. Thear & A. Frazer, eds. *The complete book of raising livestock and poultry*. London: Pan Books, pp. 196-217.

Ganscopp, D.C. & Bohnert, D.W., 2009. Landscape nutritional patterns and cattle distribution in rangeland pastures. *Applied Animal Behavioural Science,* 116, pp. 110-119.

Giles, M., 2012 *A forged glamour Landscape, identity and material culture in the Iron Age* Oxford: Windgather Press.

Goodwin, D.H. 1973. *Pig management and production.* London: Hutchinson.

Goodwin, D.H. 1979. *Sheep management and production.* 2nd edition London: Hutchinson.

Grandin, T. 1980. Observations of cattle behavior applied to the design of cattle-handling facilities. *Applied Animal Ethology* Vol 6(1), pp. 19-31.

Grandin, T. and Deesing, M. 2008. *Humane Livestock Handling*. North Adams, MA, USA: Storey Publishing.

Grigg, D. 1982. *The dynamics of agricultural change The historical experience.* London: Hutchinson.

Guttmann, E.B.A. 2005. Midden cultivation in prehistoric Britain: arable crops in gardens. *World Archaeology,* 37 (2), pp. 224-239.

Haas, J.N., Karg, S., and Rasmussen, P. 1998. Beech leaves and twigs used as winter fodder: examples from historic and prehistoric times. *Environmental Archaeology* 1, pp. 88-86.

Halliday, J. & Halliday, J. 1988. Goats. In: K. Thear & A. Frazer, eds. *The complete book of raising livestock and poultry*. London: Pan Books, pp. 73-103.

Halstead, P. 1996. Pastoralism or household herding? Problems of scale and specialisation in early Greek animal husbandry. *World Archaeology* 28(1) pp. 20-42.

Hambleton, E. 1999. *Animal husbandry regimes in Iron Age Britain:a comparative study of faunal assemblages from British Iron Age sites.* British Archaeological Reports (British Series) 282 Oxford: Archaeopress.

Harrison, K.A. and Bardgett, R.D. 2008. Impacts of grazing and browsing by large herbivores on soils and soil biological properties. In: I.J. Gordon & H.H.T. Prins, eds. *The ecology of browsing and grazing.* Ecological Studies 195 Heidelberg: Springer, pp. 201-216.

Hart, E. 1994. *Sheep: a guide to management.* Marlborough: The Crowood Press.

Harvey, N. 1980. *The industrial archaeology of farming in England and Wales.* London: BT Batsford.

Henderson, G. 1944. *The farming ladder*. London: Faber and Faber.

Hey, G. Bell, C. Dennis, C. and Robinson, M. 2016. *Yarnton Neolithic and Bronze Age settlement and landscape.* Thames Valley Landscapes Monograph 39 Oxford: Oxford Archaeology.

Hey, G. Booth, P. and Timby, J. 2011. *Yarnton Iron Age and Romano-British settlement and landscape*. Thames Valley Landscapes Monograph 35 Oxford: Oxford Archaeology.

Hodgkinson, S.M. López, I.F. & Navarrete, S. 2009. Ingestion of energy, protein and amino acids from pasture by grazing European wild boar (*Sus scrofa* L.) in a semi-extensive production system. *Livestock Science,* 122, pp. 222-226.

Houghton Brown, J. and Powell-Smith, V. 1984. *Horse and stable management.* Oxford: BSP Professional Books.

Johnston, R. 2000. Field systems and the Atlantic Bronze Age: thoughts on a regional perspective. In: J.C. Henderson ed. *The prehistory and early history of Atlantic Europe.* British Archaeological Reports (International Series) 861: Oxford: Archaeopress, pp. 47-55.

Johnston, R. 2001. 'Breaking new ground': land tenure and fieldstone clearance during the Bronze Age. In: J. Brück ed. *Bronze Age landscapes tradition and transformation.* Oxford: Oxbow Books, pp. 99-109.

Johnston, R. 2005. A social archaeology of garden plots in the Bronze Age of northern and western Britain. *World Archaeology*, 37 (2), pp. 211-223.

Jones, G. 1998. Distinguishing food from fodder in the archaeobotanical record. *Environmental Archaeology,* 1, pp. 95-98.

Jones, J. 2006. Plant macrofossil remains. In T. Gent and S. Reed, A Bronze Age field and figure from Hillfarrance. *Proceedings of the Somerset Archaeological and Natural History Society* 150, pp. 20-24.

Jones, R. and Dowling, P. 2005. Sustainability and economics of temperate perennial Australian grazing systems. *Agriculture, Ecosystems and Environment,* 106, pp. 359-376.

Jones, S. and Randall, C.E. 2010. Death, destruction and the end of an era: the end of the Iron Age at Cadbury Castle, Somerset. In: M. Sterry & A. Tullett eds. *In search of the Iron Age Proceedings of the Iron Age Research Student Seminar 2008.* Leicester: Leicester University Press, pp. 165-184.

Kelly, F. 2000. *Early Irish farming.* Dublin: Dublin Institute for Advanced Studies.

Kitchen, W. 2001. Tenure and territoriality in the British Bronze Age: a question of varying social and geographic scales? In: J. Brück, ed. *Bronze Age landscapes tradition and transformation.* Oxford: Oxbow Books, pp. 110-120.

Ladle, L., and Woodward, A. 2009. *Excavations at Bestwall Quarry, Wareham 1992-2005 Volume 1: The Prehistoric Landscape*. Dorset Natural History and Archaeological Society Monograph 19 Dorchester: DNHAS.

Lake, J. 1989. *Historic farm buildings an introduction and guide.* Blandford: Blandford Press.

Leach, H.M. 1999. Intensification in the Pacific: a critique of the archaeological criteria and their application *Current Anthropology* 40, pp. 311-339.

Lewthwaite, J. 1981. Plains tails from the hills: transhumance in Mediterranean archaeology. In: A. Sheridan & G. Bailey, eds. *Economic archaeology.* British Archaeological Reports (British Series) 96 Oxford: British Archaeological Reports, pp. 57-66.

Løvschal M. 2014. Emerging boundaries Social embedment of landscape and settlement divisions in Northwestern Europe during the First millennium BC. *Current Anthropology* 35 (6), pp. 725-750.

Maclean, M., 2000 *Resource Management: Hedges.* Tonbridge: Farming Press.

Manolson, F., Fraser D.V.M. & Fraser A. 1988. Cattle. In: K. Thear & A. Fraser *The complete book of raising livestock and poultry*. London: Pan Books, pp. 159-195.

Masefield, R. 2015. *Origins, Development and Abandonment of an Iron Age Village Further Archaeological Investigations for the Daventry International Rail Freight Terminal.* Crick & Kilsby, Northamptonshire 1993-2013. (DIRFT Volume II) .

Masseti, M. 2007. The economicrole of *Sus* in early human fishing communities. In: U. Alberella, K. Dobney, A. Ervynck, & P. Rowley-Conwy, eds. *Pigs and humans 10,000 years of interaction.* Oxford: Oxford University Press, pp. 156-170.

Mientjes, A.C. 2004. Modern pastoral landscapes on the island of Sardinia, Italy. Recent pastoral practices in local versus macro-economic and macro-political contexts. *Archaeological Dialogues* 10(2), pp. 161-190.

Morand-Fehr, P. 2005. Recent developments in goat nutrition and application: a review. *Small Ruminant Research* 60, pp.25-43.

Mulville, J., Ayres, K., and Smith, P. 2011. Animal bone. In G.Hey, P. Booth, and J. Timby, 2011 *Yarnton Iron Age and Romano-British settlement and landscape*. Thames Valley Landscapes Monograph 35 Oxford: Oxford Archaeology, pp. 487-522.

Mulville Netting, R.M. 1974. Agrarian ecology. *Annual Review of Anthropology* 3, pp. 21-56.

Olmos, G., Boyle, L., Hanlon, A., Patton, J., Murphy J.J., and Mee, J.F. 2009. Hoof disorders, locomotion ability and lying times of cubicle-housed compared to pasture-based dairy cows. *Livestock Science* 125, pp. 199-207.

Orme, B.J., and Morgan, R.A. 1982. Prehistoric wood from Wotter Common, Shaugh Moor. In N.D. Balaam, K. Smith and G. Wainwright, The Shaugh Moor Project: fourth report – environment, context and conclusion. *Proceedings of the Prehistoric Society* 48, pp. 220-227.

Papachristou, T.G., Dziba, L.U. & Provenza, F.D. 2005. Foraging ecology of goats and sheep on wooded rangelands. *Small Ruminant Research*, 59, pp. 141-156.

Pelling, R. 2011. Charred plant remains from Cresswell Field. In G.Hey, P. Booth, and J. Timby, 2011 *Yarnton Iron Age and Romano-British settlement and landscape* Thames Valley Landscapes Monograph 35 Oxford: Oxford Archaeology, pp. 523-533.

Pfaffenberger, B. 1988. Fetishised objects and humanised nature: towards an anthropology of technology. *Man*, 23 (2), pp. 236-252.

Pfaffenberger, B. 1992. Social anthropology of technology. *Annual Review of Anthropology*, 21, pp. 491-516.

Poulsen, B. 1997. Agricultural technology in medieval Denmark. In: G. Astill & J. Langdon, eds. *Medieval farming and technology.* New York: Brill, pp. 115-146.

Prins, H.T. and Fritz, H. 2008. Species diversity of browsing and grazing ungulates: consequences for the structure and abundance of secondary production. In: I..J. Gordon and H.H.T. Prins, eds. *The ecology of browsing and grazing.* Ecological Studies 195 Heidelberg: Springer, pp. 179-200.

Pryor, F. 1996. Sheep, stockyards and field systems: Bronze Age livestock populations in the Fenlands of eastern England. *Antiquity*, 70, pp. 313-324.

Pryor, F. 2006. *Farmers in Prehistoric Britain.* (2nd Edition) Stroud: Tempus.

Putfarken, D., Dengler, J., Lehmann, S. and Härdtle, W. 2008. Site use of grazing cattle and sheep in a large-scale pasture landscape: A GPS/GIS assessment. *Applied Animal Behaviour Science*, 111, pp. 54-67.

Quinnell, H. 1988. .The local character of the Devon Bronze Age and its interpretation in the 1980s. *Proceedings of the Devon Archaeological Society*, 46, pp. 1-12.

Rajkovača, V. 2016. Faunal remains. In C. Evans, G. Appleby, and S. Lucy, 2016 *Lives in Land Mucking excavations by Margaret and Tom Jones 1965-1978: Prehistory, Context and Summary*. CAU Landscape Archives: Historiography and Fieldwork (6/Mucking 6) Oxford: Oxbow Books, pp. 432-435.

Randall, C.E. 2010a. *Livestock and landscape: the exploitation of animals in the south west of Britain in later prehistory*. Unpublished PhD Thesis Bournemouth University.

Randall, C.E. 2010b. More Ritual Rubbish? Exploring the taphonomic history, context formation processes and 'specialness' of deposits including human and animal bone in Iron Age pits. In: M. Maltby & J. Morris eds. *Social Environmental Archaeology Integrated Studies of Ritual*. British Archaeological Reports (International series) Oxford: Archaeopress, pp. 83-102.

Randall, C.E. 2011. Fieldwork undertaken by the South Somerset Archaeological Research Group in 2010. In: C. .J Webster, Somerset Archaeology. *Proceedings of the Somerset Archaeological and Natural History Society*, 155, pp. 229-233

Randall, C.E. 2014. Fieldwork undertaken by the South Somerset Archaeological Research Group in 2013. In: C. J. Webster, Somerset Archaeology 2014. *Proceedings of the Somerset Archaeological and Natural History Society*, 158, pp. 146.

Randall, C.E. 2016. Faunal Remains. In E. Lupprian Pits and pottery – some evidence for Beaker activity at Bryanston School. *Proceedings of the Dorset Natural History and Archaeological Society*, 137, pp. 210-211.

Randall C.E. 2018. The faunal remains. In: R.Tabor, & C.E. Randall, Early Neolithic pits at Cadbury Castle and an adjoining temporary occupation site at Milsom's Corner, South Cadbury. *Proceedings of the Somerset Archaeological and Natural History Society* 161, pp. 33-40.

Rasmussen, P. 1993. Analysis of goat/sheep faeces from Egolzwil 3, Switzerland: evidence for branch and twig foddering of livestock in the Neolithic. *Journal of Archaeological Science* 20, pp. 479-502.

Reynolds, P.J. 1987. *Ancient farming.* Aylesbury: Shire Archaeology.

Rippon, S. 2004. *Historic landscape analysis: deciphering the countryside.* Practical Handbooks in Archaeology 16 York: Council for British Archaeology.

Ross, P. 1989. *Goats a guide to management.* Marlborough: The Crowood Press.

Ryder, M.J. 1981. Livestock products: skins and fleeces. In: R. Mercer, ed. *Farming practice in British prehistory*. Edinburgh: Edinburgh University Press, pp. 182-209.

Salmon, J. 1981. *The goatkeepers guide.* (2nd Ed) Newton Abbot: David and Charles.

Schütz, K.E., Rogers, A.R., Cox, N.R., and Tucker, C.B. 2009. Dairy cows prefer shade that offers greater protection against solar radiation in summer: Shade use, behaviour, and body temperature. *Applied Animal Behaviour Science* 116, pp. 28-34.

Searle, K.R. and Shipley, L.A. 2008. The comparative feeding behaviour of large browsing and grazing herbivores. *The ecology of browsing and grazing*, pp. 117-148.

Searle, K.R., Hobbs, N.T. and Gordon, I.J. 2007. It's the" foodscape", not the landscape: using foraging behavior to make functional assessments of landscape condition. *Israel Journal of Ecology & Evolution*, pp.297-316.

Serjeantson, D. 2011. *Review of animal remains from the Neolithic and Early Bronze Age in Southern Britain (4000-1500BC).* English Heritage research Department Report 29 London: English Heritage.

Seymour, J. 2003. *The new complete book of self sufficiency the classic guide for realists and dreamers*. London: Dorling Kindersley.

Shahack-Gross, R., Marshall, F., Ryan, K., and Weiner, S. 2004. Reconstruction of spatial organization in abandoned Maasai settlements: implications for site structure in the pastoral Neolithic of East Africa. *Journal of Archaeological Science* 31, pp. 1395-1411.

Smith, K., Coppen, J., Wainwright, G.J., and Beckett, S. 1981. The Shaugh Moor Project: the third report – settlement and environmental investigations. *Proceedings of the Prehistoric Society* 47, pp. 205-273.

Smith Thomas, H. 2005. *Getting started with beef and dairy cattle.* North Adams, MS: Story Publishing.

Stallibrass, S. 1996. Animal bones. In: R.P.J. Jackson and T.W. Potter, eds. *Excavations at Stonea, Cambridgeshire*. London: British Museum Press, pp. 587-612.

Stevens, C. 2011. Crop-husbandry as seen from the charred botanical samples from Yarnton. In G.Hey, P. Booth, and J. Timby, 2011 *Yarnton Iron Age and Romano-British settlement and landscape* Thames Valley Landscapes Monograph 35 Oxford: Oxford Archaeology, pp. 534-567.

Street, A.G. 1942. *Round the year on the farm* Oxford University Press: London.

Tabor, R. 2002. *South Cadbury Environs Project interim fieldwork report 1998-2001.* Bristol: Centre for the Historic Environment University of Bristol.

Tabor, R. 2004a. Cadbury Castle: Prehistoric pottery distribution in the surrounding landscape. *Proceedings of the Somerset Archaeological and Natural History Society*, 147, pp. 29-39.

Tabor, R. 2004b. *South Cadbury Environs Project interim fieldwork report 2002-2003.* Bristol: Centre for the Historic Environment University of Bristol.

Tabor, R. 2008. *Cadbury Castle the hillfort and landscapes.* Stroud History Press.

Tabor, R. and Johnson, P. 2000. Sigwells, Somerset, England: regional application and interpretation of geophysical survey. *Antiquity*, 74, pp. 319-325.

Tabor, R. & Randall, C.E. 2018. Early Neolithic pits at Cadbury Castle and an adjoining temporary occupation site at Milsom's Corner, South Cadbury. *Proceedings of the Somerset Archaeological and Natural History Society* 161, pp.1-48

Tani, Y. 2002. Early techniques as a forerunner of milking practices. In J. Mulville and A.K. Outram, eds, *The zooarchaeology of fats, oils, milk and dairying.* Oxbow Books: Oxford, pp. 114-120.

Tiffen, M., Mortimore, M.J., and Gichuki, F. 1994. *More people, less erosion: environmental recovery in Kenya*. John Wiley and Sons: Chichester.

Walker, J.W., Heischmidt, R.K. and Dowhower, S.L. 1989. Some effects of a rotational grazing treatment on cattle preference for plant communities. *Journal of Range Management* 42(2), pp. 143-148.

Wall, R., French, N.P., and Morgan, K.L. 1993. Sheep blowfly population control: development of a simulation model and analysis of management strategies. *Journal of Applied Ecology* 30(4), pp. 743-751.

Weller, J. 1982. *History of the farmstead.* London: Faber and Faber.

Wickstead, H. 2008. *Theorising tenure: land division and identity in later prehistoric Dartmoor, South-West Britain.* British Archaeological Reports (British Series), 465, Oxford: Archaeopress.

Wijngaarden-Bakker, L. 1998. Animal husbandry in a wetland: the case of Assendelft. In: C.M. Mills & G. Coles, eds, *Life on the edge human settlement and marginality.* Oxbow Monograph 100, Oxford: Oxbow Books, pp. 173-178.

Yates, D. 2007. *Land power and prestige Bronze Age field systems in southern England.* Oxford: Oxbow Books.