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Europe's Early Land Allotment: Questions of Time, Scale and Stewardship

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Mette Løvschal , Stijn Arnoldussen ,
and Robert Johnston

Abstract

Early field systems, in some cases several millennia old, are tangible relicts of past large-scale processes of landscaping and land allotment in many regions across Europe. Yet our cultural landscapes, created in both the near and distant past, are disappearing fast and often irreversibly so, showing how the management and preservation of fieldscape heritage is a real and urgent issue for landscape conservation policy and practice. In this introductory chapter, we provide a conceptual framework for the study of later prehistoric land allotment in Europe, including a discussion of major methodological approaches, findings and future research priorities. We outline the main scope of this volume, followed by a series of summaries of the individual chapters and describe the cross-chapter themes and approaches. Moreover, we use this introductory chapter as an opportunity to critically evaluate the research field of prehistoric fieldscapes, its current state in European archaeology as well as its future challenges and perspectives.

Keywords

Land allotment · Land enclosure · Land-use change · Anthropocene · Fieldscape heritage · Agriculture · Pastoralism

1.1 Fieldscapes: Global and European Issues

Field systems of immense time-depth weave historical textures into the fabric of Europe's present-day landscapes. In many regions, field systems dating back to the 2nd millennium BC are tangible relicts in contemporary landscapes. Often, the organisation of rural landscapes embodied in banks, ditches, hedges or terraces echoes much older historic and prehistoric forerunners (e.g. Müller 2013), illustrated by the long-term influence of large-scale landscape structures such as Roman period centuriation (e.g. Caravello and Michieletto 1999; Clavel-Lévêque and Orejas 2002; Upex 2002; Bonnie 2010). These historically constituted, deep-set fieldscapes represent the largest cultural 'artefacts' in Europe. In England, historic fieldscapes covered at least 70% of the land (Johnston, et al., this volume); for parts of Denmark, prehistoric landscape parcelling may have even covered more than 75% of all available space (Vinter 2011) – leaving little room for alternative landscape forms. Critically, however, fieldscape heritage is unlike an archaeological artefact hidden beneath the surface or displayed in a museum. Fieldscape heritage is emergent and influential in the contemporary landscape, actively co-shaping the cultural identities and characters of regions (*cf.* Gruffudd 1995; Pinto-Correia 2000; Antrop 2006: 188; Allen 2014: 165). This is not a phenomenon exclusive to landscapes of the deep past. But despite their vast extent and influence, the relicts of prehistoric field systems remain vulnerable to neglect, erosion and economic developments across Europe, as are ancient landscapes and rural ecologies globally.

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Across the globe, the fabrics of cultural landscapes created by generations of predecessors are disappearing fast and often irreversibly so. As we prepare this book for publication, international companies, military forces and small-scale landholders are clearing many thousands of hectares of Amazonian forest for soya production and livestock grazing (Stabile et al. 2020). Similar large-scale human-driven landscape transformations play out across vast areas of the planet, including the forests in Indonesia and Malaysia (Teheripour et al. 2019), Southeast Asia and Africa (Vijay et al. 2016). Concurrently, land apportionment and fencing are appearing in formerly open, unfenced pastoral landscapes as part of large-scale land confiscation and privatization processes (Galvin et al. 2008). This has recently been the situation in Inner Mongolia (Taylor 2006) and East Africa (Said et al. 2016; Løvschal et al. 2017; Løvschal and Gravesen 2021), reminding us of the rural histories of Australia and the American Great Plains in the late nineteenth century (Netz 2004; Greer 2012). Such fast-paced land-use changes are leading to deforestation and desiccation at unprecedented scales – contributing to the ‘great acceleration’ of the Anthropocene (Steffen et al. 2015). The systematic destruction of forest and grasslands and enclosure of landscapes is partly driven by international geopolitics and the globalised economy. Its destruction will have unpredictable climate-, species-, human-, cultural- and historical consequences on a local through to planetary scale (e.g. Ogden et al. 2013; Steffen et al. 2015). And as new fieldscapes are created in responses to current global demands for food and fuel, the historic fabric and connections with land are often also lost.

Hence, the conservation and governance of cultural landscapes, including those of past field systems, is a real and urgent issue in heritage management policies across Europe (e.g. Chaps. 9, 12 and 13 this volume). Moreover fast-paced landscape transformations are not merely, and frequently negatively, eroding the cultural heritage of rural landscapes. They also impair researchers’ efforts to study how past communities sustained long- and short-term modes of tenure and land use, often over centuries.

As rich, living archives of past pastoral and agricultural livelihoods and economies, Europe’s ancient field systems provide foundations for recognising European rural histories. Research on ancient fieldscapes can shape solutions that ease the tensions between heavy carbon-footprint agriculture and ecologically and socially resilient polyculture in food-economies. Moreover, given our current environmental crisis, questions pertaining to large scale land allotment and the social and economic significance of fieldscapes have never been as actual or as urgent.

In this volume, we explore a series of case-studies across Europe to address their potential as sources of information on past relations between humans, animals and their environments. The existence of field systems in pre- and protohis-

toric Europe has revealed fascinating insights into the deep history of pastoral and agricultural economies (e.g. Van Giffen 1918; Curwen and Curwen 1923; Hatt 1949; Bradford 1957; cf. Rackham and Moody 1992; Franceschelli 2015). Field systems mark the ongoing investment, improvement, structuring and restructuring of human and other-than-human relationships within landscapes. Therefore, by studying the allotment and long-term use of fieldscapes, as represented in this book, we get an insight into the complex organisation of cultural and economic relations that shaped the European countryside.

1.2 Methods

The methodological toolkit for investigating Europe’s vast prehistoric fieldscapes has expanded significantly over the last five decades. For much of the twentieth century, surveys and excavations were constrained in extent and ambition by the available archaeological technologies (e.g. Van Giffen 1918; Curwen and Curwen 1923; Hatt 1949, cf. Brongers 1973; Klamm 1993: 5–16). Since the 1970s, prehistoric field systems have more often, more deliberately, and more extensively been targeted for open area excavations, and the means for their identification and mapping have significantly improved through ambitious aerial mapping projects and advances in remote sensing (cf. Chap. 7).

Amongst the plethora of new methods and data, we need to remember the merits of intensive analytical survey. Both for mountainous terrace landscapes and lowland landscapes, where field systems generally comprise banks, lynchets or ditches, detailed ‘feet on the ground’ surveys have proven vital to accurately identify, map and better understand field systems (e.g. Chaps. 5, 6, 8 and 11). Yet due to their spatial extent, it is often not feasible to employ analytical ground survey on extensive scale. In these cases, the availability and refinement of mapping from LiDAR (Light Detection and Ranging) datasets has proved crucial in identifying earth-work field and terrace systems (e.g. cf. Humme et al. 2006; Kooistra and Maas 2008; Clemmensen 2010; Hesse 2010). The high resolution of the topographic models created from LiDAR data, from which the spatial fabric of past field systems can be mapped, should not be considered an end-point of the investigative process. However accurately they may be mapped, archaeological features present themselves as a deceptively atemporal snapshot of centuries of field system making and use, and masking details and diachronic changes in agricultural specifics, layouts and regimes (Nielsen and Dalsgaard 2017: 416).

A new generation of investigations have emerged in which pedological and palaeo-ecological analyses are integral to research design (e.g. Spek et al. 2003; Nielsen and

Dalsgaard 2017; Nielsen et al. 2019). This integration has enabled the reconstruction of the pastoraland agricultural practices, beings and processes that operated within and helped to shape the field systems. For example, details of manuring strategies involving plaggen, muck and midden materials have come to light in case-studies in Denmark, Scotland, England, the Netherlands, the Pyrenees as well as in Greece (Chaps. 6–8, 12 and 13). Barely tangible aspects, such as the frequencies and durations of fallow periods, can be recognised by integrating palynology, anthracology and pedology. Incorporation of the study of algae and non-pollen palynomorphs (NPPs) have helped to identify manuring, non-local soil admixture and to create more robust reconstructions of local vegetation (*cf.* Arnoldussen and Linden 2017; Enevold et al. 2019). These details are needed if we want to assess the intensities and rhythms of land-use within ancient field systems. For example, Behre (2008: 115) proposes that no more than 10% of the Flögeln Celtic field plots were in use simultaneously for crop-cultivation. For most prehistoric field systems, however, we still lack robust data on fallow duration, derived from percentages of biennials, and nutrient conditions (*e.g.* depletion risks and manuring requirements). The methods, such as environmental aDNA and those listed above, are available to address these gaps in the future.

Moreover, high resolution chronologies are required in order to effectively archaeological and environmental histories. There is an increased awareness of the limitations of dating prehistoric field systems by morphology (*cf.* Chap. 13), cultural material (*cf.* Chap. 3) or single radiocarbon dates (*cf.* Chap. 4). In systems where re-use of older sites was common or manuring involved an admixture of settlement waste the reliability of dating agricultural phases using pottery, charcoal or other artefacts should be evaluated critically.

There are two evident routes towards more robust chronologies for Europe's field systems. The first involves critically evaluating aggregated dates for particular types of field system phenomena (Løvschal 2014, 2020; Chap. 13). For example, basing themselves on a corpus of 323 dates for 120 sites, Johnston and colleagues (Chap. 13) identify an initial phase of large-scale apportionment of England's field systems in the early centuries of the second millennium BC, which became more widespread after 1700 BC. They also use the dataset to argue for a waning in the construction and maintenance of field systems during 1000 BC and 600 BC. The second approach can be characterised by the realisation that efforts to date specific field system elements by just a single date, or single type of date, are intrinsically flawed for building detailed diachronic narratives (Chaps. 3 and 13). Foremost, the application of OSL and TL as direct dating strategies (*e.g.* Chaps. 6 and 11) or combined application of OSL and

AMS dating will aid in unravelling the internal developmental trajectories of aggregate complexes of field systems. Moreover, for the north-west European field systems consisting of earthen banks, stratified AMS- and OSL-dates have already shown how perimeter banks can act as long-term chronostratigraphic repositories of agricultural use, not just preserving specifics of agricultural usage, but forcefully illustrating the resilience of such systems (Arnoldussen 2018; Chaps. 3 and 13).

As a consequence, there is good reason to be optimistic about the extensive and still-growing methodological toolkit for making new discoveries about Europe's prehistoric fieldscapes.

1.3 Ambitions

This book's focus is on the development of fieldscapes through time and space and in their wider landscape context. The chapters address established topics relating to past land management regimes, including manuring, water, land and livestock and crop management, and technologies such as slash-and-burn, ard and plough. Several research themes and questions link the chapters: (a) the mapping and understanding of field systems at various scales; (b) interpreting social processes from field system morphologies; (c) the relations between field systems and cultural and natural features of their environments; (d) the time-depths and temporalities of usage; and (e) the specifics of the underlying land tenure systems, with special attention to matters of resilience and changing practices (Table 1.1).

The chapters take a largely anthropocentric perspective, which focuses on the *human* shaping and inhabitation of landscapes over time. This reflects the volume's attention to the physical, human-driven allotment of landscapes through various uses and manipulations. This approach is deeply embedded in the research history of prehistoric fieldscapes. For example, the early and continuing importance of remote sensing of field systems through aerial imagery has so a large degree disconnected researchers from the land and its processes, and made humans *remote* from these landscapes (*cf.* Kostyrko et al. 2016). There are current theoretical positions that decentre humans and recognise alternative ontologies for relating human and nonhuman histories. They offer other logics than those of the westernized, sedentary and human-oriented, which more explicitly take into account the role of multispecies assemblages in the resilience of allotted landscapes (*e.g.* Deleuze and Guattari 1980; Haraway 2008; Latour 2004; Povinelli 2016; Tsing 2015). For the moment, few scholars researching fieldscapes have pursued such paths. It is our anticipation – and hope – that this will change in coming years.

Table 1.1 Coverage of main research themes by chapter. The number of crosses indicate the relative importance given to that specific theme in a paper. For details see relevant chapters

| Ch. | Author(s) | Mapping and understanding field system morphologies at various scales | The extraction of information on social processes from field system morphologies | The relations between field systems and cultural and natural features of their environment, | Time-depths and temporalities of usage | Specifics of the underlying agricultural systems |
|-----|--------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------|
| 2 | Christie | +++ | +++ | +++ | + | + |
| 3 | Arnoldussen | +++ | +++ | ++ | ++++ | +++ |
| 4 | Arnold | +++ | + | +++ | ++ | + |
| 5 | Randall | ++ | +++ | +++ | + | ++++ |
| 6 | Harfouche & Poupet | ++ | ++ | +++ | + | +++ |
| 7 | Halliday | ++ | ++ | +++ | + | ++ |
| 8 | Kvapil | +++ | +++ | ++ | + | +++ |
| 9 | Roughly, et al. | +++ | ++ | ++ | ++ | + |
| 10 | Marcigny & Peake | ++ | +++ | +++ | ++ | + |
| 11 | Lane & Aravantinos | +++ | ++ | +++ | +++ | +++ |
| 12 | Vinter | ++ | + | +++ | ++ | ++++ |
| 13 | Johnston, et al. | + | + | + | ++++ | + |
| 14 | Saccoccio | + | ++ | +++ | +++ | + |



Fig. 1.1 Distribution and characterisation of case-studies targeting European field systems in this volume

While accepting this limitation, this volume addresses the above five research themes in the first comprehensive insight into prehistoric fieldscape research across Europe. We wish to raise a broader awareness of some of the main scientific questions that are addressed by scholars working in various fieldscapes across Europe (Fig. 1.1). Their questions raise fundamental issues with the interpretation of European fieldscapes and their long-term histories, and their case-studies exemplify the established and novel methodologies that can progress our knowledge. In addition, the volume offers inspiration and guidance for the conservation management of fieldscape heritage, which we hope will stimulate the strategic guidance that will frame and support improved protection of Europe's fragile landscape heritage.

A series of important research questions are raised and answered across the chapters. Several papers examine distinct field system morphologies within their culture-historical contexts. Christie (Chap. 1) and Halliday (Chap. 7) discuss the landscapes of Shetland and Scotland more broadly in which organic, small scale enclosures and field boundaries regulated agricultural use, without evidence for extensive co-axial structures. Roughly and colleagues' case-study of Loughcrew, Ireland (Chap. 9), shows how detailed map-regression can reveal the deep temporal trajectories of patterns of irregular banks and rectilinear boundaries. For England, Johnston and colleagues (Chap. 13) review the scientific dates available for coaxial/cohesive, aggregated (*i.e.* regular and irregularly accreted), formal terraced, open, enclosed and parliamentary fields. The case-studies by Randall (Chap. 5) and Marcigny and Peake (Chap. 10) are excellent examples of how systems of ditches reflected (changing) agricultural strategies – and may have been tailored as much to livestock rearing as crop-cultivation. In the low-altitude regions around the North Sea coast, Vinter (Chap. 12; Denmark), Arnold (Chap. 4; Germany) and Arnoldussen (Chap. 3; the Netherlands) discuss systems of sub-rectangular embanked fields that extend across hundreds of hectares. The case studies from higher-altitude zones, such as the French Pyrenees (Chap. 7) and Corinthia (Chap. 8), illustrate that terracing is best understood in tandem with the study of the settlement systems and subsistence economies that required their construction (Chaps. 6 and 8).

The chapters also demonstrate the variation in the boundary architecture of field systems that existed across Europe: ditches (Chaps. 5, 10, 13 and 14), earth and stone banks (Chaps. 2, 3, 4, 7 and 12), lynchets (Chaps. 7, 12 and 13), terracing (Chaps. 6, 8 and 11) and canals (Chap. 11). It is important to realise that unenclosed fields too may have formed part and parcel of prehistoric agricultural strategies. Bjerre Enge in Thy, northern Denmark, is a well-documented case, where a series of irregular fields from c. 900 to 700 BC were separated only by unploughed wetter areas (Bech and Mikkelsen 2018; *cf.* Nielsen 1993). Another buried culti-

vated field was relatively recently discovered at Swifterbant S4, the Netherlands, where the mixing of anthropogenic materials such as carbonized plant remains and burnt bone in the soil is interpreted as the result of tillage (Huisman et al. 2009). Some features, such as hedges, fences and pathways, are often difficult to detect archaeologically. Yet, Chaps. 3, 5, 10 and 13 offer evidence for landscape structuring using fences or hedges. Pathways and roads that opened-up field systems to maintenance, manuring and harvesting, are similarly infrequently documented but discussed in Chaps. 4, 8, 10 and 14. We hope that such descriptions of rarer components of field systems may aid their conceptualisation and recognition elsewhere in the future.

A comparable observation can be made with respect to the practical life of fields: hoe-based horticulture (Chaps. 3 and 14), gardening and polyculture, manuring strategies, ard-marks as proxies for sowed-preparation or clearance (Chaps. 6, 7 and 14; Arnoldussen 2018: 315), the roles of clearance through burning and fallow cycles (Chaps. 3, 6, 7 and 12; Dev 2018), crop-rotation (Chaps. 5 and 8) and the dynamics of managing livestock and crop-plots (Chaps. 5 and 7). While the chapters touch on many of these topics, they also illustrate the need for further sustained research beyond the case-studies.

Other vital research questions and topics are underrepresented in the chapters. For instance, how might variation in social organization correspond with different forms of land management, and agricultural and tenurial regimes? We still understand relatively little about the social and labour organisation of agricultural and pastoral regimes in prehistory, and how they influenced and were related to other spheres of life. The volume also has chronological gaps. The chapters generally present the earliest manifestations of fieldscapes in later prehistory (c. 2000–500 BC; Table 1.2). However, other studies from later periods have shown the potential of relating late prehistoric and early historic land allotment processes through a combination of archaeological and historical evidence, as has been carried out fruitfully by Susan Oosthuizen (2013) and Peter Fowler (2000). Finally, there remain unaddressed questions about how prehistoric field systems can have relevance for present-day communities throughout Europe by connecting people with land, contributing to sustainability education, and shaping the identities of localities. We hope the book can offer a catalyst for research on the public archaeology or heritage of fieldscapes.

1.4 A Future for Field system Research

Notwithstanding the rich and detailed narratives offered by the case-studies in this volume, we judge that there remains significant work to be done. A first issue to raise concerns

Table 1.2 Overview of main periods of field system activity for each case-study. Dots indicate older or later activity, small crosses minor and big crosses major activities. For details see relevant chapters

| Ch. | Author(s) | 4000-3500 | 3500-3000 | 3000-2500 | 2500-2000 | 2000-1500 | 1500-1000 | 1000-500 | 500-0 | AD 0-500 | AD 500-1000 |
|-----|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-------|----------|-------------|
| 2 | Christie | . | . | x | X | X | | | | | |
| 3 | Arnoldussen | . | . | | | X | X | X | x | | |
| 4 | Arnold | | | | | | | | X | X | . |
| 5 | Randall | . | | | | X | X | X | X | X | x |
| 6 | Harfouche & Poupet | | | X | X | x | | | | | |
| 7 | Halliday | | | | x | X | X | x | | | |
| 8 | Kvapil | . | . | . | . | x | X | | | | . |
| 9 | Roughly, et al. | | . | . | . | . | X? | X? | | | . |
| 10 | Marcigny & Peake | | | . | x | X | X | x | | | |
| 11 | Lane & Aravantinos | | | | | X | X | x | | | |
| 12 | Vinter | | | . | | . | x | X | . | . | . |
| 13 | Johnson, et al. | | | | | x | X | x | | | |
| 14 | Saccoccio | . | . | . | . | X | x | | | | |

chronologies, tempos and temporalities. It is still a rather open question *when* and *how fast* the semi-permanent field systems emerged in the different areas of Northern Europe. Do we know enough about continuity and potential periods of abandonment or shifting land-use patterns? And which rhythms of labour and movement were embedded in the fieldscapes?

Investigating such issues, including the speed and phasing of land allotment processes, requires a chronological resolution often not yet available. This renders difficult narratives about how boundaries may have changed from notional and invisible to tangible and visible (Løvschal and Gravesen 2021), or from one boundary type to another, such as from fence to bank, and bank to ditch. Imprecise chronologies impact in our knowledge of the earliest phases of the use-life of fieldscapes. The earliest formation of fieldscapes marked the instantiation of particular landscape logics that, combined with landscape affordances, structured the long-term trajectories along which landscapes developed (Løvschal 2020). Much more knowledge is needed about the chronologies involved in such trajectories, in order to investigate causalities and correspondences with other ecological and cultural trajectories.

Second, research on the underpinning forms of social organisation and traditions of tenure are underrepresented, particularly outside Britain (*cf.* Wickstead 2007). The study of field systems is still a research field that is dominated by positivist notions of economic rationality, maximization and individual (human) choice, and too frequently studied as a domain separate from other aspects of human and nonhuman life. To counter overly functionalist and economic approaches, we need an increased focus on the social, organisational and more-than-human dimensions of field systems. These concern, but are not limited to, the study of the organisation of labour and which forms of bio-social organisation, rules, and regulations of access produced, managed and manipulated the fieldscapes. New studies of manuring (*e.g.* Lauer et al. 2014; Nielsen and Kristiansen 2014; Dev 2018; Nielsen et al. 2019) target the composition and intensity of manuring on the prehistoric field systems. Unfortunately, for proxies such as coprostenoles, stable bile acids and coprophilous spore bodies, it remains difficult to argue whether they entered the fields 'on the hoof' as droppings or as part of a manure-mixture prepared in settlements. This ambiguity feeds into wider questions pertaining to the relationship between pastoralism and agriculture (Chaps. 5, 6 and 8; *cf.* Holst and Rasmussen 2013), and may call for a reopening of the debate from the 1970s on the relationship between pastoralism and land enclosure (*e.g.* Fleming 1987, 2007;

Fowler 1983), as well as between pastoralist and agricultural landscapes. Many field systems are situated in landscapes typically regarded as 'marginal', such as the many Celtic fields situated in former heathlands, suggesting that grazing and herding could have formed a key part of their management and even initial allotment. In turn, the question of how particular landscapes and ways of organising landscapes shaped interaction and multispecies relationships should also be addressed. Particularly the ways and (social) scales on which usage and use-rights were coordinated to arrive at the uniform outlook that various field systems pose, hinges on the availability of studies that target the social rather than physical aspects of field systems.

Third, issues related to the causality of field-scape change remain critically absent. Particularly the possible social, cultural, demographic, climatic and spatiotemporal factors in the emerging and reconfiguring of field systems need to be addressed and disentangled. Whereas first-millennium BC climatic changes have been identified as important agents of change (Chaps. 4, 6, 7, 10 and 11; *cf.* Groenman-van Waateringe and Geel 2017), they are by no means to be seen as universal and uncausal drivers of change. If anything, the case-studies in this volume illustrate the extent that local factors all affect the resilience of local field systems, including factors such as water proximity and soil-nutrient content, the role and proximity of (older) monuments and influences of social organisation and forms of land governance.

Fourth, field systems should, in future, be studied from more diachronic or biographical perspectives, in which 'before' and 'afterlives' of fields are addressed alongside their use histories (Johnston 2005). Earlier monuments and indications of vegetation change due to prior use or settlement can have influenced the situation and development of field systems, yet too few are excavated with such questions in mind. When not in *tabula rasa* landscapes, what types of prior uses were seen as unproblematic or even favoured? Several case-studies in this book have highlighted how use and reuse have created rich – but difficult to disentangle – palimpsests of landscape structures (Chaps. 4, 7, 8, 9 and 14). This speaks volumes on the long-term consequences of land allotment. Over what durations did field systems have structuring effects on people's practices and ways of organising and negotiating landscapes (Løvschal 2020)? A stronger landscape-biographical approach – sensitive to its palimpsest character – can help identify ways of reinterpretation that showcase the sustained influence of previous structures and features related to past fieldscapes.

1.5 Chapter Summaries

We have grouped the chapters by four major approaches and themes: ‘Mapping fieldscapes’, ‘In-depth archaeological investigations of fieldsystems’; ‘New methods’ and ‘The economy of fieldscapes: pasture and agriculture’. We of course recommend a close reading of the entire volume, however, what follows are short introductions to each of the case-studies to guide readers towards their specific interests.

1.5.1 Mappings Fieldscapes

Volker Arnold (Chap. 4) demonstrates the value of LiDAR for the identification and mapping of fieldscapes in landscapes shrouded in woodland. Arnold’s case study is the Sachsenwald Forest, east of Hamburg, northern Germany. Once the digital terrain models were generated, the unmistakable patterns of field banks appeared beneath 15 km² of the woodland. The largest undisturbed and continuously enclosed area covers 5 km². The field systems vary in their regularity and sizes. Their origins post-date the Late Bronze Age/Early Iron Age funerary barrows and predate the thirteenth century AD, when the woodland was established. Scientific dates from relict field systems elsewhere in the region mainly fall within the first century BC to the first century AD. These field systems are not as extensive, complete or morphological variable as the fields in Sachsenwald Forest. The Sachsenwald fields have considerable potential for extending the chronology and better understanding the evolution of early land apportionment in northern Germany.

Along similar lines, Michael Vinter’s paper (Chap. 12) seeks to reconstruct three fieldscapes from the first millennium BC in Himmerland, northern Jutland, Denmark. Through in-depth analysis and a combination of aerial photographs, pollen data, archaeological data, topographical and historical maps, Vinter is able to reconstruct and critically evaluate the potential extent of the Celtic field systems. He estimates the original extent of these field systems in prehistory, pointing to the fact that existing distribution maps, such as those based on LiDAR (Arnold, this volume), are most often highly biased by historical land-use and modern infrastructural expansion. Moreover, he points to a potential, marked change in the use-life of these field systems in the middle of the Pre-Roman Iron Age, which corresponds with settlement nucleation, more sedentary lifeways, and a peak in heathland vegetation.

Cyril Marcigny and Rebecca Peake’s paper (Chap. 10) adds a largely over-looked region in field system research within western Europe, by presenting an overview of the Neolithic to Late Bronze Age field systems and settlements

of northern France. The fields show remarkable similarities to the extensive allotted landscapes described by Arnoldussen (this volume), Vinter (this volume) and Arnold (this volume) in that there are no clear demarcations of their actual limits, and they are present as a mixture of both coaxial and more irregular fields. Marcigny and Peake see the emergence of these field systems as related to a marked population expansion and increased population density, corresponding with a demand for an increase in agricultural production.

Corinne Roughley and colleagues spent two decades mapping and interrogating the multiperiod fieldscapes of Loughcrew, County Meath, eastern Ireland (Chap. 9). Their work began with one of the earliest LiDAR surveys undertaken for archaeological purposes, to which they added historic and recent aerial photography along with published and archival maps. These multiple sources are essential for unravelling the complexities amongst 150 km of linear earthworks in their study area. Following map regression, Roughley and colleagues used the morphology of the earthworks and their stratigraphic relationships to propose a sequence of transformations of Loughcrew’s fieldscapes, which may have begun in later prehistory. The Loughcrew area remains a changing landscape in this and the last centuries, as a dispersed pattern of new-build bungalows takes the place of earlier farms. The fragile remains of the early fieldscapes are especially vulnerable as they are extensive and difficult to protect. Loughcrew exemplifies the widespread challenge of conserving the character and archaeological potential of ancient fields for the future’s living landscapes.

1.5.2 New Methods

Robert Johnston, Rowan May and David McOmish’s paper (Chap. 13) adds an important chronological dimension to the understanding of large-scale fieldscapes such as those just mentioned. Their results are based on a project that sought to collate and review the existing evidence of scientific dating of field systems as well as other types of boundaries such as larger landscape demarcations in England. With 393 scientific dates from 120 sites from the early Bronze Age to the post-medieval period, they are able to point out the earliest dates for the emergence of large-scale landscape allotment to the early 2nd millennium BC as well as periods of interruption and reemergence.

Stijn Arnoldussen’s paper (Chap. 3) focuses on the Dutch Celtic fields assumed to date from the Late Bronze Age–Early Iron Age. The fields belong to an extensive but highly heterogeneous group of enclosed field systems, concentrated on the sandy soils, spanning an area from Belgium in the southwest to Estonia and Poland in the east. The study uses

state of the art excavation and sampling methods in both the investigation of dating of bank formation as well as use-practices pertaining to their growth. He shows that the banks consist of a mixture of soil, plants from wetlands, and household refuse, suggesting the use of manuring from byre-bedding in houses, and indicating a significant agricultural use for the fields.

1.5.3 In-Depth Archaeological Investigations of Field Systems

Claire Christie's paper (Chap. 2) focuses on the early farming landscapes of Neolithic and Bronze Age Shetland. The study deploys an extensive suite of mapping methods, including high-resolution aerial photographs combined with field surveys to detect the character and distribution of these very early fieldscapes surrounded by stone walls and banks. She shows that the field systems were much more extensive than hitherto expected as well as their connection with a series of associated structures and features such as stone-built houses, lynchets, clearance cairns and kerb cairns.

Michael F. Lane and Vassilis L. Aravantinos's paper (Chap. 11) focuses on field systems ascribed to the Late Bronze Age on Crete and central Greece. They deploy a radically different approach to the other papers. They make use of the texts in the Linear B script together with ethno-archaeological data to set up a hypothetical model for the dimensions and organisation of the land plots. This model served as a basis for conducting subsequent fieldwork in an ancient polder landscape in central Greece, including magnetometry, dating (OSL and thermoluminescence) and soil profiling. The investigations resulted in the documentation of a complex network of drained and irrigated fields, demarcated by low levees, which in scales corresponded to the expected model. They see this type of landscape management as important for the population expansion and expanding land claims of the Late Bronze Age.

Fabio Saccoccio synthesises the evidence for agricultural landscapes dating to the fourth to second millennia BC in the Campanian Plain, southern Italy (Chap. 14). Tephra layers, laid down by eruptions of Mount Vesuvius and the Campi Flegrei caldera, provide stratigraphic markers and a chronological framework for the archaeological deposits. Evidence for agricultural activity primarily consists of plough-marks left by the tip of the ard cutting into the sediment. The paper adds an important case study and its socio-economic implications to an otherwise quite overlooked region, and sees it in the wider context of prehistoric agrarian regimes in northern European contexts that can be used to interpret underlying socio-economic implications related to land tenure.

1.5.4 The Economy of Fieldscales

Two papers are particularly focused on questions of pastoralism associated with fieldscales. Clare Randall's paper (Chap. 5) considers the extensive, regular field systems emerging in southern Britain around the sixteenth century BC. They are not unlike the Celtic fields described by Arnoldussen (Chap. 3), however, there appears to be a chronological discrepancy of several hundred years. She critically engages with former notions linking enclosed field systems to arable agriculture and an ignorance of the importance of pastoral husbandry in fieldscales and late prehistoric landscapes in general. She uses morphological analyses as a way of re-engaging with such notions. The study is focused on Somerset, where the relationship between hillfort occupation, landscape and livestock holding can be studied, by integrating archaeological investigation with faunal and plant macrofossil data from within that landscape.

Stratford Halliday (Chap. 7) reviews the evidence for later prehistoric agricultural systems in Scotland. Roundhouses are widely recorded and excavated across many of Scotland's lowland and upland landscapes. Despite their ubiquity, they were rarely accompanied by bounded fields. Instead, Halliday recognises evidence for what he terms 'churning': relatively short-lived occupations of roundhouses with multiple rebuilds, and scattered clearance cairns and fragmentary banks left by intermittent agricultural activity. The lack of stockproof boundaries leads Halliday to suggest that cultivated plots and grazing areas were kept apart until harvested ground could be manured 'on the hoof'. The system was sustained through relatively frequent movements of fields and houses, which periodically returned to abandoned plots and stances. Land and settlements were managed with a dynamism that negated a need for or the means to create permanent field systems. Halliday concludes by asking if this same dynamism may also have operated amongst the more regimented and extensive field systems of southern Britain.

Two other papers interpret the field systems in the light of agrarian production and cultivation techniques. Romana Harfouche and Pierre Poupet's paper (Chap. 6) addresses the long-term dynamics of terraced fields in the Eastern Pyrenees – with particular focus on the Late Neolithic and the Bronze Age. They make use of a rich palette of multi-disciplinary approaches, including archaeological methods and excavations and pedomorphological surveys and soil science. They consider long-term dimensions in the development of fieldscales, including the expansion and abandonment of cultivated lands, and their relationship with human-induced environmental changes as well as biophysical factors. Unlike the field systems investigated by Clare Randall, the paper develops a strong focus on their link with agricultural production.

Lynne A. Kvapil's paper (Chap. 8) focuses on terraced fields and an associated settlement in south-eastern Corinthia in Late Bronze Age Greece. The study combines archaeological surveys and excavations with mapping, soil analyses and OSL-dating. Similar to Romana Harfouche and Pierre Poupet's paper, Kvapil sees large-scale land allotment and terraced fields as closely related to an intensification in agrarian production and cultivation practices. However, her paper explores and underlines the role of fields in enabling diverse cultivation techniques as well as diverse growing environments. Unlike the remaining authors, she also stresses issues of identity, the organisation and rhythms of labour and the creation of gendered agricultural spaces.

1.6 Final Remarks

We are currently facing a cascading crisis that crosses way beyond Europe, where radical, large-scale environmental change is accelerating due to humanity's devastating impacts on nature, including climate change, flooding, rural depopulation, deforestation, infrastructural expansion and moorland transformation. Ancient fieldscapes will be lost amongst many of these transformations, which could be measured in years, maybe decades. With their loss, we lose parts of the biodiversity, cultural diversity and history embedded in them. In this context, it remains critical that we reflect on what can we learn from long-term processes of landscape and environmental manipulation and transformation.

This book builds on decades of archaeological research on ancient field systems. It particularly draws upon the last 20 years, when an increase in development-led and research excavations and mapping projects have dramatically expanded our knowledge in many regions of Europe. The new data provides opportunities for understanding the legacy of large-scale landscape changes superseding individual sites and local areas. Sufficient data is now available for characterization on a continental scale, taking account of chronologies and paleoenvironments. Additionally, the increased focus on digitization and open access has enabled supra-regional archaeological comparison in radical new ways than previously possible. In turn, the amount of information poses the risk that we 'drown in data' and that consequently any deeper understanding remains absent. The individual case studies in this book each highlight a series of issues that we believe could be raised to a further level as common goals to help us focus the research and investigation of prehistoric field systems in Europe.

It is our hope that this book will provide an important step in enhancing our knowledge within this research field by highlighting the need of understanding and comparing processes of land allotment and use across existing geographical

boundaries and chronological periods, and by providing a more informed basis for facing the future challenges of human-driven large-scale landscape change.

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