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Source: *Current Anthropology*, Vol. 55, No. 6 (December 2014), pp. 725-750

Published by: [The University of Chicago Press](#) on behalf of [Wenner-Gren Foundation for Anthropological Research](#)

Stable URL: <http://www.jstor.org/stable/10.1086/678692>

Accessed: 06/12/2014 17:13

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# Emerging Boundaries

## Social Embedment of Landscape and Settlement Divisions in Northwestern Europe during the First Millennium BC

by Mette Løvschal

This article proposes a processual ontology for the emergence of man-made, linear boundaries across northwestern Europe, particularly in the first millennium BC. Over a significant period of time, these boundaries became new ways of organizing the landscape and settlements—a phenomenon that has proved possible to trace in three different regions within this geographic area. As these new forms of boundaries were managed in comparable ways, applied in similar situations, and shown to have morphological similarities, they must be considered in some way interrelated. Consequently, a number of temporal and material variables have been applied as a means of exploring the processes leading to their socioconceptual anchorage. The outcome of this analysis is a series of interrelated, generative boundary principles, including boundaries as markers, articulations, process-related devices, and fixation and formalization. These principles are then used to argue the case for socioconceptual emergence and causality between the lines. This causality appears only in a long-term perspective and implies that, although the development of these boundaries was chronologically displaced across northwestern Europe, elements of this phenomenon emerged along equivalent trajectories. At the same time, variation in the regional incorporation of these linear phenomena points toward situation-specific applications and independent development.

### Introduction: Studying Lines in the Landscape

During the first millennium BC, in some places several centuries earlier, man-made, linear boundaries became inscribed into the landscape across large parts of northwestern Europe. These boundaries became part of complex, organizational, spatial configurations that would have had a remarkable impact on the way in which the landscape was perceived and how new social relationships were established. In the absence of constructed boundaries, previous practices of landscape division appeared as spatial separations and unploughed strips of land, natural boundaries, temporal regulations of access, markings of the landscape, and so on (Bowen 1978; Nielsen 1993:113–115). However, in many regions, people now began enclosing their arable plots within banks, ditches, or dry-stone walls, leading to the formation of what are known as “Celtic fields.” Large parts of the landscape became compartmentalized and demarcated, and impediments to mobility were created in the form of linear earthworks, reaves, and pit-zone alignments. Suddenly, individual farmsteads or entire villages

were surrounded by fences, ditches, and fortifications (fig. 1). These boundaries operated through division and separation; they halted movement and created zones of linear repetition that appeared distinctly different from the landscape that existed before. This article argues that these changes fit into a general long-term development whereby certain boundaries increasingly developed a social-semiotic character: they came to mean something within the new social spaces they created. Linear structures and features were therefore not necessarily boundaries from the beginning, but they became boundaries when people began conceptualizing them as such. Consequently, over a significant period of time, new parts of the landscape and new social relations could be defined with reference to these principles.<sup>1</sup>

These boundaries were, accordingly, anchored not only physically in the landscape but also conceptually. They became a commonly understood symbol of ownership of land and cattle, of rights and obligations, and of new social ways of being, all of which was carried forward into subsequent centuries.

Although landscapes in southern Britain and along the North Sea coast, where the early landscape divisions emerged, vary, they possess certain common characteristics that enable a comparison: relatively flat terrain generally dominates close to water resources, and boundaries typically emerged here on

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1. The historical development of larger settlement societies and associated forms of social cooperation in the Holocene has been dealt with elsewhere by Sterelny (2011, 2012).

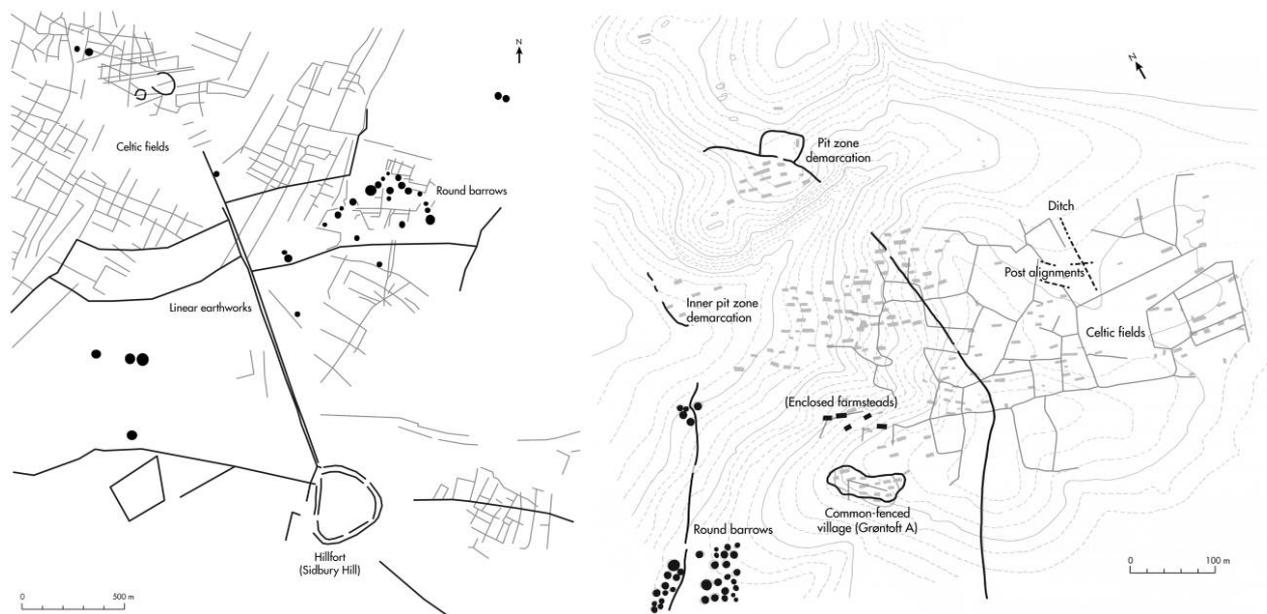


Figure 1. The emergence of different forms of linear, spatial segmentation at Sidbury Hill, Wessex (left) and in Grøntoft, western Jutland (right). Sidbury Hill: (1) barrows, (2) landscape parcelings (Celtic fields), (3) linear earthworks, (4) enclosed settlement (illustration by the author after McOmish, Field, and Brown 2002, fig. 3.6); Grøntoft: (1) barrows and hillock graves (*tuegrave*), (2) landscape parcelings (Celtic fields), (3) pit-zone demarcation, (4) fenced settlement (author's elaboration of an excavation plan kindly provided by P. O. Rindel, University of Copenhagen).

lighter soils and in the vicinity of areas that facilitated grazing (Behre 1998; Fleming 1972; Odgaard and Rasmussen 2000). By the first millennium BC, large tracts of woodland had been cleared and transformed into pastures and arable fields. People generally lived in dispersed, single-generation houses intended for one household that would have been to a major extent self-sufficient (Becker 1971; Brück and Fokkens 2013; Gerritsen 2008; Sørensen 2007; Webley 2008). Occasionally, larger cooperative units could be mobilized—for example, for particular events and rituals, gathering of livestock, and defense. During the first millennium BC, houses increasingly became aggregated into small communities and displayed a more permanent affiliation to particular areas. In this way, some areas became intensively exploited, while others were abandoned entirely. The landscapes were characterized by pronounced regional and even local variation and were influenced by central European cultures to different degrees. However, as regards infrastructure, longhouse architecture, burial tradition, material culture, and so on, the cultural links are still striking.

Intensive excavation activity in northwestern Europe in the last decade has contributed significantly to the archaeological record in general (Bradley et al., forthcoming; Fokkens, van As, and Jansen, forthcoming; Webley et al. 2012) and specifically to that relating to boundaries. The resulting data are, in many cases, of such a high quality and so extensive that they have provided new opportunities to study the emergence of boundaries across a very large area and over an extended

time span. However, as the boundary phenomenon has clearly increased in extent and complexity, so has the tendency to reduce the empirical focus on its various forms to local and regional levels. This has led to the production of substantial and very detailed accounts relating to specific areas and instances (e.g., Evans 2009; Framework Archaeology 2008; Yates 2007). There is, however, a lack of overall and overarching understanding of these boundaries cross-regionally, and the phenomenon has not been explicitly considered as a whole. Moreover, recording practices and chronological foundations differ greatly, and terminologies have been developed from specific national narratives and expectations with respect to function rather than from variables that can be studied across different forms of boundaries, as well as modern borders—for example, the linear rows of (cooking) pits, termed *kogegruberækker* (Danish), *eldstassystemer* (Swedish), *pit alignments* (English), and *Feuerstellenreihen* (German). This has concentrated attention at a deeper level of understanding and complicated the relating of small-scale analyses to cross-regional culture-historical developments.

As a consequence, there is no clear understanding of the processes that led to these manifestations, that is, the becoming (genesis and development) of these boundaries. How did they emerge? How did lines become anchored as social devices in the landscape? Is it possible to gain a deeper insight into the various generative principles behind the emergence of the boundary phenomenon in different parts of northwestern Europe in a long-term perspective?

This article presents an approach that, through comparison of the various forms of linear demarcation, aims to cut across national specific terminologies and focus on the cross-regional emergence of this phenomenon. It is based on data taken from an extensive body of sites with archaeological traces of linear, man-made settlement and landscape features and structures dating from the second and first millennia BC. The data have been collected from three study areas: western Jutland in Denmark, the Meuse-Demer-Scheldt area in the Netherlands, and Wessex in Britain. These are extensively investigated areas, where the boundary phenomenon appears to have a particular intensity and where data quality is correspondingly very high. As its underlying foundation, this article draws on a selection of theories, targeted at examining the link between social, conceptual, and spatial categorization. These argue that the temporal and material characteristics of a given spatial technology play a crucial role in the conceptual integration and social anchoring of material devices. This then allows the empirical material to be assembled and compared and justifies the temporal reclassification from which a number of new generative principles are identified. The article also adopts a long-term, culture-historical perspective with respect to these boundaries. The latter is of vital importance, because it is only through targeted and specific study of these spatial ontologies, over a longer time span, that it becomes possible to investigate the generative aspect of linear, constructed features and structures and how, as various forms of boundaries, they became enmeshed in processes that were meaningful socially—for example, the way in which the enclosures around villages or chieftains' farms became a symbolic way of staking social claims (see the section "Boundaries as Fixation and Formalization" below).

The analyses indicate that elements of the boundary phenomenon developed into forms of social symbolism that not only divided local landscapes but also, in a broader geographic perspective, formed new sets of social rules and norms that people recognized and obeyed. Within the three study areas it has been possible to identify comparable sequences in the development of linear structures and features. These areas underwent a development from simple lines in the landscape, characterized by markers and temporary articulations of existing local ways of appropriating the landscape, to the construction of increasingly meaningful linear boundaries that became established as symbols of social affiliation and of claims to new parts of the landscape.

The analyses suggest that we are dealing, on the one hand, with some kind of lawfulness with respect to the emergence of the boundaries that, in all three cases, was anchored in an articulated landscape division and that, shortly afterward, was applied and reinterpreted within a settlement context. Lawfulness is understood here in the sense of regularities or "pragmatic laws," contingent on particular conditions, as proposed by Leuridan and Froeyman (2012). On the other hand, these boundaries were anchored in local landscapes: they articulated at different points in time and were so geographically dis-

placed that they appear to represent independent processes. It is precisely through this association between widespread generative principles and local incorporation that this article aims to draw attention to the nonlinear relationship between the various ways in which boundaries materialized physically and were conceptualized and incorporated socially and to discuss the processes involved in their long-term culture-historical resonance.

### Material Lines as Clues to Conceptual Boundaries

There is now, more than ever, a broad theoretical recognition of the crucial role played by the social realm and the physical environment in human conceptualization that lies beyond the specifically representational domain (Clark 2006; Hutchins 1995, 2005; Tomasello and Moll 2010; Wheeler and Clark 2008). This approach also dominates current debates in cognitive archaeology, where it is argued that "the relevant unit of analysis when examining the interface between archaeology and neuroscience is not the individual neuron, nor even necessarily the individual brain, but instead the socio-cognitive context in which brains develop and tools are manufactured and used" (Grove and Coward 2008:387; cf. Malafouris, Frith, and Renfrew 2008; Malafouris and Renfrew 2010). These theories provide different suggestions with respect to the feedback relationship between social conceptualization and corporal, semiotic, and spatial technologies. Hutchins, in particular, has stressed the stabilizing effects that cultural models and material structures have on conceptual representation (Hutchins 2005, 1558). He argues that the association of imagined structure and perceived, spatial structure has a stabilizing effect on conceptual representations (also see Faconnier and Turner 2002). Following from this idea, spatial categorization, such as constructed linear boundaries, could under particular circumstances provide a material anchor for conceptual and social categorization. This use of material structures not only stabilizes conceptual representations but potentially gives rise to emergent properties and opens up the possibility of complex manipulation (Hutchins 2005, 1557, 1561–1562). The present study has a special focus on the generative or culture-historical dimension of such associations. Within these general strands of cognitive theory, the material and temporal dimensions are taken very seriously in relation to a deeper understanding of human conceptualization and culture-historical variation. These theories are therefore employed primarily in an overall conceptualization of the boundary phenomenon and in order to help identify points that are relevant to an investigation of the archaeological record. Furthermore, this conceptual framework is transformed into an archaeological, operative context through the selection of temporal and morphological variables deployed in the classifications.

### *Boundaries as Perceptually and Socially Salient Devices*

Boundaries are very concrete, spatial phenomena that characterize the way people understand and organize the world. General classifications, such as the perception of home, work, nature, family, and order are seen repeated in many cultures, as are more abstract spatial relations, such as *us*, *them*, *here*, *there*, *in*, and *out* (Barth 1969; Newman 2006:176). Other social classifications are manifested in physically explicit, linear demarcations, such as national boundaries, garden hedges, picket fences, and discretion lines in public buildings. Boundaries are also an essential part of the way in which the human conceptual system handles complexity. We can easily create a mental representation of a mountain, a color, a cloud, a house, a horizontal line, and so on. Being able to visualize a fictive boundary is fundamental to understanding that a mountain is not the same as a valley, that orange is not the same as red, and so on (Zerubavel 1996a:429; 2003). Another example is seen in Spivey's psychological experiments showing that not only do people, when given certain spatial information about "a tall building," imagine it as an abstract representation, but the direction of their gaze also shows whether it is "high up" or "on the ground," exactly as it would if they were standing opposite a tall building (Spivey, Richardson, and Fitneva 2004; also see Chaigneau, Barsalou, and Zamani 2009). Consequently, through recognizability and reference to similar contexts, different material structures help people to understand what happens in a given context. In other words, people use different material structures from their surroundings to imagine and think with.

Conceptual categorizations are also crucial to a number of basic psychological processes, such as pattern recognition, schema-based inference and recognition of cultural categorizations, common experiences, and semantic preferences. Some of these classifications can be very robust and resilient, while others are more easily modified in accordance with changes in the surroundings. Moreover, they result in the exclusion of large amounts of information that is not understood, expected, or anchored in a conceptual metarepresentation (cf. Bruner and Postman 1949).

### *Boundaries as Emerging Social Categorizations*

There is a further aspect of the way in which linear spatial boundaries function that seems particularly relevant compared with other types of boundary expression (e.g., Fontijn 2012; Holst and Rasmussen 2013:107). Sometimes boundaries constitute mere divisions: dikes, cattle grids, locks, and redoubts are all examples of linear boundaries that are not necessarily ascribed any other meaning over and above their immediate function. Like most other linear features or structures these boundaries have physical dividing affordances regardless of people's perception of them: a boundary around a field will keep animals in, or out, irrespective of other considerations. In most cases, however, spatial boundaries are

strongly associated with mental and social boundaries. For example, it matters whether someone is situated on one side or the other of a border running between two countries. Similarly, there are often very complex precepts associated with the hedge separating a neighbor's property—how high it can grow, where precisely the boundary line is, in which situations it may be crossed, and so on. In these situations it is crucially important that we are able to recognize boundaries as social clues, the significance of which extends far beyond their immediate function. These boundaries help to reduce conflict and uncertainty and ensure shared representation and group cohesion (Hogg and Terry 2000; Paasi 1996a). In other words, a line does not necessarily constitute a boundary unless people decide this to be the case; boundaries somehow require social embedment, recognition, and acceptance. When boundaries apply to only one group, other people often do not understand them. If people do not know the meaning of boundaries, they are very likely to transgress them or be unaware of their existence. In this way, there is a difference between a physical, dividing linear structure and an actual perceived and socially accepted boundary.

Consequently we are dealing with a spatial technology with a metacontent that people must learn and understand in order to communicate the common rules by which other norms can be negotiated and recreated. In this respect there appears to be something very significant in the social embedment and the physical manifestation of boundaries that becomes apparent over time: both conceptual and spatial boundaries are always the result of a historically dependent development and are formed and changed through complex interactions between social and spatial processes over a given period of time and in a given context. The social affordances of boundaries are something that must be realized, anchored, institutionalized, legitimized, and actualized through social and historical processes. Essentially this means that there are a number of intermediate phases, within which the given linear configurations are not yet realized or agreed. It is therefore crucial to study how and when the association of spatial lines (i.e., linear features and structures) and social conceptualization takes place.

There have been very few investigations of the generic topology of boundaries, including how constructed, linear configurations begin to operate in a sociocultural context and how a number of material structures exist without any apparent social anchoring or juridical legitimation (cf. Abbott 1995; Hernes 2008; Jones 2009:175, 184; Nielsen 2008). How can it be that some boundaries are based primarily on physical technologies, while others are associated with norms, rights, and identity? Why do some boundaries procreate further boundaries, while others remain singular entities? Is it possible to identify any characteristics that determine the ways in which boundaries emerge and develop?

Boundaries are rarely created according to a fully thought-out plan. On the contrary, they constitute specific surfaces of topicality relative to our minds and our social interactions

and are capable of prompting a certain consciousness, and of “becoming something” (cf. Schaffter, Fall, and Debarbieux 2010:259), as a result of complex mutual conceptual, social, historical, temporal, and spatial processes. Deleuze and Guattari (1987) are known for their preoccupation with the phenomenon of becoming, whereby certain elements undergo a process of actualization over time. This naturally entails some elements being considered more physically and socially accessible than others. Abbott (1995) adopts a similar but more boundary-oriented focus, considering the various stages in the creation of spatial categorizations as something beyond their functional role (see also Schaffter, Fall, and Debarbieux 2010). According to Abbott (1995:861, 866), separations do not necessarily have to be boundaries for something; they can be meaningful crystallizations and demarcations in their own right, without marking out consistent, associative, or comparable entities from the outset (867). He also operates with a concept of “thingness, entity-like quality, endurance” (872; also see Varzi 2008). Abbott states that “what makes an historical event important is its independent standing as a site of causation, as a thing with consequences. It is this independent causal authority of large-scale and small-scale events that makes theorizing the social process so difficult” (872–873). This quote stresses that it is not only decisive whether a given phenomenon is spatially repeatable, its relationship with the culture-historical context in which it appears is also important (also see Searle 2006:13). Consequently, temporal and generative aspects are stressed as being crucial to the changing manifestations and social meanings of boundaries.

#### *Temporality and Social Topicality*

In continuation of the above, the relationship between physical separation and conceptual and social categorization is never completely aligned. Neural, material, and social configurations differ significantly from each other by offering very different forms of representational topicality (Malafouris 2010:64; Sutton 2008:41–43). Through manifesting common standards in physical separations, it becomes possible to turn otherwise abstract and individual phenomena into demarcated entities that can be handled more explicitly (Day 2004; Donald 1991:314–319). The construction of common sets of frames of reference, such as garden hedges or public discretion lines, creates a stable world or order to which we can refer, that is, a material anchor (Hutchins 2005). By materializing well-known points of orientation, such as constructed linear boundaries, visual references and physical anchors are created for social conflicts, identities, negotiations of rights, and so on.

Material boundaries can potentially give certain ideas a pronounced long-term imprint, but they can also redefine them and induce tension between the way in which we perceive boundaries and the way in which they actually function in a social setting. In reality, projecting conceptual reference points on to the surroundings does not create an inalterable foundation; boundaries are never fixed social entities, but

always generic and historically contingent phenomena. However, material boundaries are often used and perceived as if they are fixed and permanent, because categories constitute such a fundamental part of our conceptual system (Jones 2009:175, 178–179, 184). Although the Berlin Wall was torn down more than 20 years ago, it is still used as a common point of reference, just as more or less remarkable cultural differences still exist between East and West Berlin. This phenomenon is referred to as the *Mauer im Kopf*—the wall in the head.

It is suggested here that there are some basic ways in which physical categorizations form part of everyday conceptual processes and social relations. If experience of the physical environment changes significantly, conceptual integration and social anchoring are also very likely to be affected. Consequently, temporality is assumed to be a critical factor in the conceptual anchorage and social acceptance of physical boundaries: it matters whether one’s fence is sturdy or fragile. It is significant whether a fence is present only at a given point of the year or is renewed and strengthened through generations. It also means something if it is there every day or exposure to it is a once in a lifetime experience.

Accordingly, the material and temporal stability of these lines—that is, whether they are long-term or short-term, how often they are used, and the possibilities for modifying them after they have been constructed—could constitute potential entry points for an investigation into why this phenomenon is interesting from both a conceptual and a culture-historical point of view. The analytical variables are therefore based equally on temporal criteria—for example, date, duration, frequency of use, stability (number of renewals)—and morphological criteria—for example, material, size, orientation (dividing, enclosing, or directive), relation to other features, shape (open/closed), and so on. These parameters will be applied in the following analysis and used to argue the nature of the trajectories and social ontologies whereby these lines became inscribed, both in concrete landscapes and in social consciousness.

#### Northwestern Europe in the Second and First Millennium BC

The foundation for this study is an extensive collection of data<sup>2</sup> (Løvschal 2014) relating to occurrences of man-made, open or enclosing lines that divide or demarcate and secure or hinder access to specific areas. This implies a focus on occurrences (= sites *sensu lato*) with constructed, linear boundaries that to some extent regulate the behavior and mobility of both humans and animals and have a significant visual or locomotional impact. These have been recorded in three areas of northwestern Europe: western Jutland in Denmark (WJ), the Meuse-Demer-

2. These data form part of a larger data set covering southern Scandinavia and northwestern Europe produced in connection with the PhD dissertation “Lines in the Landscape, Boundaries of the Mind,” Aarhus University (Løvschal 2014).

Scheldt delta in Holland (MDS), and Wessex in Britain (WE) (fig. 2). Each occurrence meeting these criteria has been classified according to the temporal and morphological variables specified in the previous section, resulting in a number of cross-regional, generative principles that represent aspects of these emerging spatial, linear configurations, which were deeply integrated within each other but which were also expressed and interpreted in different ways and provided very different opportunities for social agency.

#### *Lines as Markers*

Barrow lines several kilometers in length are particularly evident in southern and western Jutland, but shorter barrow alignments have also been located in both the south-central Netherlands and Wessex (Bourgeois 2013; McOmish, Field, and Brown 2002). Since these punctuated lines normally follow ridges and coincide with topographies suited to frequent traffic—for example, running along the watershed and via historical fords—they have typically been considered as monumentalizations of ancient roads (Fleming 1971:162; Johansen, Laursen, and Holst 2004; Müller 1904:5). They often had a long-term genesis extending over several centuries or millennia, being combined with clusters of barrows and less pronounced linear distributions. Consequently, they functioned

as collective, directive axes along which people traveled, and they would have been used as lines of reference in successive reorganizations of the landscape (Løvschal 2013). Furthermore, their position in close proximity to potential grassland and pasture suggests that they constituted markers of transition zones (Fleming 1971; Holst and Rasmussen 2013:100). Other kinds of symbolic linear markers, sometimes closely associated with barrow lines, include stone rows, avenues, and post alignments—for example, in Oss-Zevenbergen (MDS) (Fokkens, Jansen and van Wijk 2009)—and cooking-pit alignments—for example, at Rammedige (WJ) (Kristensen 2008; also see Ståuble 2002). In Wessex, landscape markers also include ring-ditch monuments and pit alignments that often formed the starting point for successive constructions of other linear features in the landscape (McOmish, Field, and Brown 2002). Settlements sometimes occurred straddling these lines, suggesting that whatever functions the lines may have had, these probably did not include the separation of different communities. It seems more likely that people would have been able to move on both sides of and across these lines without encountering any significant problems. Consequently, they did not necessarily constitute the boundary of something. However, they could potentially mark certain transition zones, the distance from A to B along their longitudinal axis acting



Figure 2. Locations of the three study areas (illustration by the author).

as a kind of boundary, or they could form barriers in the sense of social regulation. However, they were not boundaries across (i.e., barriers), and they did not explicitly keep something in or out. Conversely, they acquired more directive properties and constituted topographical markers, distances, and lines of orientation, with a significant emphasis on continuity (also see Fleming 2008:198). It would have been possible at any time to return to them, and many of them were visible from a great distance (Bourgeois 2013; Løvschal 2013). Furthermore, many linear landscape markers, such as the barrow lines in western Jutland, were subject to continuous return and reuse, and the pit alignments in southern Britain were often recut into ditches and thereby transformed into much less permeable boundaries (see, e.g., Johnston 2005:7; Lambrick and Allen 2004; Rylatt and Bevan 2007:225; Wigley 2007:125–126).

#### *Boundaries as Articulations*

A number of these culture-historical long-term markers in the landscape appeared linear in form and constituted the point of departure for an articulation of successive landscape divisions. The most widespread example of this is the emergence of parceled field systems, that is, Celtic fields (fig. 3), which comprised regular field plots, enclosed by earthen banks, dry-stone walls, or terraces, arranged in a systematic manner, and covering areas of as much as several hundred or even several thousand hectares. These parceled-out field systems, including coaxial field systems (systems oriented according to one or several dominant axes), spatially concretized certain areas that stood out from their surroundings and became subject to common segmentation and regulation. They must have resulted in a much clearer visual separation of, for example, livestock, arable land, and grassland, and must have altered the previously more kaleidoscopic use of the landscape quite considerably (Barrett 1994b:150).

Relative stratigraphic observations of such field systems show that a remarkable number were laid out over former cultivation horizons, stone rows, fences, and ditches (Hatt 1937:86; 1949, fig. 38; also see Fowler 1983, 134). Similarly, the construction of many field enclosures incorporated existing landscape markers, either directly in the banks or in clusters within the parcelings: for example, Earl's Farm Down, Orcheston Down, and Sidbury Hill (WE) (Bradley, Entwistle, and Raymond 1994; McOmish, Field, and Brown 2002), Seem, Skørør, and Troldebanke (WJ) (Hatt 1949), and Lommel-S of Baalse Gracht, Lunteren, and Melderslo (MDS) (Brongers 1976; Fokkens 1996; Scheele and Arnoldussen 2012; Vandekerckhove 1996). Consequently, many landscape divisions were laid out according to an integrative principle that respected previous use patterns and landscape markers (Hatt 1949:124; Yates 2007:126). In this sense, these lines not only created something new but also represented a continuation of existing ways of using and marking out the landscape,

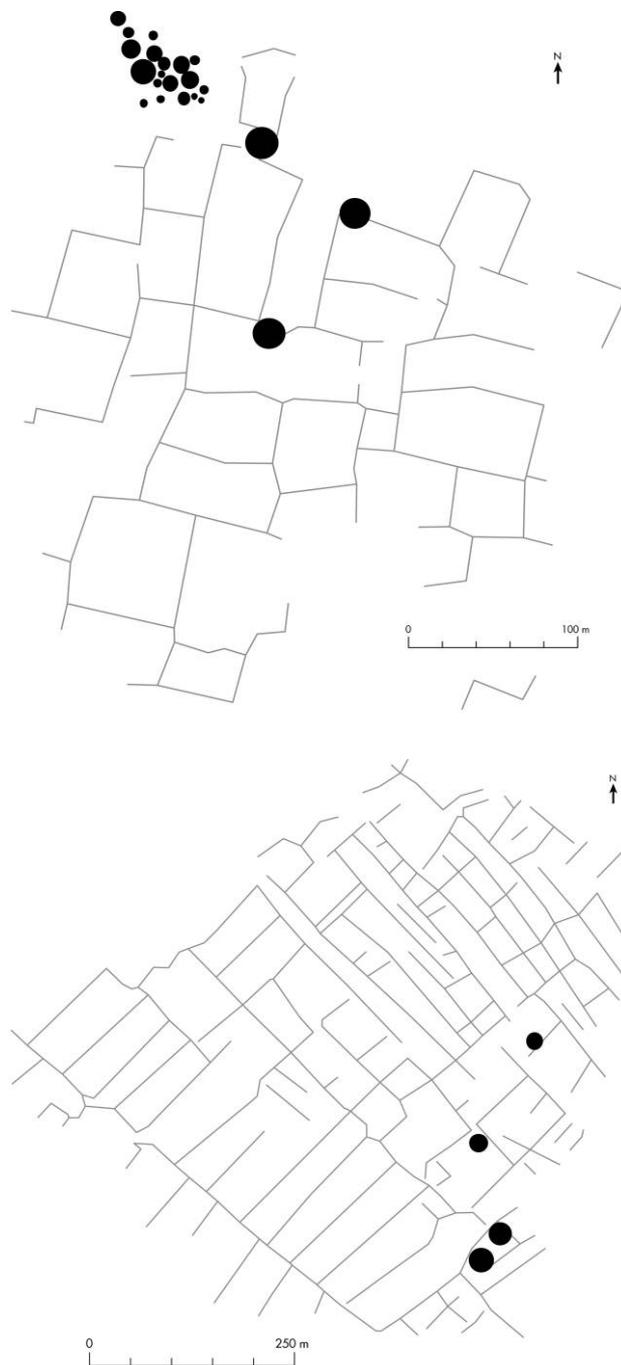


Figure 3. Examples of articulated landscape parceling (Celtic field systems) in Wessex and western Jutland with barrows integrated into the field plots. Top: western corner of Orcheston Down, Wessex (after McOmish, Field, and Brown 2002, fig. 1.17). Bottom: Lydum Hede, western Jutland (after Hatt 1949, fig. 89).

thereby articulating more “punctual” or less explicit, long-term ways of arranging it.

In the MDS area, early parceling complexes from the mid-second millennium BC, with parallel fence lines comprising several phases, have been located at, for example, Eigenblok (Jongste 2008; Jongste and Wijngaarden 2002), Enspijk, and Zijderveld (Arnoldussen 2008:275). Due to the materials used in the construction of these fences, they would have required frequent repairs, probably every 5–15 years (Theunissen 2008). Consequently, these early divisions could be extremely perishable, and despite considerable stability in the common definition of certain areas laid out as parceled plots of land, their actual use could appear much more ephemeral and dynamic. In the case of the later Celtic field system at Grøntoft Hede (WJ), the individual field banks were cleared, moved, and reshaped at short intervals (fig. 4). As just one example of many showing alternating phases between habitation and cultivation, this indicates that early landscape parcelings were not necessarily fixed in space. This situation is also reflected in the aggregate layout of many systems (also see Field 2008: 20; Fowler 2000:87; Holst 2010:168).

These characteristics are quite similar to those of the earliest settlement boundaries. In many cases these constituted fragments of linear divisions, shallow ditches, pens, and scattered single and double rows of posts within the settlement space, showing no traces of renewal or elaboration. In other instances—for example, in the lowland areas of the Netherlands and northern Germany and in Scandinavia—they took the form of farmstead enclosures that were most frequently only single-phased—for example, Agerhøj (SKJ839), Koustrup (HEM3391), and Lyngsmose (Eriksen and Rindel 2003) (WJ), and Oss-Mettegeupel and Oss-Mikkeldonk (MDS) (Fokkens 1996; Fokkens and van As, forthcoming). The alternating phases of open and closed settlement sites probably reflected the location of these settlements with changing functions and a temporary spatial affiliation. These enclosures often occurred in areas where contemporary nonenclosed farms are known to have been located, or on settlement sites with alternating enclosed and nonenclosed phases—for example, Nybro (WJ) (Nielsen and Mikkelsen 1985) and Winnall Down (WE) (Fasham, Farwell, and Whinney 1989; also see English 2012, 149). These enclosures can therefore be said to have been singular rather than repeatable: they were primarily restricted to individual farmsteads or activity areas and did not necessarily require that the next-door neighbor reciprocate. It can be argued that some of the earliest Wessex hilltop enclosures belonged to this group, as it has been suggested that they functioned as seasonal gathering points for stock management and provide only scant evidence of habitation or forms of sociosymbolic elaborations comparable with the later types of hillforts (Haselgrove et al. 2001:121).

Therefore, in certain situations, boundaries and non-bounded units could be juxtaposed: that is, boundaries did not necessarily apply equally across the landscape. Together with their varying composition and morphology, and their

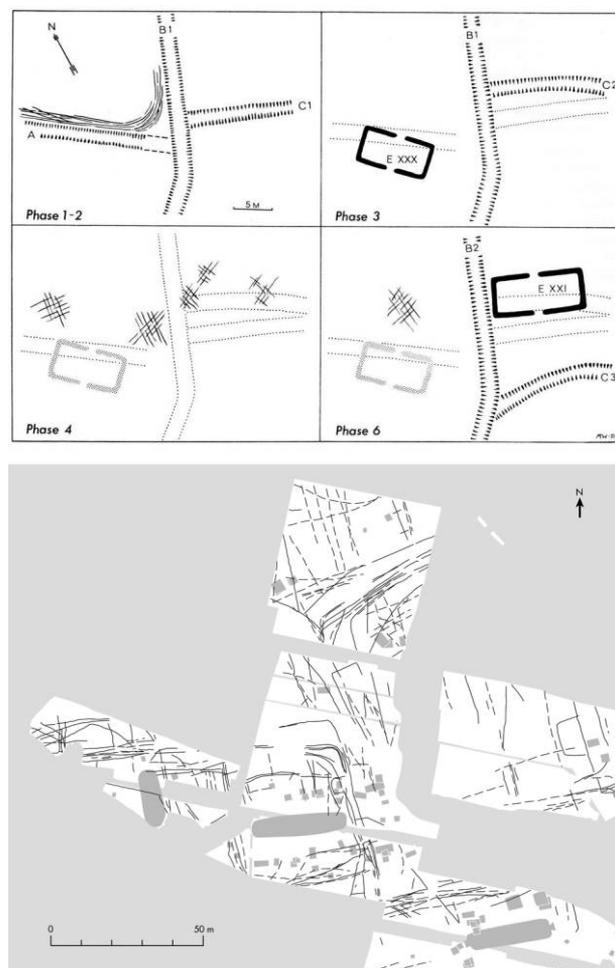


Figure 4. Top: the changing layout of banks and farms at Grøntoft Hede, western Jutland, ca. 500 BC (Becker 1971, fig. 21). Bottom: parcel-like fence lines at Zijderveld, the Meuse-Demer-Scheldt area, ca. 1500 BC (after Arnoldussen and Fokkens 2008, fig. 2.6).

often short-lived occurrence, this indicates that there was not necessarily any significant social anchorage or desire to express or maintain a social concept associated with such boundaries. Conversely, these boundary articulations emerged as inductive processes, technological devices, and situational crystallizations of already existing divisions in the field systems. The boundaries coincided with a number of general changes in the ways in which people appropriated the landscape, including increased fixation and investment in certain areas, that would have required more explicit and articulated division of the available space (Roymans and Theuvs 1999:15). Precisely the same appears to be true of many settlement boundaries. The settlement divisions and enclosures around farmsteads did not lead to any significant elaboration of the surrounding, enclosed space. These articulated concurrently with an observable aggregation and stabilization of the settlement pattern, and they were applied in particular situations

associated with the potential uncertainty that arose from people moving together and from other problems emanating from a more sedentary lifestyle (see also Cunliffe 1995:27).

#### *Boundaries as Process-Related Devices*

A third generative boundary principle seems less dependent on landscape markers and claims already associated with the landscape. In this case, lines were constructed as a kind of operational process-related spatial tool that was actively used to define and divide new parts of the landscape independently of prior markings, to make new spatial claims, to organize the landscape or settlement in new ways, or explicitly to redefine existing parceled landscapes. These lines were characterized by new boundary morphologies and intergroup interfaces that affected central movement patterns in the landscape on a greater scale. Examples include the Wessex linear earthworks, which deliberately superposed and surpassed existing field systems (Bowen 1978; Cunliffe 2000, fig. 4.18; McOmish, Field, and Brown 2002, figs. 3–4). Other examples are the pit-zone alignments in western Jutland, which cut across the central communication corridors (Eriksen and Rindel, forthcoming), the large, closely set, densely settled Oss enclosures, which represented a very different form of living than the otherwise dispersed, nonenclosed settlement pattern (Jansen and van As 2012), and generally the construction of enclosed and fortified sites in parts of the landscape that show no traces of explicit linear regulation (also see Fleming 1987:193). In this way, these lines not only articulated already established claims or markings but represented a new, visible, material anchor for us and them, where certain claims to the landscape, previously made or legitimated through active incorporation of barrows and other landscape markers in the layout of the boundaries, could now be actively established by means of the linear principles themselves. This claim will be elaborated in the following.

In Wessex, the emergence of linear earthworks was intimately connected with the emergence of the first hillforts, often seen as indicating a completely new form of cattle-based landscape appropriation in the hands of larger groups of people (Bradley, Entwistle, and Raymond 1994; Bradley and Yates 2007; Cunliffe 2004). Comparably, the common-fenced settlements in western Jutland appeared a few centuries after the first pit-zone alignments and were often situated in areas suitable for pasture. Previous nonenclosed settlement phases are rarely found on these sites (also see Hingley 1984:74). Conversely, the villages were established by means of, and contemporaneously with, the enclosing boundaries.

Sometimes this was followed by a pronounced explorative test of the social affordances of the enclosure and very elaborate forms of enclosures appeared on sites with reinforced or enlarged gateways and/or glacis-style ramparts at the Wessex “developed hill forts” of, for example, Beacon Hill, Danebury, and Winklebury, palisade enclosures at Hedegård, Hodde, and Lysgård (WJ) (Hvass 1985; Madsen 1999; Olesen

2006), very deep or wide ditches and moats at Kjelst (Andresen 2007) and Lyngsmose (WJ) (Eriksen and Rindel 2003), and several sites in the Oss area (MDS) (Jansen and van As 2012) (fig. 5). Many of these sites maintained a fairly autonomous appearance, with the potential to increase differentiation between larger social units, as reflected in size differences between the enclosures. They show that process-related boundaries were used as active and explorative process-related tools to mark and create new communities and to support specific strategies and interests, resulting in an immense variation in their size, shape, and morphology.

In many cases, such as the pit-zone alignments and the common-fenced villages in western Jutland, the fortified enclosures of the central Netherlands, and the linear earthworks and hillforts of Wessex, these constituted collective constructions and temporary refuges. By creating an explicit boundary for the group(s), this demarcated these social units from their surroundings by explicitly forcing people to cross this line when coming and going. At the same time it constituted a very visual signal of compliance with the social order that applied within this boundary (see also Paasi 1999:81; Zerubavel 1996*b*). Accordingly, these boundaries created a material framing of much more explicit social affiliations than previously was the case. Common to these boundaries is the fact that they were associated with significant investment and required coordination between several social units. Both in their construction and in their dimensions, they often greatly exceeded any purely functional requirement and therefore formed part of fairly expressive social categorizations that could not easily be altered. In other words, they represented boundaries where it was now pivotal whether one stood on one or the other side of the demarcation line.

In other cases, they facilitated an enterprise for an individual farmstead (Field 2008:216). The fences around farmsteads, as seen in the lowland areas of the Netherlands and northern Germany and in Scandinavia, were part of the definition of more flexible latitude in the area around the farmstead, which, to a certain degree, solved some of the potential problems otherwise associated with very conservative architecture.<sup>3</sup> Furthermore, a very dominant characteristic was that the farmsteads, at virtually all times, maintained their independent demarcation (Holst 2010; Webley 2008:37). With extended, aggregate enclosures it became possible to add new buildings and, at the same time, mark their affiliation with an individual farm, as seen at Ørskovvej (HEM4291), Rosenholmvej (Møller-Jensen 2006), and Sønder Messevej (HEM3754) (WJ) (fig. 6). Furthermore, these fences were incorporated into an explicit definition of new spaces for social interaction, such as the farmyard and the extended structured area around the longhouse, divisions of settle-

3. No new modules were normally added to the houses, houses were not rebuilt, their functions did not change, and their roofs were constructed in such a way that apparently did not facilitate extensions (Gerritsen 2008:152; cf. Hoof and Jongste 2007; Webley 2008).



Figure 5. (A) The common-fenced Iron Age village of Hodde, western Jutland, Denmark, ca. 150–0 BC (Hvass 1985, pl. 92). (B) The ditched settlement enclosure of Overton Down, site X/XI, Wessex, ca. 800–600 BC (after Pollard and Reynolds 2002, fig. 58). (C) The double ditch at Oss-Horzak, the Dutch river area, ca. 250–12 BC (after Jansen and van As 2012, fig. 6).

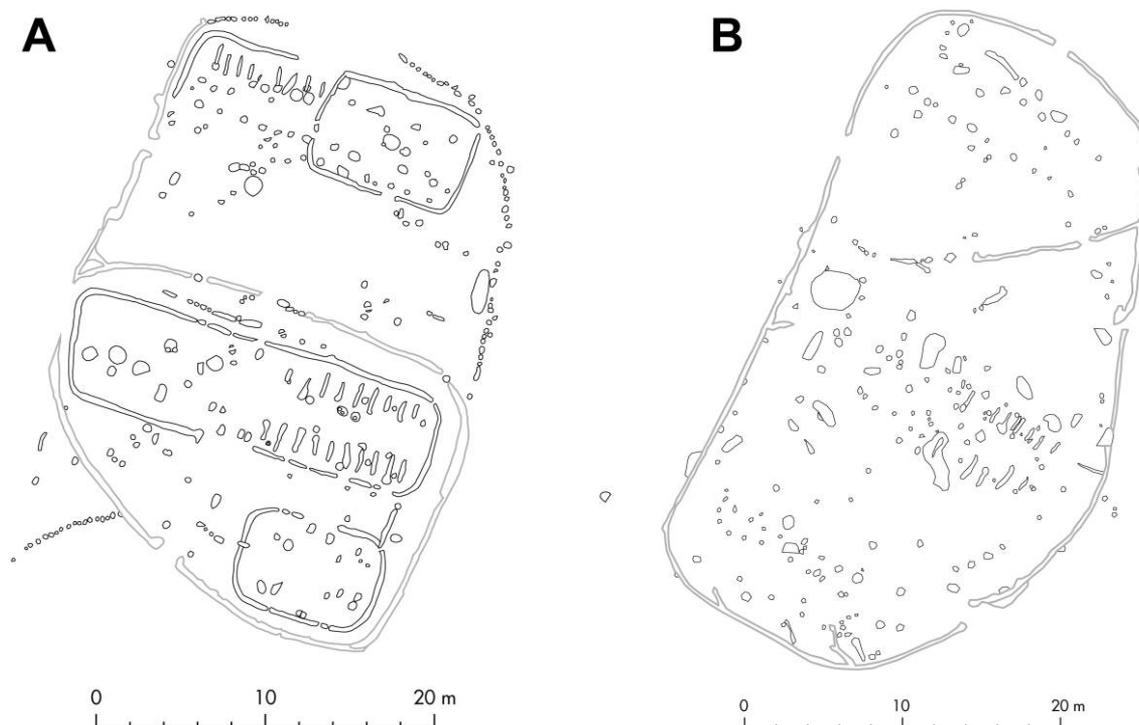


Figure 6. Extended, aggregate enclosures with independent demarcations of the farmsteads. (A) Sønner Messevej, western Jutland. (B) Ørskovvej, western Jutland (illustration by the author, redrawn from plans kindly provided by Museum Midtjylland).

ment areas, streets running between the houses, and non-built common areas in the middle of the villages, and so on.

Constructed, process-related boundaries often appeared within areas of tension, such as those under demographic and/or ecological pressure associated with grazing lands, where there was a remarkable emphasis on new, large-scale, regulatory principles such as reaves, earthworks, or pit alignments, or areas with several types of coinciding boundaries (Corney and Payne 2006; Fleming 1987; also see fig. 1). This is seen on the Wessex chalk lands, where linear earthworks and hillforts often appeared in close proximity to one other and in close association with Celtic fields. In other instances, these boundaries were used in areas where no, or only few, traces of preceding settlement or cultivation have been detected (Hatt 1949:85; Mauritsen 2010). In both cases, linear axes, divisions, and demarcations could be used to reorganize and lay new claims to certain areas.

These processes of boundary drawing were clearly not based on the same idea of equal distribution as seen in Celtic fields. Many of the northwest European fortified settlements, the common-fenced villages in western Jutland, the Wessex settlement enclosures, villages surrounded by pit-zone alignments, the Frisian fortresses, and so on, stood out from contemporaneous settlements as anomalies. These enclosures often show no, or very little, evidence of repairs, or it is evident

that they had been entirely reorganized, as seen at Rockley Down (McOmish 2005), were unfinished, as at Ladle Hill (WE) (Feacham 1971), or had a relatively short period of use, as at Lyngsmose and Nørre Holsted (WJ). Consequently, this suggests that these boundaries did not constitute a well-established medium, but like articulated boundaries, were relatively labile and ambiguous structures. In this sense, these spatial forms of enclosure do not seem to have been anchored in commonly understood or valid social principles that could justify their existence.

#### *Boundaries as Fixation and Formalization*

A fourth type of generative boundary principle appeared as an extension and development of the three preceding principles. This was where linear demarcations were used as a consistent principle over a larger area (fig. 7), where new boundaries were constructed on top of existing ones, where the number of different boundary principles decreased as a result of the standardization and formalization of certain forms, where certain lines were maintained over significant periods of time, such as many of the Late Bronze Age linear ditches that survived into and throughout the Iron Age, or where particular types of boundaries showed cross-regional characteristics, such as the Celtic field systems (see also Geritsen 2003, sec. 4.4). In some places, the parceled field com-

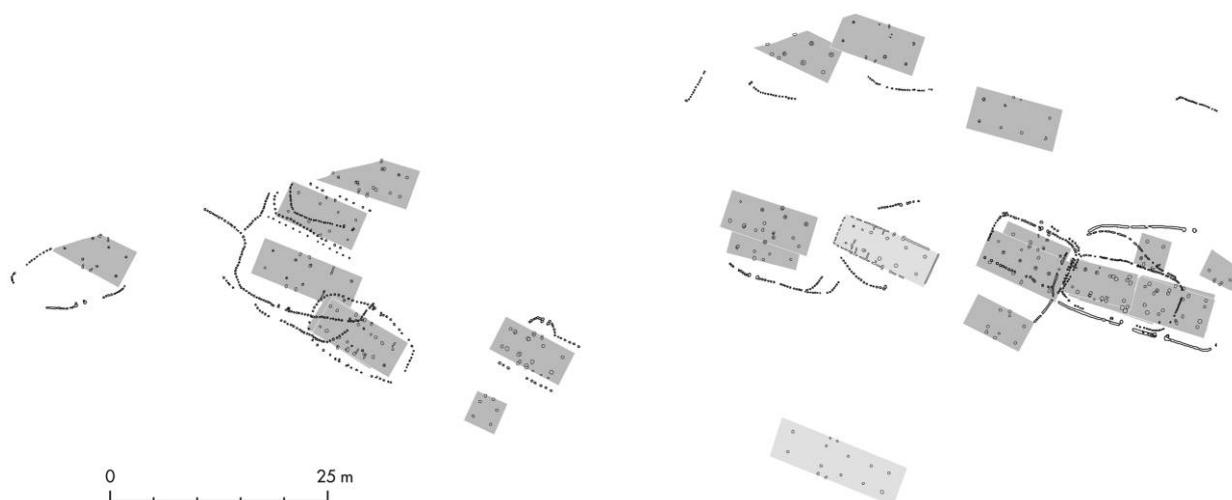


Figure 7. The enclosed farmsteads at Agerhøj, western Jutland (ca. 500–150 BC) (illustration by the author, redrawn from plans kindly lent by Ringkøbing-Skjern Museum).

plexes were in operation for a period of more than 700 years, with some field banks achieving a considerable height as a result of long-term use and the fixation of certain boundaries and larger compartmentalized areas (Arnoldussen and Scheele 2014:66; Hatt 1949:120; Olesen 1982:10; Wickstead 2008:140–143). Significant chronological differences were thereby apparent between different internal parts of the systems (Gertsen 2003:172–173). Examples include Orcheston and Charlton Down (WE) (McOmish, Field, and Brown 2002; see also Field 2008:212) and Øster Lem Hede (WJ); it was also true of the Iron Age hillforts in Wessex that continued into the fourth and third centuries BC as developed hillforts (Cunliffe 1994; Payne, Corney, and Cunliffe 2007) and were associated with an elaboration and addition of several contour works, as well as complex entrance features. In western Jutland, short-term pit-zone settlement demarcations were succeeded by much more elaborate, structured common-fenced villages that were often reorganized several times, and farmstead enclosures were used continuously over a period of at least 300–400 years, for example, at Rosenholmvej and Agerhøj (fig. 7).

In numerous cases, partitioning of the land led to stones being cleared from the soil and moved to the corners of the plots, being subsequently incorporated into dry-stone walls or piled up to form clearance cairns (Hatt 1949:92; Kristensen 1932:240). Together with the incorporation of burial mounds, graves, and shallow ditches and pits, these stone markers and banks probably led to some points or plots becoming relatively permanent. In several cases, it was larger macrostructures, such as constructed axes, rectilinear compartments, and parallel banks, that constituted the oldest and most stable structures and determined the successive dynamics in a particular area (Brongers 1976:57). Consequently, parts of the landscape were involved in local fixation and formalization processes that were likely to be linked to a more stable perception of

these boundaries. Concurrently, preserving these lines and boundaries also led to the retention of a fairly open structure that permitted individual elements to be added or modified. By maintaining large rectilinear compartments and common enclosures, it became possible to fill in the spaces between the compartments and allow for a dynamic within the enclosure. This is seen in the common-fenced village of Hodde (WJ), where the main palisaded enclosure around the village was altered several times to accommodate new functions (Hvas 1985). However, with a few exceptions, the fences between the houses on this site were not repaired during the course of its 150-year life span, indicating a large degree of mobility.

Initially, structures such as field banks required that the fields were in relatively frequent use and that material was added to the banks in order to make them stand out from uncultivated strips and ditches. However, this repeated use had a clear cumulative effect, leading to some parts becoming more materially stable, higher, and more visually prominent than others. Moreover, as soon as they had become established as visual banks or walls, they gained a certain degree of inertia. Many fossil field systems, hillforts, and linear ditches can still be detected today through ordinary archaeological fieldwalking. Consequently, these types of landscape boundary differed by virtue of their markedly varying visibility and durability, and the fact that it was possible, at any given time, to return to them, even after a very long break. These boundaries thereby constituted new long-term structures that continued to be visible in the landscape a long time after their actual use.

Their material temporality differed from that of the settlement fences, which naturally decomposed and perished and, consequently, did not at any point attain the same stability and long-term impact as the earthen landscape divisions, the stone-built reaves, or hillforts. However, another way of cre-

ating such stability is evident from the numerous examples of repairs to settlement fences and recutting of ditches, often indicating reuse and expansion (also see Jansen and van As 2012). In western Jutland, this occurred in particular from the second century BC onward, when fenced farmsteads were subject to numerous repairs, as seen at Grønbjerg Skole, Hodde, Lysgård, Rosenholmvej, and Sønder Messevej. There was also an increasing tendency toward certain standard sizes and shapes, resulting in very similar farmstead layouts (fig. 6). Furthermore, fences now featured as a dominant characteristic of settlement sites (fig. 7) or became stabilized and were maintained over longer periods of time without any intervening fenceless periods. This continuity, together with the standardized dimensions, may suggest that the settlement boundaries were becoming part of a similar process of increasing symbolic ascription and narrowing of meaning, making them more broadly understood, recursive, and repeatable; the boundaries not only enclosed singular features; they were also subject to collective agreement with respect to what took place on either side of them.

Furthermore, the fences at settlements sites in western Jutland, such as Hodde and Åbrinken, were directly aligned with respect to existing graves or burial mounds (Hvass 1985:96, pl. 77, feature 37; Johansen 2011:81). Fossil sea urchins and fragments of stone axes have also been found in the fence ditches at Hodde and Solbakkegård (Webley 2008:142). In Wessex, ditches around farmsteads, hillforts, and other forms of settlement enclosure were often foci for similar depositions, for example, at Blewburton, Down Farm, Gussage All Saints, South Lodge Camp, and Winnal Down (Bowden and McOmish 1987; Brück 1999; Hill 1995; Hingley 1990). This could be seen as an attempt to enhance symbolic meaning or incorporate references to the past in the maintenance of the boundaries.

This approach to the study of landscape and settlement boundaries indicates that there were probably times when these boundaries constituted, first and foremost, defensive or practical devices that clearly were not mandatory for everyone. At other times, however, they were not merely spatial but also profound social and conceptual technologies. Their repeated renewal and reorganization and their formalized shapes and patterns of use strongly suggest that people recognized and treated these boundaries as social interventions and intentionality, the meaning and significance of which extended beyond their immediate function. Such claims are not obviously or easily substantiated on the basis of the archaeological record. They clearly build on the general assumption that rebuilding reflected not only practical arrangements and unintended consequences but also ways of appropriating space that were embedded in formation processes of social concepts. However, if we accept the premise that physical morphology and temporality have an explanatory value on a social level, then, as shown above, a number of trends become evident in long-term developments that are difficult to explain as random events.

## Discussion: Spatial Boundaries as an Unfolding Concept

It has been demonstrated above that the embedment of landscape and settlement divisions in northwestern Europe followed certain long-term paths. In western Jutland, the earliest linear boundaries are revealed by sporadic traces of ditches and fences on settlement sites and beneath later field banks. These were followed by the visual subdivision of Celtic field systems (ca. 700–400 BC), followed by an increase in pit-zone alignments (ca. 500–200 BC), then enclosed farmsteads and villages in the final centuries BC. In the MDS area, extensive fenced landscape parceling systems emerged at a very early point in time (ca. 1550 BC), with, however, a plausible chronological lacuna prior to the emergence of Celtic field systems (ca. 700–400 BC) and sporadic appearances of ditches and fences on settlement sites. This happened before a number of large-scale ditch systems and enclosed settlement areas appeared in the centuries just prior to the birth of Christ. In Wessex, landscape division and coaxial field systems were also introduced at a very early stage (ca. 1550 BC). This was followed by a phase of linear earthworks (ca. 1100–750 BC) and hillforts (ca. 700 BC), together with an increase in a wide range of other kinds of settlement boundaries. During the fourth century BC, most hillforts were abandoned, while others became reorganized as developed hillforts. Although the three study areas vary significantly with respect to boundary intensity and complexity, as well as displaying a chronological displacement in when the different forms of boundaries developed, a general sequence can be identified whereby different kinds of punctual or linear landscape markers became incorporated into articulated landscape divisions, followed by phases of process-related boundaries and larger-scale demarcations relating to a large range of applications, such as defended settlements and cross-country landscape structures (fig. 8). On the basis of this development, a selection of boundaries became reinforced and formalized, while others were rejected or forgotten. Needless to say, this does not necessarily reflect the dominant topology outside the three areas, and, although highly generalized, this indicates a general tendency or lawfulness in the emergence of boundaries, namely, a lawfulness that unfolded at different points in time in a long-term perspective according to specific geographical conditions and culture-historical trajectories.

In terms of their temporal properties, the new linear boundaries took on radically different and more flexible qualities, compared with the long-term landscape markers of the preceding centuries. Many boundaries appear ephemeral, and, as opposed to the situation previously, they could be modified, reinforced, reorganized, and renewed. Consequently, this aspect of the boundary phenomenon does not appear to have been introduced in the form of stable morphological elements; neither did it necessarily refer to a fully thought-out plan or constitute a series of fixed common concepts that subsequently were extended out into the landscape. Conversely,



Figure 8. The highly generalized chronological sequence of the emergence of linear, constructed boundaries within the three study areas (illustration by the author).

articulated boundaries appear to have constituted a spatial principle that was repeated across the landscape but that was most probably associated with conflicting ideas regarding its purpose and legitimacy. The boundaries established only momentary stability, using short-lived materials, and show no signs of any particular symbolic investment; many could have served local, situation-specific, and practical purposes. This situation also indicates that, both geographically and chronologically, the boundaries emerged independently of each other in response to specific needs and requirements and probably did not possess widespread conceptual resonance. Consequently, they can be characterized as being technologically or perceptually linked; they controlled access to the settlement and certain parts of the landscape and led to the direct spatial coupling of various kinds of demarcated space. In a long-term perspective, however, they constituted forerunners for more socially shared or metacognitive representations—for example, the definitive demarcation of households aggregating in the landscape or of larger social groupings forming across previous social or genealogical links and bonds. Without the existence of a physical boundary, it would clearly have been more difficult to establish, anchor, and communicate such new social concepts (see the section “Boundaries as Process-Related Devices” above).

In other words, the function of these boundaries was to articulate certain areas of the landscape, which thereby attained an applied meaning (cf. Larsen 1992:105), and it is precisely this applied meaning that can, according to the conclusions presented in this article, be seen to emerge in the landscape. The moment people discovered this generative potential and reconnoitered the potential of boundaries as social technologies, they became increasingly able to use them actively in an explorative manner. The generative processes—boundaries as process-related devices and tools of fixation and formalization—have outlined a number of examples in which the boundaries probably participated in more deliberate (re)definitions of social relations and conceptual associations between, for example, the parceling of fields and settlements. As a consequence, certain shared representations and physical circumstances were created and became concretized, enabling people to take advantage of them. It became possible, consciously, to act through these spatial structures. This was achieved by constructing and maintaining boundaries that underwent a radical symbolic ascription that far exceeded any functional requirement and that, in their construction, surpassed existing boundaries or defined new demands with respect to labor investment.

Some of these new boundaries appear to have been rela-

tively stable from the outset—for example, the embanked field systems—and resulted in temporary fixation of certain spatial categorizations. These boundaries constituted physical framings of specific areas within which certain rules applied and where people must necessarily have agreed on their meaning. Consequently, the emergence of linear boundaries afforded an obvious communicative potential and created new possibilities for equalization, standardization, and more formalized comparison.

The spatial principles associated with landscape division relating to, for example, axially, the ability to be partitioned, demarcation, and symmetric classification were probably used as schema for forms of organization within other domains, such as the settlement context, that could be manipulated in various ways. This provided an opportunity to build a relatively complex, associative repertoire of different linear solutions to related problems that emerged on settlement sites and in the landscape, such as the need to secure access to good soil, to allocate areas already exploited to their maximum, and to distinguish between insiders and outsiders (also see Thomas 1997).

However, a long time passed before these spatial divisions emerged in other contexts; in some places this did not occur until late in the first millennium BC, and in practice they were used in very different ways. This indicates that people were far from agreeing on the meaning of individual, linear structures and features that did not appear to be anchored in socially stable or culturally valid principles. Instead, these demarcations seem to have been coupled with relatively loosely defined local schemata. People would have been able to recognize these boundaries as indicators of intentionality and similarly expected them to operate in certain ways, but without necessarily agreeing on their social meaning. This resulted in different regional, and even local, forms and morphologies, such as the amoeba-shaped enclosures in the eastern part of western Jutland and the monumental ditches and palisade constructions of the Iron Age Oss enclosures.

When establishing some of the earliest linear features, people made use of existing man-made elements in the landscape, such as the barrows, that would have been associated with certain ideas of the past and possibly also a given right to particular areas with reference to the ancestors buried inside them. At a later stage, precisely the same linear features were used as abstractions for demarcating the domesticated area. For a long time, the early fences and landscape divisions in western Jutland and the Dutch river area were very inconsistent in both time and space. However, as soon as fences explicitly demarcated larger social entities, such as villages and clusters of houses, or appeared in standardized morphologies such as the parcel-shaped enclosures, they were very quick to articulate. In some places (e.g., in the Herning area) this took only a few generations. This strongly suggests that elements of the boundary phenomenon could, at given points in time, be transmitted and aligned in different contexts.

In these situations, the recursive relationship between spa-

tial configuration, conceptualization, and social anchorage had a strong accumulative and self-reinforcing effect, and boundaries appeared as a more formalized and broadly accepted social phenomenon. Returning to Abbott (1995), his concept of entity-ness can be compared with the boundaries that apparently took on a social and conceptual meaning and not a purely technological function.

This aspect of the emerging, shifting, and contested nature of boundaries—that lines were not necessarily boundaries but could become them—is considered to be an important contribution to an understanding of the historical development and material anchoring of social concepts. It is suggested here that boundaries, although grounded in different landscapes, may have worked as a comparable material launch pad for the development of the immense variation that appeared across northwestern Europe and that articulated boundaries, in some places, increasingly came to work as conceptually and materially stable symbols, although an explicit, shared representation or agreement concerning their social meaning did not necessarily exist initially.

## Conclusion

In this article I hope to have demonstrated an approach that allows different spatial and temporal scales to be compared in order to understand the emergence, in the Bronze Age and Iron Age, of one of the most complex organizational devices relating to the landscape. I have argued that, with the emergence of boundaries, we are seeing a combination of both local and cross-cultural processes that, in a long-term perspective, were likely to trigger wider social and conceptual changes. The different generative principles have been used to argue for causality and an, albeit fallible and partial, internal logic in the development of the various forms of boundaries.

This analysis has, however, also exposed remarkable chronological discrepancies between the three main study areas. The suggested generative principles entered into different local chronological sequences, and the individual occurrences varied in size, shape, and degree of complexity. The often ephemeral and unstable character of these boundaries appears to reflect the very nature of Iron Age societies in general: this was a time of upheaval, uprisings, and calls for the redefinition of a number of social relations. Moreover, the many fortified sites—the pit-zone alignments of western Jutland, the enclosed sites of the Netherlands and northern Germany (Waterbolk 2009), and the developed hillforts of Wessex—testify to a period marked by cattle raids, plundering gangs, and local power struggles. Societies were characterized by a pronounced lability, conflict, new ideas about identity, rights and obligations, social affiliations, and people who fought over a power that was still negotiable, over cattle that could be stolen, over new parts of the landscape that could be claimed, and so on.

Many landscape divisions appear initially to have been built on principles of equality and equal distribution that quickly became widespread and pervasive. However, the boundary

also eventually became a principle that people could easily either take advantage of or reject. Some large areas apparently did not incorporate linear boundaries until a much later stage and in others, such as Salisbury Plain (WE) and Skovbjerg Moraine (WJ), the use of landscape divisions was extremely intense and varied. Consequently, although these boundaries had potentially a very broad application, their development and incorporation depended on the culture-historical context in which they appeared—on whether there was a tradition of landscape lines, whether people accepted that there was a need for this technology, and whether the boundaries had acquired a critical mass.

Furthermore, as has been demonstrated above, these generative processes are revealed only when we approach the landscape from a long-term perspective. I hope to have demonstrated that this processual ontology has advanced new aspects of the archaeological record (e.g., cross-domain and chronological causalities across the traditional conceptual frameworks), as well as a new terminology for describing the emerging character of spatial configurations. Many boundaries would initially have been built with a rather limited temporal intention, but could acquire some of the same qualities as existing long-term landscape markers, through complex legitimation, formalization, and fixation processes. Furthermore, they probably did not develop on the basis of fully thought-out plans or as purely idiosyncratic solutions but rather through complex feedback mechanisms between materialization, conceptualization, time, and social embedment.

### Acknowledgments

I am very thankful to Mads Kähler Holst for support and discussions, without which this article would not have been written. I would also like to thank Andreas Roepstorff, Helle Juel Jensen, Leo Webley, and the reviewers of this article for some very pertinent comments and suggestions on an earlier version of this article. Finally, I am very grateful to everyone who has helped with providing data and illustrations.

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## Comments

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### Cognitive and Social Implications of Boundaries: Trying to Read Iron Age Minds

Archaeologists are always searching for indications how the past societies were organized. But very often we focus on burial data, neglecting the evidence from settlement studies. There is a practical reason for this: settlement research is often

fragmented, and does not allow for “clear” insights in the social organization of past societies as burial data appear to provide. There is yet another practical problem: burial research generally is of limited size, often spectacular in nature and therefore more readily published. Settlement data are much more fragmented, and large scale settlement research is difficult to publish. Data, especially data excavated in the twentieth century, have remained unpublished to a large extent. That is one of the reasons that research like Mette Løvschal has carried out is difficult but also very important. It is important because it demonstrates the potential of settlement research for answering kinds of questions that we generally do not ask, How can boundaries help us to recognize social concepts that cannot be derived from burial analysis—concepts that tell us about social categorization and its “material anchors.”

This does not imply that archaeologists have not been thinking about boundaries and about the way in which boundaries direct movement and are directly related to ways social life is structured and organized. But so far, research of this kind generally was restricted to the house as “an encoding model of society itself” (Barrett 1994a:88). The settlement and the wider settled area structured by boundaries has remained out of focus. Moreover, Løvschal rightly states that there is a lack of overarching understanding of boundaries. So her interregional and diachronic perspective is needed and innovative. Her analysis of thinking about boundaries, the way they are connected to and structure social categories, is certainly refreshing and adds important new insights to the discussion. Especially important to me is the realization of how boundaries become material anchors of social categories.

Reading Løvschal’s analysis made me aware of the fact that there is indeed a period in which boundaries become more permanent, in which they are no longer process related, but become fixed and formalized, to use her terms. But this realization also lays bare one of the elements that in my view is lacking from Løvschal’s approach: the physical form of the boundary, or demarcation. Whether we are dealing with wooden fences, palisades, or ditch systems, in my view, does matter. In the Oss region in the central Netherlands, one of Løvschal’s research areas, we find, for instance, that until ca. 250 cal BC Bronze and Iron Age boundaries consist of fences made of stakes set 30 cm apart with wickerwork in between—a kind of almost-permeable fence demarcating farmyards. Generally they constitute a boundary between areas with many features and structures (farms, granaries) from areas with only large pits and wells (Fokkens, van As, and Jansen, forthcoming). Such structures appear to have been in place for one or a few generations, and then disappear. These structures do not seem to have been formalized: they appear and disappear. As Løvschal notes, boundaries like that were “singular rather than repeatable.” However around 250 cal BC, a new element is added to the shifting and not repeated pattern that seems to have been stable over more than a thousand years. People start digging ditches. This is something that they

did not do in the Early and Middle Iron Age. Though Løvschal does indeed discuss the emergence of large scale ditch systems as a phenomenon, she does not consider ditch digging—opposed to fence building—a different social act and a manifestation of different categorization processes. In my view, thinking that through might help structure thoughts about long-term, interregional, connected social processes. In my view, digging ditches, at least on sandy uplands, starts as a demarcation of communal spaces. Often they can be demonstrated to have had no visible function in drainage, but they enclose settled areas—not in a defensive manner, but as seemingly unplanned amoeba-like yet structuring elements. This is an element not only in Denmark but also in the southern Netherlands (and Belgium and Northern France). In her figure 8, Løvschal therefore could have added another chronological sequence in the central Netherlands: enclosed villages and farmsteads.

In conclusion, I think that Løvschal's approach is an important contribution to our understanding of how boundaries emerge. But at the same time it is only a beginning. The consideration of the physical form of the boundaries should be incorporated, but maybe also layout. A general movement from round to rectangular enclosures (from ca. 500 BC onward) is visible as well. How is that connected to categorization and what does cognitive psychology has to say on that? An interesting research future lies ahead!

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### Do We Need a Wall to Have a Wall in Our Head?

Løvschal's article is a valuable contribution to the debate on the development of humanly ordered landscape in late prehistoric Europe. I particularly appreciate her approach to compare the emergence of all sorts of land boundaries and field systems in regions that are usually discussed in isolation. I feel, however, that this article sometimes places too much emphasis on the role of physical boundaries such as fences or walls, neglecting the significance of other kinds of boundaries, land divisions, or segmentations, be they natural or humanly made. Take, for example, the case of Bronze Age barrows. Recent research in the Netherlands demonstrates that these were usually situated on heaths, humanly managed grazing grounds surrounded by forest (Doorenbosch 2013a, 2013b). In several regions, landscape might have been dotted with, or rather, segmented by, a patchwork of small heaths around barrows, sometimes stretching out to narrow corridors of a few kilometers (e.g., Doorenbosch 2013a, figs. 10b, 11a–b). Doorenbosch (2013b) has demonstrated that many

of them existed as heaths for a very long time, evidencing long-lived traditions of collective land management. As they are visually differentiated by vegetation, these ubiquitous anthropogenic heaths may be seen as another instance of humanly induced landscape segmentation. Interestingly, many of them appear to originate in the third millennium BC. This implies that they are much older than fence and ditch systems (these emerge in the second millennium BC; Arnoldussen 2008, 244, 252, 255–262).

In a similar vein, it may be useful to discuss “fixation” or “formalization” also beyond physical boundaries. Fixation and nucleation, for example, are also apparent in landscape orderings in another way. Case in point are the Late Bronze Age/Early Iron Age urnfields which are found in large parts of Western Europe. An urnfield, a cluster of often hundreds of graves and burial monuments, evidences a long-lived concern to bury deceased in close proximity to ancestors in one particular place (Fokkens 1997). This is in marked contrast to the loose and linear orderings of Middle Bronze Age burial mounds (Bourgeois 2013; Løvschal 2013). The same holds true for areas in the landscape where people deliberately deposited objects. Whereas Bronze Age depositions tend to take place in zones, lacking clear boundaries (Fontijn 2012), for the Late Iron Age one can indeed speak of cult places: one fixed location in the landscape where people repeatedly deposited objects (Fontijn 2002, 262–263; Van Hoof 2000, 57–58, table 4.1). These are known to exist with, but also without, physical humanly made demarcations (e.g., Gerritsen 2003, 150–167).

This brings us to a more fundamental question discussed by Løvschal: what did a landscape visibly structured by boundaries bring about? Or, as she states it: how could people “act through these spatial structures”? At the same time, ditch digging and fence building also imply that there already was a concept of space as something that can be divided. In addition to this, it also requires some shared understanding by the people involved that there is a need to physically divide space, and to do it in this particular way. Although it may not have been the primary motivation for dividing land, considering land as something that is alienable and commodity-like at least becomes “thinkable” by the presence of physical segmentation. In this way, the first occurrence of regularly divided space in a system of “emerging boundaries” is something that requires more attention. What was the rationality behind the regular setup of many Celtic field systems? It occurs to me that discussions about boundaries in relation to issues of land ownership are rarely touched on in this article. This is somewhat odd if we realize that “ownership” issues are an important topic in explaining field boundaries in the subsequent Roman Period (e.g., Wesselingh 2000, 214–217, on Roman Period Oss, one of the sites to figure prominently in this article for its Iron Age ditches). If we realize that similar boundaries were already in existence in the Late Iron Age at the same site, it is all the more remarkable to realize that

archaeologists studying prehistory evaluate a comparable system differently from Roman Period archaeologists.

I see Løvschal's study as an invitation to rethink much of what has so far been said on physical boundaries but also to start considering landscape orderings in terms of much subtler kinds of boundaries, demarcations and transitions. I argue that we do not necessarily need a *Mauer* to have a *Mauer im Kopf*, to rephrase Løvschal's statement. But, yes, a *Mauer* does help. A fascinating example of this principle is the recent discovery that deer in the Czech republic still respect the former boundaries of the border between West and East, even though the physical wall has been gone more than 20 years already (Spiegel Online 2014).

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This article is an interesting and sophisticated examination of the appearance of spatial divisions and boundaries on the landscape in northwestern Europe during the second and first millennia BC. As an Africanist archaeologist, I must say that I am envious of the detailed spatial and chronological data that make possible the research described here. Those detailed data allow analysis of boundary making as a dynamic phenomenon, with distinct principles some or all of which may be instantiated in particular cases, and with a continual tension between local realities and priorities and cultural understandings that are in some way shared (or at least comprehensible) over larger regions. The author's intent was clearly to provide an overview of commonalities and contrasts in the three different areas being studied, and she certainly succeeds in doing so.

It may under those circumstances be slightly churlish to concentrate on issues not much covered in this wide-ranging article, but I do so in the hope of extending the possibilities for the analysis. The exclusive concentration on boundary production means that said production floats somewhat free of other cultural and social structures and concerns in the article: we learn a great deal about boundaries, but rather less about the human systems within which they existed. For example, boundaries in agrarian societies will be largely produced through the culturally meaningful labor of community members, both the labor involved in making the boundaries and labor within the cultural spaces demarcated by those boundaries. Yet the issue of labor or work is hardly mentioned in the article at all. This struck me with particular force in the account of stone clearance from fields and the incorporation of the stones so removed in dry-stone walls and clearance cairns, an onerous task that I remember all too well from growing up on a small farm in Atlantic Canada. The author assumes that it was the presence of these walls and cairns that

led to points and plots on the landscape becoming relatively permanent, but it is impossible to separate those physical monuments from the agricultural labor that led to their appearance in the first place. In this case, the fields and the patterns of labor involved in those fields would have produced the boundaries. Obviously, this process would be dynamic, because stone deposition during field clearance would take place on culturally meaningful points in the landscape and because the extents of fields would be mutually defined with the monuments demarcating them. In any case, the meaningfulness of the boundary systems would lie as much in tilling fields as in building walls, in the embodied meaningfulness of labor as much as in its material markers. At a time when increased attention is being paid to the performative aspects of monument construction and use, the absence of human work in the article is noticeable.

The article claims to work toward a processual ontology of boundary systems in northwestern Europe, and, as noted, the discussion of boundary dynamics is strong, but the historical coming-into-being of these boundary systems is rather more weakly developed. It is extremely unlikely, for example, that the processes described involve boundary production *de novo*, and yet there is something of a tension throughout the article between the idea of boundaries as new impositions on more-or-less blank-slate landscapes and that of boundaries as contestations of preexisting systems of demarcation and identity. In the latter case, which probably better describes the regions and periods covered in the article, it seems highly unlikely that any boundary making will "constitute mere divisions," associated only with technical functions, and much more probable that the act of modifying earlier systems will be socially meaningful and contested—even if those systems are only dikes or field boundaries. This is probably in large part due to the comparative nature of the article, an entirely worthwhile goal, but it makes for a somewhat detached discussion of boundary-making processes that would certainly be embedded in local histories as much as continental developmental trajectories. Overall, however, this article has left me with much to think about, and I applaud its ambition and sophistication.

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### Boundary: The Word, Concept and Practice

It has been fascinating for a border scholar coming from another field to read Mette Løvschal's richly theorized article on the emerging boundaries in northwestern Europe, that is, dividing lines that were mobilized to organize/reorganize landscapes and settlements and sociospatial mobility. Løvschal

goes to the roots of boundary thinking to study how boundaries have arisen historically. Boundaries are, for her, both visible lines and elements that divide space and establish social, collective meanings.

Writing this commentary has been an exciting task because this has forced me to consider the meanings of spatial concepts in archeology and archeology's position in the burgeoning field of border studies. Archeologists have shown that human societies have long created demarcation lines between themselves and others (Kirby 2009). They have studied not only dividing lines (Aminzadeh and Samani 2006; Kowalewski et al. 1983) but also problematized boundaries as identity markers (Díaz-Andreu et al. 2005), the relations between borders and landscapes (Anschuetz, Wilshusen, and Scheick 2001), sovereignty and territoriality (Osborne 2013), and the ideas of social space (Llobera 1996). They also challenge the often taken-for-granted views of past social spaces as containers with rather fixed borders. This is in line with political geographers who have proposed that spaces are simultaneously "relational" and "territorial" (Paasi 2012).

Writing this comment has been also somewhat puzzling task, since the "boundary" often means dissimilar things in different disciplines. No genealogy of the boundary as a word, concept, and practice has been written (cf. Elden 2013). *Boundary* is, of course, an English-language word (with many concepts) whose etymology is relatively recent. This word has partly overlapping meanings in other languages. Løvschal uses predominantly the word *boundary*, but she does not really justify this use. Yet her research object—linear and at times bounded patterns in the landscape—makes this reasonable. *Boundary* normally means a dividing line, contrary to the broader meanings of currently popular terms *border* or *frontier*. For Løvschal's *boundary* is above all related to the process of making dividing lines and linear demarcations and establishing social meanings.

One conceptual difficulty is hidden in Løvschal's comment where she says that "Linear structures and features were therefore not necessarily boundaries from the beginning, but they became boundaries when people began conceptualizing them as such." While she correctly suggests that spatial demarcations must be related to social consciousness (Paasi 1996b) to be meaningful, it would have been thrilling to hear more about the black box, that is, "when people began conceptualizing them" as boundaries. While Løvschal's rich examples show how dividing lines and closed spaces evolved, and she provides us with some hypothesis of how they possibly structured social life, we should be careful to avoid an impression of anachronism; that man-made artifacts, lines, and shapes, or rather the people who made them, "spoke" or "thought" in modern boundary language.

It is easy to agree with her emphasis on the processual character of boundaries (cf. Paasi 1996b). Respectively her key conceptual contribution is what she labels as the generative boundary principles: boundaries are conceptualized as markers, articulations, process related devices, and vehicles of

fixation and formalization. These are largely inductive generalizations from the data. Such "processual ontology" or interpretation is important because so much of the conceptual basis of boundary/border research is perpetually related to the modern state and its changing territorial features and forms of governance. Løvschal sees boundaries in a more flexible way as accumulating technologies that social communities used to organize their activities. It is most laudable that she brings together literature and ideas from several academic fields in developing her conceptual approach. Such academic border crossing can contribute to finding novel, cross-disciplinary conceptual tools for research.

Archeologists have paid attention to concept of territory and pondered over the past forms of governance, especially whether the forms of territory were similar or dissimilar as modern container-type territories that have for a long time been the dominant way to understand the modern state (Osborne 2013). It was a bit surprising not to find any comments on territory/territoriality in the text, even if the spaces and lines Løvschal discusses partly indicate power relations and tendencies to control social spaces. She suggests, for example, that the "boundaries" in the case study areas were partly related to the emerging forms of marking ownership.

All in all, I wish to thank *Current Anthropology* for a chance to read and comment Mette Løvschal's conceptually strong and empirically rich article that takes us to problematize the roots and the "traveling" of material practices, technological functions, and social meanings that have given rise to borders and border thinking.

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The article's theoretical approach represents an important contribution to the general interpretation of boundaries in the landscape during this period in northwest Europe. Løvschal argues convincingly that this phenomenon followed common generative principles and emerged along equivalent trajectories in the three study areas.

The results are summarized in a very generalized model (fig.8). This model must be regarded as a hypothesis to be tested more thoroughly in the three study areas as well as in other parts of northwest Europe where comparable boundaries occur in the first millennium BC. My comments deal primarily with the study area in western Jutland. The suggested sequence, with the successive introduction of Celtic fields, pit zone alignments, and enclosed farmsteads and villages, may be correct and fits very well with the conditions and changes in contemporary society that Løvschal discusses in her concluding remarks. The labile nature of the enclosures around villages in 200–0 BC and the successive addition of new functions and meanings are well illustrated by the en-

closed villages at Grøntoft and Nørre Holsted (Rindel 2010: 255–258). In Grøntoft the houses were in the earliest phase situated close together, and the fence closely surrounded the houses closely in a winding course, probably serving a purely practical function. In the somewhat younger village at Nørre Holsted, the enclosure was during the late phase expanded eastward to make room for three additional farmsteads, whereas the open central place in the villages was never filled with houses. The enclosure was labile, but the enclosed area now incorporated an open central place with new functions and meanings.

Several basic aspects of the pit zone alignments in western Jutland are, however, still insufficiently clarified. This means that the importance of the pit zone alignments in the generalized model might be overestimated and that other kinds of boundaries should perhaps be included instead. More than 30 sites with pit zone alignments (also called *linear pit zones* or, in Danish, *hulbælter*) are now known in Denmark (Eriksen and Mauritsen 2012). So far, however, only a few of them are dated to the period of 500–200 BC, while the majority remain undated. This means that the possibility cannot be excluded that the pit zone alignments in Western Jutland cover a much longer time span than it currently appears. Similar structures are known from later times in other parts of western Europe (Modderman 1981; Von Schnurbein 2008). It is, in any case, questionable whether the pit zone alignments should really be interpreted as “large-scale landscape demarcations.” Most of the pit zone alignments show no signs of renewal, and their time of function must have been rather short. On the other hand, they display considerable variation in size and occurrence with other kinds of structures, such as ditches, ramparts, or systems of postholes. For this reason, the function and meaning of the pit zone alignments is probably multiple and varied. Inspired by Caesar’s description of his fortifications at the siege of the Celtic stronghold at Alesia in 52 BC, it has been suggested that such pit zone alignments might have been used in prepared battlefields (Eriksen and Rindel 2001; Rindel 2010:258–260). If this interpretation is correct, the pit zone alignments in some cases must have had a very short time of function during a specific event or conflict, and they were perhaps more or less invisible in the landscape and placed only according to strategic considerations, maybe even constructed by people who did not live in the local area in question.

The question is whether other linear structures had more importance as large-scale landscape demarcations in western Jutland in 500–200 BC. At Grøntoft, a hollow way system occurs close to a large cemetery with hillock graves from this period and part of the system of pit zone alignments at this site (Rindel 2010:258–259). The road system divides the cemetery in two and must have existed contemporaneously with the cemetery. Where the pit zone alignment meets the hollow way, it bends and continues along the road. The pit zone alignment must have been constructed after both the cemetery and the road, and it is remarkable that the pit zone alignment

does not constitute an obstruction running across the road. In this case, the road may have constituted a clearly visible and long-term demarcation in the landscape, which also had importance in the physical organization and the symbolic conception of the landscape around it (see also Herschend 2009:178–181). Large-scale linear ditch systems with ditches and numerous broad interruptions are known from other parts of Denmark. The ditch system at Kirstineberg on Funen has been dated to 300–200 BC, and the part that has been excavated is 600 m long and has an almost rectilinear course (Henriksen 2005:97–102). A similar ditch system is known from Trældiget in southeast Jutland (Knudsen and Rindel 1994:46–47). Such ditch systems probably had a much more visible and long-term appearance in the landscape than the pit zone alignments, and they should probably be interpreted as markers of territorial borders rather than as fortifications.

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### John Sutton

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There is a thrill about Løvschal’s identification of a long-term cross-regional “causality between the lines” across regions of northwestern Europe: despite “remarkable chronological discrepancies,” boundaries emerged “along equivalent trajectories.” Whether these involved transmissible influences across regions and time scales, as the term *causality* suggests, or relatively independent transitions with a “fallible and partial, internal logic,” this is an impressive “culture-historical” case study of the symbolic, social, and cognitive life of things. Picking out four asynchronous phases in the “long-term paths” by which the functions of boundaries shift, destabilize, and rework, Løvschal reclaims a less purist notion of “lawfulness” for the human sciences, putting pragmatic flesh on the idea of patterned but context-specific regularities of unfolding process.

Though it is dizzying, for an outsider to archaeology, to navigate such brave movements between scanty evidence and deep-historical theory, the interest of Løvschal’s big-picture target—an integrative but context-sensitive account of the material, social, conceptual, and cognitive life of boundaries—justifies the journey. Her topic is not central to new waves of cognitive-archaeological theory on other forms of “material engagement” (Malafouris 2013; also Knappett 2011; Malafouris and Renfrew 2010). Nor have historians of landscape in later periods for which evidence is more abundant such as early modern England typically added systematic theoretical treatments of boundary symbolisms to their detailed accounts of enclosure, place, and identity (but see Walsham 2011; Whyte 2009). My comments home in on Løvschal’s links to certain “strands of cognitive theory.”

The external symbol systems which our ancestors constructed or manipulated took diverse forms, as material struc-

tures—each with their own histories, features, and dynamics—were augmented, transformed, or created (Donald 1991). With unusual openness to and reliance on environmental and social interaction, our phenotypic and neural plasticity grounded cultural inheritance, as we constructed our own niches with increasing levels of skill, collaboration, and specialization (Richerson and Christiansen 2013; Sterelny 2012). Incomplete biological machines, we plug into and soak up technologies, practices, and artifacts, which in turn transform our individual and collective lives and actions. If our cognitive processes are thus hybrid—distributed across brain, body, and world—this is no sudden result of modern industrial or digital cultures, for we are cyborgs by nature (Clark 2003). Our brains are better at motivated pattern recognition and action guidance than abstract reasoning: as Clark argues, they “make the world smart so that we can be dumb in peace” (1997: 180).

Some case studies of such “distributed cognitive ecologies” address historical and environmental resources rather than contemporary technological media networks (Hutchins 2010; Tribble and Sutton 2011): but place and boundaries have been left to social theorists, on the one hand, and individualist cognitive psychology, on the other, with fewer signs of rewarding interdisciplinary exchange. So Løvschal points to historically specific instances of the entangling or overlaying of conceptual and material structure, of imagined symbolic meaning and perceived spatial structure. At different time scales, gestures or routines, verbal maxims, and cognitive artifacts can anchor or reorient thought and action, becoming the medium of mind themselves rather than merely external triggers and cues. So more enduring worldly features like boundaries come to operate as “material anchors for conceptual blends,” stabilizing social configurations or cognitive categories for collective scrutiny or negotiation (Clark 2006; Hutchins 2005). Løvschal describes these processes in the making, as lines came to mark, to articulate, to demarcate, or to fix and formalize certain divisions, functions, or identities.

Identifying specific temporal and morphological variables which ground and shift the use and interpretation of boundaries, Løvschal contributes to multidimensional frameworks for studying socially distributed cognition (Sterelny 2010; Sutton et al. 2010). Her analysis integrates effectively the interacting material, social, and cognitive aspects of boundaries, raising two further questions. First, need we distinguish the cognitive life of things from their social life (Sutton 2008)? What specifically cognitive processes might we identify, presumably at the level of small groups, alongside the changing social affordances that Løvschal identifies? Can we analyze particular communicative or symbolic work done by these boundaries across the four phases?

Second, in such a case study of material culture, how are more implicit developments balanced with more explicit processes involving socially shared understandings? Can we meaningfully ask whether, when, and how Løvschal’s “bound-

ary principles” became known or accessible to people as well as embodied or enacted? Awareness of the social meaning of boundaries may, Løvschal suggests, have itself emerged gradually from more basic forms of agreement in action. As physical markers blended with conceptual divisions, how were dispositions and behavioral norms refigured so that boundaries were explicitly recognized “as social clues” with significance beyond their instrumental function? Under what circumstances might “people decide,” as Løvschal puts it, that a line is a boundary? Presumably “common rules” can be acted on before they are fully articulated and explicitly renegotiated. But the long-term developments Løvschal sketches cannot involve the displacement of implicit collective agreement by more reflective socially shared representations, for collaborative interaction in a complex structured world of material symbols always involves both (Williamson and Sutton 2014).

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## Reply

I am very grateful to all commentators for raising some important points of clarification and for making positive suggestions relative to further exploration of the subject. A recurring question relates to various aspects of the entanglement of conceptual and material structure. Paasi mentions this as the “black box” of when people began to conceptualize spatial demarcations as boundaries. Sutton wants to know how implicit developments were balanced by more explicit processes. As he expresses it: “Presumably ‘common rules’ can be acted on before they are fully articulated.” He also asks about the “specifically cognitive processes” and “particular communicative or symbolic work done by these boundaries,” and whether the two can be distinguished. These aspects concur with Fontijn’s examples of people in prehistory respecting a spatial limit without the (at least archaeologically recognizable) existence of a physical, unbroken, linear boundary, which he quite rightly uses to emphasize that people do not necessarily need a wall to have a wall in their heads.

Humans are not alone in constructing lines or having representations of boundaries. Although not marked by any fences, wild male chimpanzees patrol the boundaries of their territory in a straight line (Mitani and Watts 2005), and badgers systematically concentrate latrine use along otherwise unmarked territorial boundaries (Kilshaw et al. 2009). Even crows respect hybrid zones along a long, narrow, straight and relatively stable border (Brodin and Haas 2009). Thus, representation of a boundary does not necessarily demand its actual physical existence. The most interesting aspect of linear boundaries is therefore not so much when humans (or animals) first obtained a representation of boundaries but, from an archaeological point of view, when, how and why they

began to construct boundaries in a way that makes them recognizable in a modern context.

It is true that these boundaries were sometimes embedded in “more cognitive” and kinesthetic aspects; other strands of cognitive archaeology have already engaged in searches for specific neural correlates for other technological advancements, by applying modern methods of MRI scanning (Stout et al. 2008). However, in fact, there were many aspects of the boundaries as a social phenomenon that were not to any significant degree specifically related to the cognitive domain, not to assume any sharp line between the two. With relatively limited cognitive effort, labor, and materials, a new fence or ditch could be constructed that enabled individuals to modify their immediate environment with profound consequences. Many boundaries were not laid out on the basis of a fully developed 1:1 plan in the mind but rather involved the dynamic and flexible operation of some fairly simple linear principles that allowed people to add on to, extend, and subdivide space. And their integration into prehistoric communities was associated with protracted introductory periods, often lasting several centuries, suggesting a conceptual and cultural resistance to, or ignorance of, this technology (Løvschal, forthcoming). Therefore, the “specifically conceptual” is not in itself as interesting as how the long-term interplay between conceptualization, the social realm, and the physical environment generated new trajectories.

However, clearly bracketing the landscape into repeatable, bounded entities would have influenced two of the most decisive modalities of the body: sight and movement. In turn, the boundaries would have influenced how people perceived, categorized, and remembered space and their potential for referencing and negotiating it. Physical boundaries potentially lowered the cost of coordination and problem solving (and in return posed new problems). The boundary principles could be shared, mimicked, and communicated across an extensive geographical area. They also had consequences for social predictability: by constructing a boundary, you subjected yourself to its specific descriptions and expected the same from others. Having a fence or fixed field plot to return to would have enhanced the ability to remember and plan ahead and to employ temporal rotation in the grazing of pasture, crop cultivation, and so on.

To return to Fontijn, these are particular conceptual and communicative affordances that are different from natural boundaries or barrow alignments. Although these may have been conceptualized as forms of boundaries, their exact definition was much less clear (e.g., dependent on how people moved relative to them) and much less operative (e.g., could not be changed by individuals) and did not necessarily involve a conceptual abstraction of the line (Løvschal 2013).

Another general concern centers on the study’s historical context. Several commentators request further elaboration of the labor investment (Fokkens and MacEachern) and initial culture-historical coming-into-being (Sutton), as well as expressing a concern about other ways of engaging with the

landscape (Fontijn): I fully acknowledge these points. As recognized by MacEachern, these aspects were given a much reduced priority due to the overall comparative aims of the article but are by no means detachable from its development. In line with this concern, Sutton asks: “Under what circumstances might ‘people decide,’ as Løvschal puts it, that a line is a boundary?” Boundaries become particularly prominent in people’s consciousness when they are somehow contested or violated, when they have to be reassigned, or when they conflict with other ways of organizing space. In such situations, implicit boundaries are costly: Since there is no clear-cut demarcation between different spatial categorizations, their exact position must constantly be remembered and maintained. This complicates planning ahead as well as negotiations of their exact demarcation. Many of the earliest boundary articulations emerged in landscapes with a high settlement concentration and indications of severe economic pressure, during periods of pronounced social and political instability. Increasingly during the first millennium BC, a general situation emerged whereby formal access to land was probably extremely limited and a number of previously dispersed units became spatially juxtaposed: arable land and pastures became concentrated within particular areas and settlements aggregated much closer together. This posed very concrete challenges to cooperation and required regulation of the desirable parts of the landscapes in new ways. And it is in exactly such situations, boundaries materialized and afforded wide-ranging and, at least theoretically, low-cost solutions.

In relation to the historical context, I am also grateful to MacEachern and Fokkens for mentioning the importance of the labor and social acts involved in these manifestations. Concepts of labor investment play a key underlying role in the generative principles, but they are right in pointing out that these could have been addressed more explicitly. For example, the greater tendency to large-scale, communal boundary systems in southern Britain compared with small-scale, piecemeal systems east of the North Sea embodies some deep long-term social differences between these regions. In the context of hillforts and linear earthworks, the collective performance of constructing and maintaining boundary were probably intimately related with ways of creating and recreating community ties (Giles 2007), whereas on the other side of the North Sea, there was a greater ideological emphasis on the independence and autonomy of the individual household unit, expressed in individual fences and often less labor-costly boundaries (Gerritsen 2003; Herschend 2009; Webley 2008). Thus, various material boundaries did not simply emerge on a blank slate, but as MacEachern correctly states: “the meaningfulness of the boundary systems would lie as much in tilling fields as in building walls, in the embodied meaningfulness of labor as much as in its material markers.”

However, a point raised in the article is that, once instantiated in the landscape, some forms of boundaries obtained social consequences that endured temporally beyond their

initial labor investment and the people who initially built them. Consequently, there are not only fundamental differences in labor organization and landscape management but also material and historical differences between ephemeral farmstead fences and large-scale embanked field systems. For example, in many places, earthen field banks afforded cumulative structures that continued to influence movement and landscape organization and that people continued to put to other uses centuries after they were cultivated.

A possible continuation along these lines would be to discuss other discontinuous, qualitative concepts, such as inheritance rights, private land ownership (as suggested by Fontijn and MacEachern), or territoriality (as suggested by Paasi), but these aspects have already been discussed exhaustively elsewhere (e.g., Bradley, Entwistle, and Raymond 1994; Thomas 1997; Webley 2008, 38–44; Yates 2007). Since such concepts also carry an inherent risk of anachronism, and could not be afforded due attention, I have purposely avoided using them in the article. I have focused instead on topological processes involved in, for example, the detachment of the boundaries from the specific local contexts, as another way of approaching the emergence of commodity-like qualities, as suggested by Fontijn.

Returning to specifically archaeological matters, several commentators suggest that I focus on other aspects, including form, material, and function. Although useful and important, none of these is related explicitly to the key theoretical contributions made by the article, that is, generative principles and displaced historical trajectories. The aim was not to cover all aspects of boundaries, but to propose a theory and an approach which could address processes of becoming that did not necessarily follow a linear historical trajectory. This was in order to overcome some of the problems inherent in archaeological comparisons based on discrete feature types or periods and generalized in a linear and synchronous chronological perspective (from irregular to regular, from ephemeral to stable, etc.). Therefore, focusing on such issues in their own right appears somehow oblique to the main thrust of my article.

Rindel expresses a concern about the function of the pit-zone alignments and their position in the developmental sequence (fig. 8). I concede that my point with respect to their affordance is unclear, in that reference is made primarily to other forms of process-related boundaries. I believe that pit-zones were largely a short-term phenomenon, of low visibility in the landscape, that had an effect rather than representing a specifically conspicuous and elaborate social symbol.

I also agree that they could indeed represent a construction form with very wide-ranging applications, and I therefore consider it unnecessary to contrast their function with other construction forms. The first millennium BC saw the emergence of a wide range of linear landscape demarcations, used for a great variety of purposes. A more useful approach is to see these different boundary forms as part of an extensive boundary repertoire, involving different materials and prin-

ciples of application that potentially combined freely on a scale ranging from household to territorial level (Løvschal and Holst, forthcoming).

Another of Fokken's suggestions is to consider form, as exemplified by the development from round to rectangular enclosures. Again, the concept of a repertoire offers an alternative conceptual framework. Although this development was associated with chronological tendencies, the replacement of amoeba-like fences with rectilinear forms of farmstead enclosure apparently did not take place in a linear sequence. Rather, the two coexisted as different strategies in the relationship between farmstead and surrounding landscape.

Returning to the initial conceptual framework of my article, it elucidates comparative chronological trajectories across traditional regions and feature types. Aspects of these concentrate in time, allowing them to be compared in general models of historical trajectories (fig. 8). The generative principles cannot be reduced solely to material, form, or function. Instead, they provide a new opportunity to study displaced and complementary relationships between conceptualization and materialization (Sutton 2008), instead of in a constantly balanced or linear development, as well as challenging the way in which archaeological boundaries are usually compared. We are still in the early stages, but I believe that investigating these generative historical processes displaced in space and time constitutes a fruitful way forward in exploring the integration of long-term dynamic entanglements with social concepts and material structures.

—Mette Løvschal

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