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## CONTINUITY AND CHANGE: THE FIELD SYSTEMS AND PATTERNS OF LAND-USE IN EARLY MEDIEVAL ENGLAND

*Continuidad y cambio: sistemas de terrazgos y usos del suelo en la Inglaterra  
altomedieval*

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**ABSTRACT:** Britain ceasing to be part of the Roman Empire undoubtedly had a profound effect on society, and traditionally this was thought to include major changes in the economy and patterns of agrarian production, with large areas of the landscape being abandoned as population declined. Medieval fieldscapes were thought to be much later in date, with a large swathe of central England seeing the creation of vast open fields sometime between the eighth and twelfth centuries. Recent archaeological and palaeoenvironmental evidence – mostly from developer-funded work – has, however, dramatically transformed our understanding of landscape change in this period, with many regions seeing a far greater degree of continuity than was previously thought. Rather than open fields having been created through a «great replanning» of the landscape that swept aside all traces of the earlier field systems, in some cases they appear to have evolved within a framework of existing boundaries that had survived from the Roman period.

*Keywords:* Field systems; Pollen evidence; Arable cultivation; Cereals remains; Animal husbandry; Animal bones; Climate change; Open fields.

**RESUMEN:** El final del dominio romano en Gran Bretaña tuvo un profundo efecto en la sociedad y tradicionalmente se ha visto como un momento de grandes cambios en la economía y en los modelos de producción agraria, incluyendo el abandono de vastas áreas del territorio y el declive de la población. Se pensaba que los paisajes típicamente medievales eran posteriores, cuando en una amplia franja del centro de Inglaterra se crearon extensos

sistemas de «open field» en los siglos VIII al XII. La reciente evidencia arqueológica y paleoambiental –en buena medida procedente de la arqueología empresarial– ha transformado completamente nuestra comprensión sobre los cambios en el paisaje durante este periodo, y muchas regiones muestran un mayor grado de continuidad de lo que hasta ahora se había pensado. Los «open fields» parece que no se crearon tanto como consecuencia de una «gran replanificación» del paisaje, que habría barrido los terrazgos previos, sino que en algunos casos parecen haber evolucionado a partir de los límites de terrazgos preexistentes que habrían sobrevivido del periodo romano.

*Palabras clave:* Sistemas de campos; Evidencia polínica; Cultivos agrarios; Restos cerealísticos; Ganadería; Huesos animales; Cambio climático; «Open fields».

SUMMARY: 0 Introduction. 1 Inherited landscapes: The roman period. 2 The Fifth and Sixth Centuries. 2.1 Evidence of absence, or absence of evidence? 2.2 The development of field systems in the early post-Roman period. 2.3 Patterns of land-use in the early post-Roman period. 2.4 A retreat from the margins. 2.5 The role of climate change. 2.6 The Fifth and Sixth centuries: a period of adjustment. 3 The «Long Eighth Century». 3.1 Agricultural intensification. 3.2 The restructuring of field systems. 4 Conclusions. 5 References.

## 0 INTRODUCTION

A characteristic feature of the English landscape is the way that almost every parcel of land across its lowland areas are divided by substantial physical boundaries, comprising banks, ditches, walls, and hedges. Superficially, this landscape of enclosures appears quite unrelated to the abandoned field systems of the later prehistoric and Roman periods, with the traditional view being that this discontinuity was due to a major break in land-use as the Imperial economy failed at the start of the early medieval period. The assumption has long been that the highly productive Romano-British landscape – characterised by villas and their estates – was replaced in the fifth century by more transient, dispersed settlement patterns. In turn, it has been argued that these earliest medieval landscapes were then swept away towards the end of the early medieval period (during the eighth to tenth centuries) as a widespread re-planning of the landscape led to the creation of nucleated villages and open fields. Recent archaeological and palaeoenvironmental research has, however, shown that there was far greater continuity in landscape history from the Roman through to the start of the early medieval period than previously thought. While it remains clear that there were widespread changes to the landscape starting around the eighth century AD, these sometimes developed within a framework provided by earlier fields as opposed to dramatically replanning them. This paper will therefore explore the development of land-use and field systems across lowland England during what was a crucial five centuries in the history of the landscape, and will highlight both the major periods of continuity and change, and the various drivers behind what were complex patterns of land-use.

## 1 INHERITED LANDSCAPES: THE ROMAN PERIOD

Until quite recently it was thought that the landscape of Roman Britain was relatively uniform in its character, with a highly stratified settlement pattern – that included a hierarchy of towns, villas, and lower-status farmsteads – and intensive agricultural production. The recent Roman Rural Settlement Project<sup>1</sup> has, however, started to show the extent of regional variation within the Romano-British landscape, both temporally and spatially. Although some lowland regions were less «Romanized» than others, by the Late Roman period most rural communities appear to have been generating an agricultural surplus as active participants in a market-based economy (reflected, for example, in their ability to purchase goods – such as pottery – manufactured within centralised industries). Extensive archaeological surveys and excavations have revealed landscapes with very clear zonation of land-use, with areas of enclosed fields surrounding the settlements beyond which lay areas of open (unenclosed) pasture, woodland, and meadow. Over the course of the Roman period there was an expansion of settlement into physically marginal environments such as coastal wetlands, which may have resulted from a variety of factors including rising population, the incentives that a market-based economy provides to increase agricultural production, and Imperial policy to colonise new land.<sup>2</sup>

## 2 THE FIFTH AND SIXTH CENTURIES

### 2.1 *Evidence of absence, or absence of evidence?*

Archaeological surveys and excavations have revealed extensive evidence for Romano-British field systems that have been abandoned, and are physically unrelated to the later medieval landscape.<sup>3</sup> These are one of the factors that contributed to the traditional view that Britain ceasing to be part of the Roman Empire led to a collapse in its economy, population decline, and the widespread desertion of agricultural land. This traditional view in part still appears to be correct, as there is no question that the money-based market economy collapsed: the importation of coinage ceased (and there was no attempt to replace it with forged issues, as had been the case in other periods), while manufacturing industry disappeared, and towns were abandoned. This does not, however, mean that the countryside will inevitably have been deserted too.

<sup>1</sup> SMITH, Alex; ALLEN, Martyr; BRINDLE, Tom and FULFORD, Michael. *The Rural Settlement of Roman Britain. New Visions of the Countryside of Roman Britain Volume 1*. London: Society for the Promotion of Roman Studies, 2016.

<sup>2</sup> RIPPON, Stephen. *The Transformation of Coastal Wetlands*. London: British Academy, 2000; MATTINGLY, David. *An Imperial Possession: Britain in the Roman Empire*. London: Penguin Books, 2006.

<sup>3</sup> e.g. PALMER, Rog. «The aerial evidence». In HALL, David (ed.). *The Fenland Project, Number 10: Cambridgeshire Survey, The Isle of Ely and Wisbech*. Cambridge: Cambridgeshire County Council, 1996, pp. 192-198; McOMISH, David; FIELD, David and BROWN, Graham. *The Field Archaeology of the Salisbury Plain Training Area*. London: English Heritage, 2002; GARTON, Daryl. «The Romano-British landscape of the Sherwood Sandstone of Nottinghamshire: fieldwalking the brickwork-plan field-systems». *Transactions of the Thoroton Society of Nottinghamshire*, 2008, vol. 112, pp. 15-110.

Although a decline in population and food production is likely, not least because the non-agriculturally productive sections of society – the army, industrial workers, and town-dwellers – disappeared, it is inherently likely that the rural population simply switched to subsistence-based farming.

The traditional view is that settlement patterns in the fifth to seventh centuries were very different to their Romano-British predecessors, being characterised by relatively ephemeral timber buildings and settlements that gradually shifted their location over time. These settlements themselves lacked internal ditched property boundaries, and do not appear to have been associated with ditched field systems: there is a strong feeling of impermanence associated with these landscapes.<sup>4</sup> The countryside of fifth to seventh century England is, however, difficult to study due to a scarcity of evidence: although some communities – notably those with an Anglo-Saxon identity – used small amounts of material culture, there are many regions where this material is absent, leading to the traditional view that large areas of the landscape were abandoned. There is, however, another possibility: that there was a substantial surviving British population which ceased to use durable and distinctive material culture making their settlements and field systems virtually invisible. A recent research project – *The Fields of Britannia* – has therefore tried to shed new light on this period through studying three strands of research: palaeoenvironmental sequences that record land-use in the Roman and early medieval periods; the relationship between Romano-British and medieval field systems; and the relationship between settlement patterns in those two periods.<sup>5</sup> Crucial to the success of this synthesis was the huge increase in archaeological survey and excavation, and the resulting palaeoenvironmental sampling, which has resulted from developer-funded work that in the United Kingdom started in 1990 through the government's Planning Policy Guidance Note 16. The Fields of Britannia was one of a series of projects that made use of this new data, much of it unpublished but made available online through the Archaeology Data Service's «Grey Literature Library».<sup>6</sup> It is striking how another of these major synthetic research programmes – *The Roman Rural Settlement Project*<sup>7</sup> – also used the vast increase in data to reveal previously unsuspected regional variation in landscape character and change over time.

<sup>4</sup> HAMEROW, Helena. *Rural Settlements and Society in Anglo-Saxon England*. Oxford: Oxford University Press, 2012. Examples of large, medium, and small-scale settlements lacking in ditched boundaries include Mucking in Essex (HAMEROW, Helena. *Excavations at Mucking Volume 2: The Anglo-Saxon Settlement*. London: English Heritage, 1993), West Stow in Suffolk (WEST, Stanley. *West Stow: The Anglo Saxon Village*. Ipswich: Suffolk County Council, 1985), and Sawston in Cambridgeshire (PAUL, Samantha; COLLS, Kevin and CHAPMAN, Henry. *Living with the Flood: Mesolithic to Post-Medieval Archaeological Remains at Mill Lane, Sawston, Cambridge*. Oxford: Oxbow Books, 2016).

<sup>5</sup> FLEMING, Fiona. *A Persistence of Place: A Study of Continuity and Regionality in the Roman and Early Medieval Rural Settlement Patterns of Norfolk, Kent and Somerset*. Oxford: British Archaeological Reports, 2016; RIPPON, Stephen; SMART, Chris and PEARS, Ben. *The Fields of Britannia*. Oxford: Oxford University Press, 2015.

<sup>6</sup> <http://archaeologydataservice.ac.uk/archives/view/greylit/query.cfm>.

<sup>7</sup> SMITH, Alex et al. *The Rural Settlement of Roman Britain: an online resource* <<http://archaeologydataservice.ac.uk/archives/view/romangl/>>.

## 2.2 *The development of field systems in the early post-Roman period*

The analysis of excavated late Romano-British field systems showed that across lowland England as a whole – there is insufficient excavated data from upland areas or Wales to make any analysis statistically valid – around 60-70% of Romano-British landscapes that were overlain by medieval field systems shared the same orientation (although there were marked regional and local differences in the extent of this potential continuity, with some regions as low as 30-40%). It should be stressed that Romano-British sites in areas without field systems of medieval character (that will include areas of woodland and unenclosed common pasture) were excluded from the analysis, as were coastal wetlands that were flooded in the post Roman period. This means that we cannot say that 60-70% of the Romano-British landscape shows potential continuity in its field systems, just that this was the case where both Roman and medieval field systems have survived.

This close relationship between the physical fabric of Roman and medieval landscapes suggests the potential for broad continuity in land-use: it does not, however, mean that the use to which these fields were put remained unchanged. A shift from arable to pasture is inherently likely due to the move away from the production of surplus grain for sale at market towards more subsistence based farming. Equally, however, a prolonged period of total abandonment is highly unlikely. Long-term field observations at the Rothamsted Experimental Station at Harpenden, in Hertfordshire, for example, has shown that arable land will revert to woodland within 10 to 30 years,<sup>8</sup> and this rate of regeneration is confirmed by the analysis of historic maps (e.g. the Benfleet Downs in Essex).<sup>9</sup> While it is conceivable that the removal of woodland could reveal the earthworks of earlier field systems, and that these could then be rehabilitated, in practice this is regarded as unlikely: the process of clearing trees and grubbing out stumps would surely destroy or at least render the remains of any relict field system so incoherent that they would simply have been flattened and replaced. It may also be argued that even if an earlier field system was lost due to woodland regeneration, following the clearance of this woodland a new field system would be laid out on the same orientation as the earlier one because both sets of boundaries would have followed the contours: this may indeed have happened in some cases, but it is difficult to see how it can account for 60-70% of field systems in some regions as so many of them lie on areas of flat ground.

Further support for the hypothesis that many Romano-British field systems may have survived in use into the early medieval period is the extent to which sherds of fifth to seventh pottery have been recovered from ditches that otherwise contain Late Roman pottery. This material has all too often been overlooked – the sherds are usually few in numbers – but they indicate two things: firstly, that these field boundaries were open in the fifth to seventh centuries, and secondly that there was still some manuring of the

<sup>8</sup> HARMER, Ralph; PETERKEN, George; KERR, Gary and PAULTON, Paul. «Vegetation change during 100 years of development of two secondary woodlands in abandoned arable lands». *Biological Conservation*, 2001, vol. 101, pp. 291-304.

<sup>9</sup> RIPPON, Stephen. *Olympic Mountain Bike Venue, Hadleigh Farm, Essex: the evolution of the historic landscape*. Unpublished report: University of Exeter, 2012 [<http://hdl.handle.net/10036/4089>].

fields (kitchen rubbish having been mixed with farmyard manure and spread over arable land). The parish of Raunds, in Northamptonshire, for example, has seen extensive fieldwalking with pottery scatters suggesting around eighteen small settlements dating to sometime between the mid fifth and mid ninth centuries, each with a manured infield; an extensive fieldwalking survey in the Langton parishes, in South East Leicestershire, similarly revealed a dispersed scatter of fifth- to seventh-century settlements each with an intensively manured infield.<sup>10</sup>

One problem with interpreting of these sherds is that they are often described as «Anglo-Saxon». In fact, they are usually from simple, undecorated, globular, handmade vessels that, while sometimes found in associated with artefacts and architecture that were introduced by the immigrant Anglo-Saxon population (e.g. brooches and *Grubenhäuser*), they are also often recovered from sites associated with pits, ditches, and simple timber structures that have no particular ethnic affinities.<sup>11</sup> Rather than being «Anglo-Saxon», this pottery is exactly what we expect native British communities to produce themselves once the large-scale Roman industries failed in the late fourth and early fifth centuries.

Another important methodological advance that is revealing the extent to which the late Romano-British landscape continued in use into the early medieval period is the growing use of radiocarbon dating on aceramic sites. This has resulted in many settlements and cemeteries being dated to the fifth to seventh centuries,<sup>12</sup> supporting the

<sup>10</sup> PARRY, Steve. *Raunds Area Survey: An Archaeological Study of the Landscape of Raunds, Northamptonshire 1985-94*. Oxford: Oxbow Books, 2006; BOWMAN, Peter. «Villages and their territories part II: the south-east Leicestershire survey». In BOWMAN, Peter and LIDDLE, Peter (eds.). *Leicestershire Landscapes*. Leicester: Leicestershire Museums Archaeological Fieldwork Group, 2004, pp. 120-136.

<sup>11</sup> For a general discussion see RIPPON, Stephen. *Kingdom, Civitas, and County*. Oxford: Oxford University Press, 2018. Some examples include Baldock and Pirton in Hertfordshire (BURLEIGH, Gilbert and FITZPATRICK-MATTHEWS, Keith. *Excavations at Baldock, Hertfordshire, 1978-1994. Volume 1: An Iron Age and Romano-British Cemetery at Wallington Road*. Letchworth Garden City: North Hertfordshire District Council/North Hertfordshire Archaeol Soc, 2010; FITZPATRICK-MATTHEWS, Keith. «Defining fifth-century ceramics in North Hertfordshire». In GERRARD, James (ed.). *Fifth Century Roman Pottery*. Internet Archaeology, vol. 41, 2016, at: <<http://dx.doi.org/10.11141/ia.41.4>>), Boxworth and Childerley Gate in Cambridgeshire (CONNOR, Aileen. «A Romano-Saxon farmstead and possible 12th-century dovecote or windmill: community excavations at Spring Close, Boxworth». *Proceedings of the Cambridge Antiquarian Society*, 2008, vol. XCVII, pp. 111-119; ABRAMS, Joe and INGHAM, David. *Farming on the Edge: Archaeological Evidence from the Clay Uplands to the West of Cambridge*. Bedford: Albion Archaeology, 2008); and Stansted Airport and Upminster in Essex (HAVIS, Richard and BROOKS, Howard. *Excavations at Stansted Airport 1986-91, Volume 2*. Chelmsford: Essex County Council, 2004; VINCE, Alan. *Characterisation Studies of Anglo-Saxon and Medieval Pottery from Upminster*. Unpublished report: Alan Vince Archaeological Consultancy, 2006 at: <[doi: 10.5284/1004376](https://doi.org/10.5284/1004376)>; HOWELL, Isca; SWIFT, Dan and WATSON, Bruce. *Archaeological Landscapes of East London: Six Multi-period Sites Excavated in Advance of Gravel Quarrying in the London Borough of Havering*. London: Museum of London Archaeology, 2011 [for digital archive: [http://archaeologydataservice.ac.uk/archives/view/eastlondon\\_ch\\_2010/overview.cfm](http://archaeologydataservice.ac.uk/archives/view/eastlondon_ch_2010/overview.cfm)]).

<sup>12</sup> e.g. Codham Hall, in Great Warley, Essex (BIDDULPH, Edward and BRADY, Kate. *Excavations Along the M25: Prehistoric, Roman and Anglo-Saxon Activity Between Aveley and Epping, Essex*. Colchester: Essex Society for Archaeology and History, 2015, pp. 18-19); Brightwell, in Suffolk (MINTER, Faye and PLOUVIEZ, Jude. «Archaeology in Suffolk 2014». *Proceedings of the Suffolk Institute for Archaeology and History*, 2015, vol. 43(3), pp. 448-449); Queensford Farm outside Dorchester-on-Thames and Tubney Wood Quarry in

hypothesis presented here that the landscape of lowland Britain was more populous than previously thought.

### 2.3 *Patterns of land-use in the early post-Roman period*

Another source of evidence for early medieval agriculture is palaeoenvironmental sequences. A search through the published and unpublished «grey literature» revealed that up to 2013 there were 194 pollen sequences that covered the Roman and/or early medieval periods in Britain south of Hadrian's Wall and its immediate environs.<sup>13</sup> This figure includes both long «off-site» sequences taken from natural deposits such as peat bogs (that are usually radiocarbon dated), and shorter «on-site» sequences usually from settlement-related features such as pits, ditches, and wells (which are dated through radiocarbon determinations or artefactual evidence). In *The Field of Britannia* analysis pollen taxon were grouped into those indicative of four broad vegetation types: woodland, arable, improved pasture, and unimproved pasture. Percentages refer to the pollen from those land-use groups as a proportion of Total Land Pollen, and it must be stressed that as some plants – particularly wind-pollinated trees – produce far more pollen than others these figures do not directly relate to the proportion of the landscape that was covered by that type of land use (i.e. if 40% of the pollen from a particular region was indicative of woodland, this does not mean that 40% of the land mass of that region was forested: it will actually have been far lower).<sup>14</sup>

This analysis revealed very marked regional differences in land-use during the Roman period, and even greater differences in the extent to which land-use changed from the Roman through to the early medieval period. During the Roman period, the most extensively cleared regions were in England's Central Zone and East Anglia, while the South East and the Western Lowlands were the most wooded. During the fifth century there is clear evidence for a decline in the intensity of land use in most areas, but not

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Oxfordshire (CHAMBERS, R. A. «The late- and sub-Roman cemetery at Queenford Farm, Dorchester-on-Thames, Oxon». *Oxoniensia*, 1987, vol. 52, pp. 35-70; SIMMONDS, Andrew; ANDERSON-WHYMARK, Hugo and NORTON, Andrew. «Excavations at Tubney Wood Quarry, Oxfordshire». *Oxoniensia*, 2011, vol. 76, pp. 105-172), South Petherton in Somerset (BRETT, Mark and MUDD, Andrew. «Prehistoric, Roman and post-Roman discoveries in South Somerset: the archaeology of the Ilchester to Barrington gas pipeline 2005-6». *Proceedings of the Somerset Archaeological and Natural History Society*, 2013, vol. 156, pp. 74-104).

<sup>13</sup> RIPPON, SMART and PEARS, *The Fields of Britannia*, pp. 57-61.

<sup>14</sup> An alternative approach to the interpretation of pollen data has been developed that involves a model-based «correction» of raw pollen data in order to quantify vegetation abundance and cover (the REVEALS approach: SUGITA, Shinya. «Theory of quantitative reconstruction of vegetation I: pollen from large lakes REVEALS regional vegetation composition». *The Holocene*, 2007, vol. 17, pp. 229-241). This relies on a more thorough understanding of the pollen-vegetation relationship, and has been applied to data from the UK to produce the first estimates of different plant abundances in certain areas (FYFE, Ralph *et al.* «The Holocene vegetation cover of Britain and Ireland: overcoming problems of scale and discerning patterns of openness». *Quaternary Science Reviews*, 2013, vol. 73, pp. 132-148). At present, however, the method is limited because it requires raw pollen count data (which is usually not available), data has to be aggregated into long time windows (which can cut across key periods of landscape change), and the number of pollen taxa that can be transformed is currently limited to the major types (and does not include many arable weeds).

for the widespread abandonment of agricultural land: there was no extensive woodland regeneration. In England's Central Zone, for example, there was a shift from improved pasture towards unimproved pasture but very little increase in woodland. In the South East, however, there was an increase in woodland, although this was largely at the expense of improved pasture rather than arable. Overall, the pollen evidence shows that there was no single land-use history across the whole of lowland England, and it is striking that the Central Zone – that's saw the greatest potential continuity between Romano-British and medieval field systems (see above) – was also the region that was the most extensively cleared of woodland, had the greatest amount of arable cultivation, and saw the least increase in woodland in the post-Roman period.

The study of palaeoeconomic evidence – such as animal bones and charred cereal remains – sheds further light on Romano-British and early medieval agriculture.<sup>15</sup> The comparison of the evidence from a wide range of different regions shows that during the Roman period there was a general shift towards the keeping of cattle and a decline in sheep/goat, although there were significant differences in animal husbandries on different geologies: cattle dominating on heavy clay soils and in river valleys, while sheep/goats were most prevalent on the light soils overlying chalk and limestone.<sup>16</sup> At the start of the early medieval period, however, this trend towards cattle husbandry was reversed, which is to be expected following the collapse of the market economy: there was a shift back to the keeping of sheep/goats, but also an increase in the significance of pigs. A similar pattern is seen within cereal cultivation: over the course of the Roman period there was an increasing focus on the growing of spelt wheat in most areas at the expense of barley and oats, whereas at the start of the early medieval period cropping regimes returned to being far more diverse. Once again, farming regimes varied according to geology and soils. On Boulder Clays, for example, wheat rose from 86% of the charred cereal grains in the early Roman period to 97% in the Late Roman period, falling to 60% on the fifth to eighth centuries; barley fell from 7% to 3%, before rising to 26%. On chalk, in contrast, wheat rose from just 35% in the early Roman period to 78% in the late Roman period, but then fell back to 56% in the fifth to seventh centuries; barley fell from 62% to 19% before rising to 34%.

#### 2.4 *A retreat from the margins*

Through palaeoenvironmental and palaeoeconomic research, studying the relationship between excavated Roman-British and medieval field systems, and recognising settlements occupied by native British communities, we now have a far clearer idea of the extent and character of agriculture and field systems at the start of the early medieval period: overall, there was decline in the intensity of agricultural production,

<sup>15</sup> RIPPON, Stephen; WAINWRIGHT, Adam and SMART, Chris. «Farming regions in medieval England: the archaeobotanical and zooarchaeological evidence». *Medieval Archaeology*, 2014, vol. 58, pp. 195-255; RIPPON, SMART and PEARS, *The Fields of Britannia*, pp. 61-85.

<sup>16</sup> Sheep and goats can rarely be distinguished on the basis of their bones.

which is to be expected as the market-based economy collapsed, but there was no widespread desertion of land or extensive woodland regeneration. This generalised picture, however, hides important local variations and there were parts of the landscape which saw more profound changes. These were most striking in environmentally marginal areas such as coastal wetlands which had been extensively colonized during the Roman period but which saw a significant contraction of settlement in the fifth century.<sup>17</sup> This may well have been due to environmental factors that were special to these particular landscapes, notably rising water levels, continuing a trend that had started in the Roman period.

Traditionally, it has been thought that certain dryland areas were also abandoned in the post-Roman period, although the evidence is not as clear-cut as was previously thought. The higher chalk downlands of central-southern England, such as Salisbury Plain, for example, are littered with the earthworks of deserted Romano-British settlements and at some point in the early medieval period there must have been a major contraction of settlement, although its date is unclear: few sites have seen any excavation and where they have, only small amounts of Anglo-Saxon pottery have been recovered suggesting that the contraction was well underway by the fifth century.<sup>18</sup> Radiocarbon dating is, however, once again showing that certain burials unaccompanied by grave goods are early medieval,<sup>19</sup> although these may well be native Britons rather than Anglo-Saxons. Overall, it appears that the higher chalk downlands saw a contraction of settlement, but not complete desertion. Many heavy claylands have traditionally been thought to have lacked evidence for fifth to seventh century occupation, and there does indeed appear to have been some retreat from the heaviest interfluvial soils in some areas.<sup>20</sup> In Norfolk, however – a county that has seen particularly extensive fieldwalking surveys, excavations, and metal detecting – it now appears that both the lighter and the heavier soils continued to be occupied during the fifth and sixth centuries.<sup>21</sup> Another phenomenon that would appear to suggest that some marginal areas of the landscape were abandoned in the post-Roman period is the way that Romano-British settlements and field systems have been found in areas that during the later medieval and modern

<sup>17</sup> WILKINSON, Tony and MURPHY, Peter. *The Archaeology of the Essex Coast, Volume 1: The Hullbridge Survey*. Chelmsford: Essex County Council, 1995; HALL, David. *The Fenland Project, Number 10: Cambridgeshire Survey, the Isle of Ely and Wisbech*. Cambridge: Cambridgeshire County Council, 1996; EDDISON, Jill. *Romney Marsh: Survival on a Frontier*. Stroud: Tempus, 2000; RIPPON, Stephen. *Landscape, Community and Colonisation: The North Somerset Levels during the 1<sup>st</sup> to 2<sup>nd</sup> millennia AD*. York: Council for British Archaeology, 2006.

<sup>18</sup> SEAGER SMITH, Rachael. «Saxon and medieval pottery». In FULFORD, Michael; ENTWISTLE, Roy and RAYMOND, Frances. *Iron Age and Romano-British Settlements and Landscapes on Salisbury Plain*. Salisbury: Wessex Archaeology, 2006, p. 121.

<sup>19</sup> BOWDEN, Mark; SOUTAR, Sharon; FIELD, David and BARBER, Martyn. *The Stonehenge Landscape*. Swindon: Historic England, 2015, pp. 81-5.

<sup>20</sup> e.g. south-eastern Suffolk: NEWMAN, John. «The Late Roman and Anglo-Saxon settlement pattern in the Sandlings of Suffolk». In CARVER, Martin (ed.). *The Age of Sutton Hoo*. Woodbridge: Boydell Press, 1992, pp. 25-51.

<sup>21</sup> CHESTER-KADWELL, Mary. *Early Anglo-Saxon Communities in the Landscape of Norfolk*. Oxford: British Archaeological Reports, 2009.

periods are covered in woodland,<sup>22</sup> although the date of that woodland regeneration can rarely be dated and could have been several centuries after Britain ceased to be part of the Roman Empire. At Sidlings Copse, in Oxfordshire, for example, a well-dated pollen diagram shows continuity in land-use from the Roman into the early medieval period with an increase in woodland as late as the tenth century.<sup>23</sup>

## 2.5 *The role of climate change*

A possible driver behind landscape change in the early medieval period is climatic deterioration. Michael Jones, for example, argues that temperatures fell and rainfall increased in the fifth century, and that combined with past over-exploitation of soils, a declining demand for food as the market economy collapsed, and an outbreak of disease, this led to the abandonment of agricultural land.<sup>24</sup> Jones followed the tradition approach of Lamb in using a range of proxy indicators for climate change, notably documentary sources,<sup>25</sup> although in such a poorly recorded period these will never be reliable indicators of climate change. In recent years there has, however, been a growing interest in past climate change amongst the scientific community, and this has led to a far better understanding of trends in temperature and precipitation. This research is not, however, without its problems as some scientists have made overly simplistic correlations between observed trends in climate on the one hand, and developments within society on the other.<sup>26</sup> Klimenko, for example, plotted fluctuations in temperature in north-eastern Europe and then made simplistic correlations with documented historical events, arguing that «it is virtually certain that the mode and speed of development and northeastward expansion of the Russian State from the Middle Ages to the Modern Time were in many ways *dependent* on natural and geographical factors» [emphasis added by this author].<sup>27</sup> Such views have been challenged from within the palaeoenvironmental community,<sup>28</sup> with Middleton for example arguing

<sup>22</sup> e.g. BRYANT, Stuart; PERRY, Brian and WILLIAMSON, Tom. «A “relict landscape” in south-east Hertfordshire: archaeological and topographical investigations in the Wormley area». *Landscape History*, 2005, vol. 27, pp. 5-16; RIPPON, Stephen. «The Rayleigh Hills in South East Essex: patterns in the exploitation of rural resources in a “woodland” landscape». In GREEN, Sarah (ed.). *The Essex Landscape: in Search of its History*. Chelmsford: Essex County Council, 1999, pp. 20-28.

<sup>23</sup> DAY, S. P. «Woodland origin and “ancient woodland indicators”: a case study from Sidlings Copse, Oxfordshire, UK». *Holocene*, 1993, vol. 3(i), pp. 45-53.

<sup>24</sup> JONES, Michael. *The End of Roman Britain*. Ithaca: Cornell University Press, 1996.

<sup>25</sup> LAMB, Hubert. *Climate, History and the Modern World*. London: Routledge, 1982.

<sup>26</sup> VAN GEEL, B. *et al.* «Climate change and the expansion of the Scythian culture after 850 BC, a hypothesis». *Journal of Archaeological Science*, 2004, vol. 31(12), pp. 1735-1742; TURNER, Chris; BAILLIE, Mike; PALMER, Jonathan and BROWN, David. «Holocene climatic change and past Irish societal response». *Journal of Archaeological Science*, 2006, vol. 33(1), pp. 34-38; TURNER, Chris; JONES, Richard; THOMAS, Zoe; PALMER, Jonathan and BROWN, David. «Extreme wet conditions coincident with Bronze Age abandonment of upland areas in Britain». *Anthropocene*, 2016, vol. 13, pp. 69-79.

<sup>27</sup> KLIMENKO, Vladimir. «Thousand-year history of northeastern Europe exploration in the context of climatic change: medieval to early modern times». *The Holocene*, 26(iii), 2016, pp. 365-379.

<sup>28</sup> COOMBES, Paul and BARBER, Keith. «Environmental determinism in Holocene research: causality or coincidence». *Area*, 2005, vol. 37(3), pp. 303-311.

that «palaeoclimatic studies have already profoundly impacted the study of collapse and culture change, and a new determinism is in evidence».<sup>29</sup> Buntgen *et al.*'s reconstruction of summer temperatures, for example, does indeed appear to show a decline from the mid-sixth through to the mid-seventh centuries, but surely this does not mean that it constitutes a «Late Antique Little Ice Age» which caused «the Justinian Plague, transformation of the eastern Roman empire, and collapse of the Sasanian empire».<sup>30</sup>

There are many problems with these ill-informed arguments, including that climate change data mostly comes from environmentally marginal landscapes such as uplands that will not reflect climate trends in lowland regions (which, because they have longer growing seasons, will have been far less vulnerable to slight fluctuations in average temperature or rainfall). Another problem is that it is easy to assume data is accurate because it is «scientific». Modern techniques use a range of proxies such as changes in the widths of tree-rings, plant and animal remains preserved within sequences of upland peat that indicate the degree of wetness, and the accumulation of lake sediments. There are, however, many problems: these palaeoclimate reconstructions rely upon analysing deposits at intervals that can be many decades or even centuries apart, and the material that is used to reconstruct climate may not in itself be datable which means that radiocarbon determinations have to be used which themselves are only accurate to a hundred years or so. Overall, many of the climatic trends that have been reconstructed are actually very poorly dated, which in a period with precise historical dates makes correlation with socio-economic trends extremely difficult.

Bearing all of these problems in mind, Rippon and Fyfe have brought together a range of recent palaeoenvironmental data compilations that describe climatic fluctuations during the first millennium AD.<sup>31</sup> This data includes Charman *et al.*'s compilation of bog-surface wetness records derived from testate amoebae assemblages from ombrotrophic (i.e. rain-fed) peatlands in northern Britain that allow changes in precipitation to be determined, and which show increased wetness between the mid-fourth and early seventh centuries AD.<sup>32</sup> Whilst there is some correspondence with inferred rainfall in central Europe, there are also apparent differences such the later fifth century that was a period of continued increased wetness in Britain but one of decreased precipitation in mainland Europe. Three indicators of temperature in the fifth century are seemingly contradictory: oxygen isotopes from a speleothem (stalagmite) in South West Ireland,<sup>33</sup>

<sup>29</sup> MIDDLETON, Guy. «Nothing lasts forever: environmental discourse on the collapse of past societies». *Journal of Archaeological Research*, 2012, vol. 20, pp. 257-307.

<sup>30</sup> BUNTGEN, U. *et al.* «Cooling and societal change during the late antique Little Ice Age from 536 to around 660 AD». *Nature Geoscience*, 2016, vol. 9, pp. 231-236.

<sup>31</sup> RIPPON, Stephen and FYFE, Ralph. «Regional variation in the continuity of land-use patterns through the first millennium A.D. in lowland Britain». *Late Antique Archaeology*, 2017, vol. 13, fig. 8.

<sup>32</sup> CHARMAN, Dan; BLUNDELL, Antony; CHIVERRELL, Richard; HENDON, Dawn and LANGDON, Pete. «Compilation of non-annually resolved Holocene proxy climate records: stacked Holocene peatland palaeo-water table reconstructions from northern Britain». *Quaternary Science Reviews*, 2006, vol. 25, pp. 336-350.

<sup>33</sup> MCDERMOTT, Frank; MATTEY, David and HAWKESWORTH, Chris. «Centennial-scale Holocene climate variability revealed by a high resolution speleothem <sup>18</sup>O record from SW Ireland». *Science*, 2001, vol. 294, pp. 1328-1331.

and the measurements from the Greenland ice sheet,<sup>34</sup> show mean temperatures falling, while Luterbacher *et al.*'s synthesis of a wide range of proxy records from across mainland Europe show temperatures broadly stable.<sup>35</sup> The picture that emerges in upland Britain is that the fifth century may have seen a shift to cooler and wetter conditions, although whether the same trends were seen in lowland areas is unclear. Even if the same patterns were seen in lowland areas, their impact is even less certain as the temperate regions of north-western Europe had lengthy growing seasons during which a little shortening will not have caused major problems.<sup>36</sup>

## 2.6 *The fifth and sixth centuries: a period of adjustment*

Overall, it is argued here that the fifth to sixth centuries were not the period of great change in the countryside of lowland England that they were once assumed to be. It is true that the market-based economic system that had characterised Roman Britain collapsed relatively quickly, and this will have had important implications for farming communities: overall demand fell, and the ability to trade at market, and hence the incentive to specialise in certain products, disappeared. Palaeoenvironmental data such as pollen, palaeoeconomic evidence such as animal bones and charred cereal grains, and the excavated remains of settlements and field systems, however, all suggest that across most lowland areas some level of farming continued, albeit with a shift from intensive arable and cattle rearing towards more mixed and subsistence-based farming with a greater diversity of crops and animals kept. While the overall intensity of farming declined, and some of the most marginal environments were abandoned, many of the old Romano-British field systems in the core agricultural areas continued in use for at least a few hundred years.

## 3 THE «LONG EIGHTH CENTURY»

### 3.1 *Agricultural intensification*

After several hundred years when farming appears to have been on a largely subsistence basis, the economy revived from the later seventh through to the early ninth centuries (what historians have called the «long eighth century»<sup>37</sup>). This was a period

<sup>34</sup> VINTHER, B. M.; BUCHARDT, S. L., CLAUSEN, H. B.; DAHL-JENSEN, D.; JOHNSEN, S. J.; FISHER, D. A.; KOERNER, R. M.; RAYNAUD, D.; LIPENKOV, V.; ANDERSEN, K. K.; BLUNIER, T.; RASMUSSEN, S. O.; STEFFENSEN, J. P. and SVENSSON, A. M. «Holocene thinning of the Greenland ice sheet». *Nature*, 2009, vol. 461, pp. 385-388.

<sup>35</sup> LUTERBACHER, J. *et al.* «European summer temperatures since Roman times». *Environmental Research Letters*, 2016, vol. 11(2), pp. 1-12.

<sup>36</sup> Michael Jones's own maps show that the lowland Britain cannot be classed as marginal in terms of its climate: JONES, *The End of Roman Britain*, figs. 8 and 9.

<sup>37</sup> HANSON, Inge Lyse and WICKHAM, Chris (eds.). *The Long Eighth Century: Production, Distribution and Demand*. Leiden: Brill, 2000; RIPPON, Stephen. «Landscape change in the "Long Eighth Century"». In

when first the Church and then the secular elite started to acquire large landed estates which they exploited with a greater intensity. There was increased investment in the infrastructure associated with agriculture such as large stock enclosures,<sup>38</sup> corn-drying ovens,<sup>39</sup> and water-powered mills,<sup>40</sup> as well as other forms of food production such as fish traps.<sup>41</sup> This intensification in agricultural production is also seen through an expansion of settlement into physically marginal environments such as coastal wetlands<sup>42</sup> and some uplands,<sup>43</sup> while in some landscapes there are signs of growing specialisation. In districts with heavier soils, such as the Boulder Clay and valley terraces, there was a shift towards the growing of wheat, while chalkland saw a growing emphasis upon the cultivation of barley.<sup>44</sup> The wider context of this was a general rejuvenation of economic activity that saw the renewed use of coinage, mass-production of pottery, and international trade.<sup>45</sup>

### 3.2 *The restructuring of field systems*

It was also during this period that there appears to have been a major restructuring of how agricultural space was organised in England's Central Zone and East

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HIGHAM, Nicholas and RYAN, Martin (eds.). *The Landscape Archaeology of Anglo-Saxon England*. Woodbridge: Boydell, 2010, pp. 39-64.

<sup>38</sup> HARDY, Alan; CHARLES, Bethan and WILLIAMS, Robert. *Death and Taxes: The Archaeology of a Middle Saxon Estate Centre at Higham Ferrers, Northamptonshire*. Oxford: Oxford Archaeology, 2007.

<sup>39</sup> SHOESMITH, Ron. *Hereford City Excavations Volume 2: Excavations on and Close to the Defences*. London: Council for British Archaeology, 1982; HEATON, Michael. «Two mid-Saxon grain driers and later medieval features at Chantry Fields, Gillingham, Dorset». *Proceedings of the Dorset Natural History and Archaeological Society*, 1992, vol. 114, pp. 97-126.

<sup>40</sup> e.g. RAHTZ, Philip A. and MEESON, Robert. *An Anglo-Saxon Watermill at Tamworth: Excavations in the Bolebridge Street Area of Tamworth, Staffordshire, in 1971 and 1978*. London: Council for British Archaeology, 1992. ANDREWS, Phil; BIDDULPH, Edward; HARDY, Alan and BROWN, Richard. *Settling the Ebbsfleet Valley. High Speed I Excavations at Springhead and Northfleet, Kent. The Late Iron Age, Roman, Saxon, and Medieval Landscape*. Oxford and Salisbury: Oxford Wessex Archaeology, 2011.

<sup>41</sup> COWIE, Robert and BLACKMORE, Lyn. *Early and Middle Saxon Rural Settlement in the London Region*. London: Museum of London Archaeological Service, 2008, pp. 115-124; MURPHY, Peter. «The landscape and economy of the Anglo-Saxon coast: new archaeological evidence». In HIGHAM, Nicholas and RYAN, Martin (eds.). *The Landscape Archaeology of Anglo-Saxon England*. Woodbridge: Boydell, 2010, pp. 211-222; ROBERTSON, David and AMES, John. «Early medieval inter-tidal fishweirs at Holme Beach, Norfolk». *Medieval Archaeology*, 2010, vol. 54, pp. 329-346; COHEN, Nathalie. «Early Anglo-Saxon fishtraps on the River Thames». In BROOKES, Stuart; HARRINGTON, Sue and REYNOLDS, Andrew (eds.). *Studies in Early Anglo-Saxon Art and Archaeology: Papers in Honour of Martin G. Welch*. Oxford: British Archaeological Reports, 2011, pp. 231-238; HEPPELL, Ellen. «Saxon fishtraps in the Blackwater Estuary, Essex: monitoring survey at Collin's Creek, Pewet Island and The Nass 2003-2007». *Transactions of the Essex Society for Archaeology and History*, 2011, vol. 2, pp. 76-97.

<sup>42</sup> CROWSON, Andy; LANE, Tom; PENN, Ken and TRIMBLE, Dale. *Anglo-Saxon Settlement on the Siltland of Eastern England*. Sleaford: Lincolnshire Archaeology, 2006.

<sup>43</sup> RIPPON, Stephen; FYFE, Ralph and BROWN, Anthony. «Beyond villages and open fields: the origins and development of a historic landscape characterised by dispersed settlement in South West England». *Medieval Archaeology*, 2006, vol. 50, pp. 31-70.

<sup>44</sup> RIPPON, WAINWRIGHT and SMART, «Farming regions», pp. 195-255.

<sup>45</sup> WICKHAM, Chris. *Framing the Early Middle Ages*. Oxford: Oxford University Press, 2005.

Anglia,<sup>46</sup> although it is striking that this was less widespread than the intensification in landscape exploitation seen at this time.<sup>47</sup> The traditional view is that the landscape of Roman Britain had been largely abandoned in the fifth century, and a pattern of settlement established that was based upon isolated farmsteads and small hamlets that drifted across the landscape over time. Very little evidence had been found for the nature of the field systems associated with these dispersed settlement patterns, as none appeared to be associated with boundary ditches.<sup>48</sup> Within England's Central Zone these enigmatic landscapes were replaced by large nucleated villages surrounded by open fields, within which all of the cultivated land of that community was managed within two to four large fields, each being sub-divided into blocks known as furlongs that in turn were divided up into long narrow strips: the boundaries of neither the strips nor the furlongs were marked by permanent boundaries such as walls, banks, ditches, or hedges. Early archaeological and historical scholarship attributes the introduction of villages and open fields to Anglo-Saxon immigrants, although by the 1960s it was thought that open fields evolved more gradually and within an existing framework provided by the old Romano-British landscape.<sup>49</sup>

During the 1980s a new paradigm developed based on the idea that villages and open fields were created as part of a «great replanning» during the eighth century,<sup>50</sup> or a «village moment» around the tenth to twelfth centuries.<sup>51</sup> A wide range of explanations were put forward for what was seen as a major transformation of the landscape including the emergence of stable land-ownership and the need to increase agricultural productivity to meet the demands of the emerging kingdoms and their international trade.<sup>52</sup> There has also been considerable discussion over why only parts of the English landscape saw the emergence of villages and open fields, with no correlation with ethnic identity, population density, or the strength of lordship being discernible.<sup>53</sup> Tom Williamson suggested that open field farming was a response to particular soil conditions and the need to crop extensive areas of meadow, and although this is an interesting hypothesis it has not been supported by a statistical analysis.<sup>54</sup> Roberts and Wrathmell, however, noted

<sup>46</sup> The Central Zone continued to be characterized by villages and open fields throughout the medieval period, although in East Anglia they started to disappear within a few hundred years of their creation.

<sup>47</sup> RIPPON, «Landscape change in the "Long Eighth Century"», pp. 39-64.

<sup>48</sup> DEEGAN, ALISON and FOARD, Glenn. *Mapping Ancient Landscapes in Northamptonshire*. London: English Heritage, 2007 [<https://www.historicengland.org.uk/images-books/publications/mapping-ancient-landscapes-northamptonshire/>].

<sup>49</sup> THIRSK, Joan. «The common fields». *Past & Present*, 1964, vol. 29, pp. 3-29; THIRSK, Joan. «The origins of the common fields». *Past & Present*, 1966, vol. 33, pp. 142-147.

<sup>50</sup> BROWN, Tony and FOARD, Glenn. «The Saxon Landscape: a regional perspective». In EVERSON, Paul and WILLIAMSON, Tom (eds.). *The Archaeology of Landscape*. Manchester: Manchester University Press, 1998, pp. 67-94.

<sup>51</sup> LEWIS, Carenza; MITCHELL-FOX, Patrick and DYER, Christopher. *Village, Hamlet and Field*. Manchester: Manchester University Press, 1997.

<sup>52</sup> ROWLEY, Trevor (ed.). *The Origins of Open Field Agriculture*. London: Croom Helm, 1981.

<sup>53</sup> WILLIAMSON, Tom. *Shaping Medieval Landscapes*. Macclesfield: Windgather Press, 2003.

<sup>54</sup> WILLIAMSON, *Shaping Medieval Landscapes*; LOWERRE, Andrew. *Rural Settlement in England: Analysing Environmental Factors and Regional Variation in Historic Rural Settlement Organisation Using Regression and Clustering Techniques*. London: English Heritage, 2014.

a correlation between those areas that saw the development of villages and open fields and England's Central Zone that place-names and documentary sources suggest was the most extensively cleared of woodland in the early medieval period, a hypothesis that has since been confirmed through *The Fields of Britannia* project's pollen analysis.<sup>55</sup> More recently Williamson, Liddiard, and Partida have suggested a later date for the origins of villages and open fields, and a process that involved more gradual evolution as opposed to a «great replanning»,<sup>56</sup> although their arguments have in turn been challenged.<sup>57</sup>

Although there is as yet no consensus on why open fields were created in England's Central Zone and East Anglia, it does now seem clear that there is a correlation with those parts of the landscape that had a long history of intensive arable cultivation and were the most extensively cleared of woodland. The process appears to have started during the «long eighth century» (the later seventh to early ninth centuries), and as such has to be related to the general intensification of agriculture that is seen in this period. It should be noted, however, that there were areas outside England's «Central Province» that saw this intensification in landscape exploitation but not the widespread development of large-scale villages and Midland-style open fields, suggesting that the latter was a particular response to a widespread set of circumstances, whereas people elsewhere responded in different ways. The Fields of Britannia project has also shed important light on the actual process whereby open fields were created, and it is striking that the region which shows the greatest potential continuity of field systems – England's Central Zone – is the same one as went on to see the development of villages and open fields.<sup>58</sup> Instead of a «great replanning», which swept away all traces of the preceding landscape, the open fields appear to have in part been created within an existing framework of boundaries, supporting Thirsk's model that was prevalent back in the 1960s (see above).

The role of climate change in this intensification of agriculture is far from clear, not least because of the problems in compiling, dating, and interpreting the data as outlined above: oxygen isotopes from South West Ireland<sup>59</sup> and measurements from the Greenland ice sheet<sup>60</sup> suggest that temperatures were actually falling in the late seventh and early eighth centuries, whereas Luterbacher *et al.*'s synthesis of a wide range of proxy records from across mainland Europe show temperatures steadily rising!<sup>61</sup> Charman *et al.*'s compilation of bog-surface wetness records from upland peats in northern Britain

<sup>55</sup> ROBERTS, Brian and WRATHMELL, Stuart. *An Atlas of Rural Settlement in England*. London: English Heritage, 2000; RIPPON, SMART and PEARs, *The Fields of Britannia*; WRATHMELL, Stuart. «Woodland in Roman Britain: some hypotheses». *Britannia*, 2017, vol. 48, pp. 311-318.

<sup>56</sup> WILLIAMSON, Tom; LIDDIARD, Robert and PARTIDA, Tracey. *Champion: The Making and Unmaking of the English Medieval Landscape*. Liverpool: Liverpool University Press, 2013.

<sup>57</sup> HALL, David. *The Open Fields of England*. Oxford: Oxford University Press, 2014; BLAIR, John; RIPPON, Stephen and SMART, Chris. *Planning in the Early Medieval Landscape*. Liverpool: Liverpool University Press, forthcoming.

<sup>58</sup> RIPPON, SMART and PEARs, *The Fields of Britannia*, esp. pp. 329-331.

<sup>59</sup> McDERMOTT, MATTEY and HAWKESWORTH, «Centennial-scale Holocene climate variability revealed by a high-resolution speleothem <sup>18</sup>O record from SW Ireland», pp. 1328-1331.

<sup>60</sup> VINTHER *et al.* «Holocene thinning of the Greenland ice sheet», pp. 385-388.

<sup>61</sup> LUTERBACHER *et al.* «European summer temperatures since Roman times», pp. 1-12.

show precipitation as broadly stable in the late seventh and early eighth centuries before increasing sharply later in the century.<sup>62</sup>

#### 4 CONCLUSIONS

The development of landscape archaeology – and in particular developer-funded work – has shed important new light on early medieval agriculture and field systems: in addition to excavations, important new information has come from field walking surveys and metal detecting about the distribution of settlements and field systems across the landscape, while pollen sequences are starting to provide a broad picture of regional and temporal variations in the major types of land-use. The analysis of assemblages of faunal remains and cereal grains is starting to show important differences in animal husbandry and arable cultivation across both time and space, with previously unsuspected complexities in regional and temporal change.

The period covered by this special volume of papers was one of profound change in both the structure of field systems and the use to which they were put. Following the collapse of the Romano-British market-based economy, the fifth to sixth centuries saw agriculture revert to a subsistence basis and this is reflected in the greater diversity of crops grown and animal raised. There was a decline in the intensity of landscape exploitation, and some retreat from the most marginal areas, but there is no evidence for a widespread woodland regeneration. In the «long eighth century» there was an intensification of agriculture which was part of a general economic revival, although a market-based economy and a network or urban-based market centres did not develop until the tenth century. Changes in agricultural practices included the development of new forms of field systems, although rather than the widespread abandonment of Romano-British fields in the fifth century, and then a «great replanning» that swept away all trace of what was left from the eighth century onwards, it now seems as if many Romano-British field systems survived and that some were gradually modified as open fields developed.

The drivers behind these landscape changes were clearly numerous and complex. Migration does not appear to have been significant: although there was Anglo-Saxon migration into parts of southern and eastern England, this was not responsible for the origins of open fields which happened much later, and also in some areas that never saw Anglo-Saxon immigration. While rising water levels may have contributed to the abandonment of one specific type of environment – coastal wetlands – across other lowland areas there is no evidence that it was a significant casual factor (although patterns of cereal cultivation and animal husbandry do appear to have been influenced by geology and soils). Overall, therefore, while the natural environment was an influence on early medieval farming practices it does not appear to have been a driving force. Instead, the development of agriculture in this period appears to have been driven by indigenous, socio-economic factors, and rather than it being one of great transformation – brought

<sup>62</sup> CHARMAN *et al.* «Compilation of non-annually resolved Holocene proxy climate records», pp. 336-350.

about by economic catastrophe – there appears to have been far greater continuity in the daily lives of farming communities than previously thought.

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