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Repeating boundaries – repertoires of landscape regulations in southern Scandinavia in the Late Bronze Age and Pre-Roman Iron Age

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Towards the end of the Late Bronze Age, linear boundaries such as enclosed farmsteads, field divisions, and pit zone alignments emerged and gradually permeated the landscapes of southern Scandinavia on multiple scales. This article suggests the concept of a 'repertoire' as a way of approaching this phenomenon. The repertoire consisted of different topological operations (e.g. plot definition, demarcation, and enclosure), constructed by different materials (e.g. fences, pit zones, and earthen banks) on different scales (e.g. farmstead, settlement, and landscape). Such linear boundaries were applied as technological solutions to the new social and economic problems that occurred at this time in prehistory. A number of chronological and regional preferences can be demonstrated within this repertoire, and during the Late Bronze Age and Pre-Roman Iron Age, a range of new applications and combinations were developed in a creative exploration of the repertoire of linear boundaries.

Keywords: Late Bronze Age; Pre-Roman Iron Age; settlement archaeology; landscape regulation; social organisation; boundaries; fences; field systems; repertoire

Introduction

Research history

Southern Scandinavia is characterised by a long and comprehensive settlement archaeological research tradition, which can be traced back to the pioneering excavations of Iron Age houses (Kjær 1928, 1930, Hatt 1930, 1938, 1954, 1957, Brøndsted 1936) and the later introduction of mechanised area excavations (Becker 1966, 1969, Voss 1976).

In many ways, this research tradition developed along its own lines, generally staying outside the major theoretical discussions of the 1960s (Binford 1965, Binford and Binford 1968, Clarke 1968, cf. Hvass 1992). However, it clearly incorporated many of the ideas from the processual discourse more implicitly such as a clear behavioural–economic focus. This was, for example, reflected in a strong tradition of considering settlement structure and development in the light of demographic, climatic, and socio-economic conditions (Becker 1966, 1976, Kristiansen 1975, 1978, Nielsen 1982, p. 138, Champion *et al.* 1984, Hedeager 1990, Jensen 2003, p. 244). Similarly, it tended to focus on a few key archaeological sites, which could be fit into social-evolutionary lines of development, for example, from loosely structured to rectilinear field systems (Hatt 1949, Sørensen 1982) or from simple towards increasingly complex settlements (Hansen 1984, p. 65, Hvass 1993, p. 190, Jensen 1994, p. 118 ff., Ethelberg 1998, pp. 259–60, Webley 2007, p. 456). The model below implies that one

principle of settlement enclosure builds upon and eventually replaces another with a relatively clear development from open settlements towards common-fenced villages, towards an increasing internal differentiation, which eventually results in an individual farmstead parcelling (Figure 1).

This type of evolutionary explanatory model received relatively little criticism in a Danish research context compared to the British (Hodder 1982, 1986, Tilley 1990, Shanks and Hodder *et al.* 1995). A critique was nevertheless raised, which insisted on the multiplicity of interpretations as well as ahistorical variation being part of the nature of prehistoric societies. This provided an alternative view that considered each site on its own premises without relating it to courses of evolutionary progression (Ejstrud and Jensen 2000, Jensen 2005; also see Hedeager 1993, p. 172). A recent contribution was made by Herschend (2009), who similarly engaged in interpretations and research themes across the established archaeological periods. This critique was raised at a time where development-led archaeology was in a radical intensification and which increasingly has made it obvious that a number of explanatory models (cf. Figure 1) no longer can be maintained in proportion to the immense variation in the data: fenced villages which were previously unique for the sandy soils of western Jutland are now discovered in eastern Jutland (Skousen 2010), new types of large-scale areal demarcations appear from a much earlier point in time than previously thought (Bentsen 2011), and tightly fenced farmsteads are discovered both before and after the emergence of common-fenced villages (Isler 2012, Jørgensen 2011).

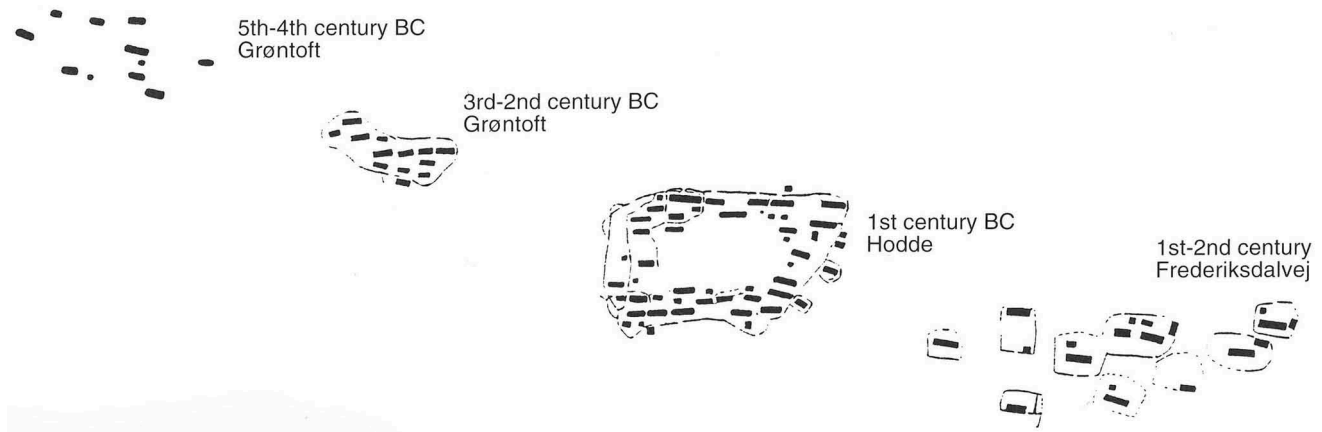*Corresponding author. Email: farkml@cas.au.dk

Figure 1.   Model of the development of the Iron Age village in southern Scandinavia (after Mikkelsen 1999, fig. 11, 191).

However, the evolutionary model has still continued to dominate settlement and landscape studies, and the interpretation of landscape and settlement demarcations refers to overall long-term narratives. This has sustained a particular understanding of the definition and delimitation of the archaeological feature types and their social bearing: the classical fence around 'farm 1' at Hodde as the ultimate symptom of a power structure in which the village chieftain has an unequivocally dominant position, the common-fenced village of Grøntoft as the ultimate symptom of a normative and egalitarian community, the Celtic field systems as the ultimate symptom of private property and agricultural intensification, and so on.

We wish to propose a pragmatic approach where the variation in the archaeological material is considered in the light of the concept of a repertoire, the definition of which is unfolded in the section below. On the one hand, the repertoire was not introduced as a package nor does it imply a development from one stage to another. Instead, the analyses demonstrate how different principles of operation were transferred across different materials and spatial levels, together forming a dynamic and flexible set of solutions to interrelated problems. On the other hand, different elements and combinations in the repertoire emerged in geographical concentrations and at particular times, of which some disappeared again while others became part of an increasingly formalised and institutionalised application ('Landscape technologies in a long-term perspective').

An emerging repertoire

The Late Bronze Age/Pre-Roman Iron Age is generally understood as a period of societal fragmentation and regional variation. Graves became increasingly anonymous, and there were strong culture–geographical differences in burial forms, including covered cremation [hillock] burial sites, burial pits, stone cairns, and reburials

in barrows (Becker 1961, pl. 124, Jensen 1966, Jørgensen 1972). The settlement patterns as well as the strategies of livestock management and landscape exploration varied considerably between regions and even within local areas (Haue 2012, pp. 288–291). This is, for example, reflected in the village mounds of northern Jutland (Jensen 1976), the densely settled, more dynamically explored compounds (Becker 1969), whereas other areas appear to have been much more sparsely settled until mid-Pre-Roman Iron Age or later (Møller 2013).

The longhouse architecture was dominated by a new type of house, which was significantly shorter than in the preceding centuries, averaging ~75 m^2, only leaving room for smaller families (Becker 1982, Rasmussen and Adamsen 1993). Although some variation can be recognised (cf. Hvass 1985, Rindel 1999, Haue 2011), the homogeneity in construction principles as well as the internal layout is striking. The stall now made a consequent element, which was normally situated in the eastern half of the longhouse (Fokkens 2003, Herschend 2009). Thus, an integrate quality of this schematic architecture was also associated with new economic regulations where cattle and livestock were explicitly kept within the walls of the individual houses. This form of architecture was so widespread that it dominated the entire lowland area from Scania to the southern Netherlands (Tesch 1993, Theunissen 2008, Webley 2008). The houses bear witness to far-reaching architectural regulations associated with the individual farmsteads in spite of regional variations, such as paved floors (Frandsen 2011), wall-ditches in the east end (Mikkelsen and Jensen 1996), turf-built walls (Hatt 1957), preference of orientation (Webley 2008, table 4.1, p. 57), as well as variations in subsistence strategies.

The farmsteads were generally situated in an open landscape; however, towards the end of the Late Bronze Age (*c.* 700 BC), a number of linear, physical boundaries

began to appear in their surroundings, such as linear ditches, fences, pit zones, and earthen banks. Over the following centuries, many houses became enclosed or partly enclosed by often fragile and ephemeral fences (Nielsen and Mikkelsen 1985, Pedersen 2007, Jørgensen 2011). Such fences created a new element on the settlement sites forming an explicit boundary between the farmstead and its surroundings or between neighbouring farmsteads. Similar kinds of fences and ditches also occurred less explicitly tied to individual farmsteads, separating larger areas within the settlement sites or connecting houses. From *c.* 250 BC, fences became more common and sometimes enclosed entire settlement sites, either as common-fenced villages or as boundaries demarcating the limits of much larger (inhabited) areas (Becker 1966, Andersen 1984). Other boundaries again were constructed as belts of open holes, the so-called pit zone alignments, that obstructed traffic corridors or cut off larger pieces of land and which appeared from the very beginning of Pre-Roman Iron Age (Mauritsen 2010, Løvschal in press b). Thus the introduction of linear boundaries created very tangible and indisputable boundaries between farmsteads, groups of people, and parts of the landscape and are hence expected to reflect new forms of regulation on multiple levels.

Although these physical boundaries demonstrate an almost inexhaustible range of variation (including construction material, morphology, size, and demographic association), certain principles repeated themselves across different contexts. The parcel-shaped plots that characterised the enclosed field systems (Celtic fields/Danish: 'digevoldinger') also reoccurred in the fences surrounding farmsteads forming plot-like structures. The pit zone alignments that were typically constructed as hindering of access outside the intensively explored areas were also surrounding aggregated settlement sites (Becker 1969, 1971, Eriksen and Rindel 2001, Mauritsen 2010). And principles of nearness to the houses that were characteristic for the farmstead fences also reappeared in the common fences that surround nucleated villages.

As a result this period was characterised by the introduction of a number of new elements, giving evidence to an increased formalisation and standardisation within multiple domains. Furthermore, it saw the emergence of new physical principles which were selected for in particular situations. These regulatory elements were apparently not fixed or well defined. Instead the material suggests an incredible breadth of variation as well as a significant creativity in how they were used and combined. These elements could be characterised as a set of very basic spatial principles or a kind of 'repertoire', which will be explained in the section below.

The idea behind the concept of a repertoire

The 'repertoire' is understood here as a form of toolbox comprising both concrete types of structures (e.g. fences, ditches, earthen banks, and pit zones) and more abstract principles of regulation (e.g. parcelling, plotting, add-on, compound, demarcation, and enclosure). They have parallel existence and can potentially be combined freely on multiple levels.

The concept of a 'repertoire' has been given particular attention within cognitive neuroscience and behavioural psychology (Delgado and Hayes 2007, Palmer 2009, Carey 2011). Here, a 'conceptual repertoire' is (often implicitly) taken to cover the sets of acquired procedures or behavioural responses that either consciously or unconsciously fit the expectancies of people and their surroundings. A repertoire is something that accumulates and gradually builds up and which therefore also, with time, gains certain inertia: in a long-term perspective, certain representations as well as behavioural responses are more likely to become evoked than others, depending on how well they fit with the general cultural schemes they appear in. Similar to the notion of a cultural schema (D'Andrade 1995, Nishida 1999), a repertoire is constituted by the generalised procedures of social life that are passed down from one generation to the next, transformable and applicable to different contexts. Such conceptual and behavioural categorisations and competencies are obviously not developed in isolation, but are both caused by and a cause to particular categorisations in the environment.

Therefore, although the term is originally geared towards a range of (verbal) concepts and not for handling prehistoric spatial behaviours, a 'spatial repertoire' could be understood along the same lines: a repertoire representing the sets of solutions and technological choices that people gradually develop, know about, have access to, and can choose to implement, modify, or ignore. Such a repertoire is not considered a universal human trait available to everybody but rather as dynamic, emerging spatial technologies learned, transmitted, and developed through a dynamic feedback relationship between micro- and macro-level processes. Therefore, a spatial repertoire is perhaps best described as a set of technological choices and horizons of possible operations that can be applied onto a wide range of tasks for social communication, coordination, distribution, landscape regulation, and allocation and which is deeply embedded in decision making processes and social concepts of organisation.

This repertoire does not emerge on a blank slate but operates on a particular culture-historical and topographical surface (cf. Figure 4), which has already been subject to preceding concepts and practices of landscape organisation and regulation and thus naturally hold certain affordances. In the archaeological material in focus of this

article, such a repertoire would appear as articulations of similar spatial regulatory principles appearing across larger geographical areas, archaeological periods, materials, demographic scales, or commonly used feature types.

This is a different view than previous models of evolution and chronological horizons based on fixed combinations of types of structures and usage and isolated developmental courses (Sørensen 1975, cf. Rogers 2003). Opposite a repertoire, horizons are characterised by phases of rapid innovation or diffusions (Willey and Phillips 1958, p. 32; also see South 1972). They also imply a degree of similarity across the given variables that can be distinguished from each other and which links different cultures to the same chronological phases. This is different from the repertoire, which is triggered by certain similar conditions that cannot necessarily be coupled to discrete cultural periods or unilinear developments. At the same time, the many varied forms of boundaries within the repertoire are not just random variation and unique expressions. They refer to a limited set of more abstract principles. It is these principles which should be identified to understand the development of the boundaries.

The repertoire as method

A repertoire, as used in this article, comprises a set of operations, which include plot definition, demarcation, and enclosure. Plot definition includes either a parcelling of a defined space or an application of rectilinear enclosures with particular stackable and repeatable morphologies. Demarcations consist of open lines that cut off particular spaces from their surroundings, often in a visible relation to a certain direction of movement. Enclosures consist of closed, curvilinear lines, which enclose a particular space into singular entities. These operations are applied on various spatial levels, which in principle constitute a continuous scale. However, they are here classified as household/farmstead, settlement, and landscape (Figure 2). These scales are functionally selected, but are associated with different cultural logics to specific use patterns, for example, landscape level

comprises both boundaries regulating traffic on a territorial scale as well as boundaries regulating an economic aspect such as fields and pastures. Furthermore, the operations materialise as fences, ditches, palisades, earthen banks, stone banks, and pit zones. The different operations and materials have parallel existence and can potentially be combined freely.

The classifications have been applied on a data set consisting of a systematic collection of sites with physical linear boundaries from the Late Bronze Age–Pre-Roman Iron Age across north-western Europe (Løvschal 2014a) with additions from Fund og Fortidsminder, Jensen (1976), and Runge (2009). The categories are not necessarily clear-cut but imply topologic overlaps. For example, plot definition on landscape level also includes elements of parcelling, demarcation, and alignment. There is also a, primarily discursive, drift between demarcation and enclosure, and enclosure and plot definition). However, they are still considered meaningful categories, which, in their combination with particular materials, partly relate to established archaeological feature types (e.g. pit zone alignments, common-fenced villages, and Celtic fields). Their development will be explained and synthesised in the following section, which aims to contribute to a more holistic understanding of the archaeological record.

Synthesis: manifestations of landscape technologies

In this section, we present seven different scenarios where the most dominant combinations of 'operation' and 'scale' are represented in various combinations with different materials; they distribute geographically according to Figure 3a–g.[1] The purpose of the section is to explore the observable manifestations of the repertoire in the archaeological record that embrace an extremely wide variety of ways in which similar operations and materials are combined across multiple scales. Similarly, they do not cover the entire repertoire but combinations that are particularly evident in the archaeological material.

Figure 3a–g demonstrates a geographical overlapping between the different selections of the repertoire although

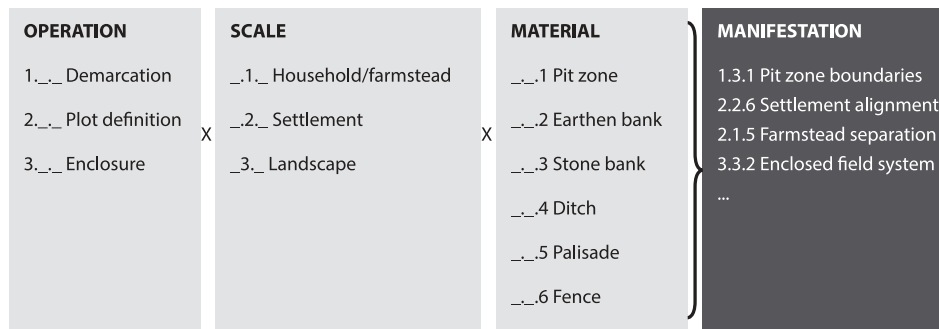| OPERATION	SCALE	MATERIAL	MANIFESTATION
1._._ Demarcation	_.1._ Household/farmstead	_._.1 Pit zone	1.3.1 Pit zone boundaries
2._._ Plot definition	_.2._ Settlement	_._.2 Earthen bank	2.2.6 Settlement alignment
3._._ Enclosure	_.3._ Landscape	_._.3 Stone bank	2.1.5 Farmstead separation
		_._.4 Ditch	3.3.2 Enclosed field system
		_._.5 Palisade	...
		_._.6 Fence	

Figure 2.   Diagrammatic outline of the main components involved in the definition of the repertoire.
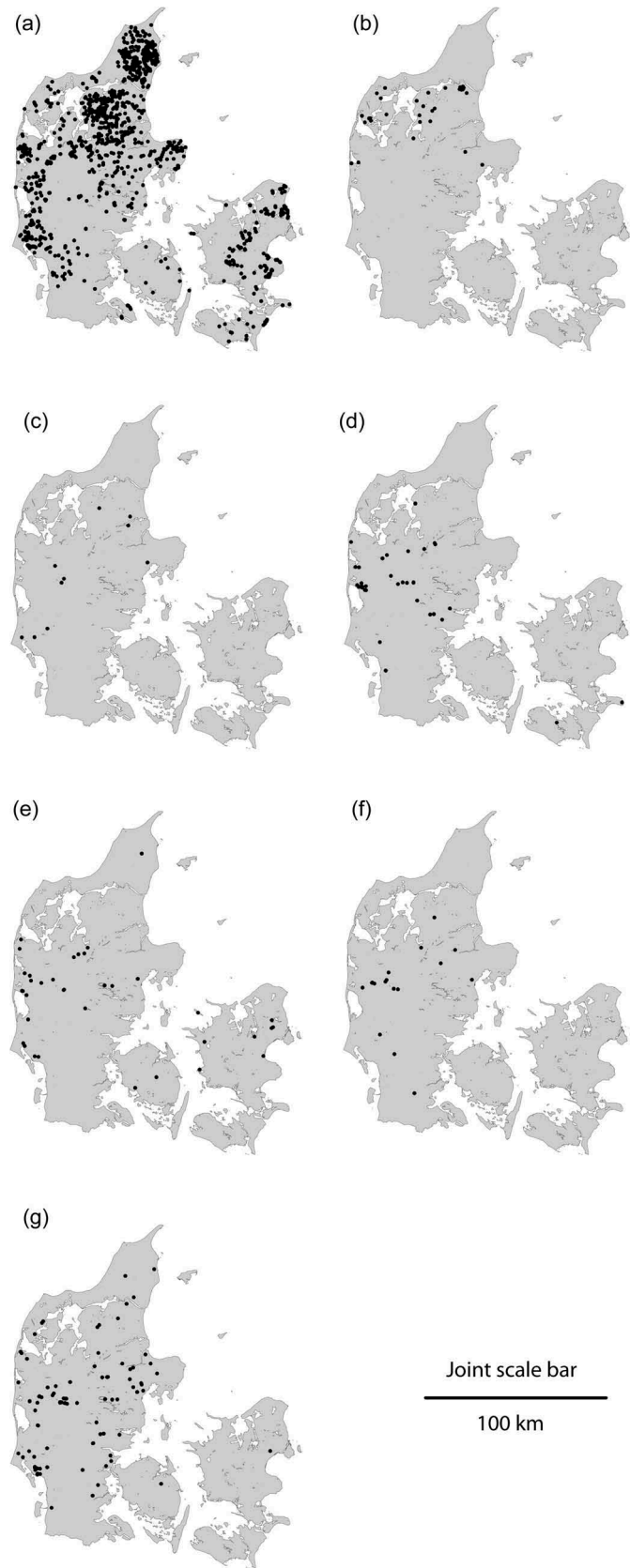
Figure 3. (a–g) Distribution map of the landscape technologies that figure in the analyses (No. 1-7), dated to 1100 BC–AD1. (a) Plot definition on landscape level. (b) Plot definition on settlement level. (c) Plot definition on farmstead level. (d) Demarcation on landscape level. (e) Demarcation on settlement level. (f) Enclosure on settlement level. (g) Enclosure on farmstead level.

with clear geographical concentrations for the different principles. Plot definition on landscape level (enclosed field systems) was mainly concentrated on the sandy soils in northern and western Jutland. Plot definition on settlement level (aligned settlement and village mounds) concentrated in northern Jutland with few occurrences in the rest of Jutland. Plot definition on farmstead level was a rare phenomenon with sporadic occurrences in north-eastern and western Jutland. Linear demarcation on landscape level (pit zone alignments) was mainly distributed in western Jutland with few coincidences in southern, northern, and eastern Jutland. Demarcation on settlement level appeared widely across southern Scandinavia, particularly in western and eastern Denmark. Enclosure on settlement level (common-fenced villages) was almost exclusively situated in western Jutland. And finally, enclosures on farmstead level were distributed widely but particularly in western and eastern Denmark.

These concentrations partly relate to culture-geographical regions (Figure 4). Although dominated by a flat terrain with a short distance to coast and waterways, the landscapes of southern Scandinavia also hold some fundamentally different qualities, spanning from the sandy-loamy moraines and ice-pushed ridges, the sandy heath plains and marshes in southern and western Jutland to the heavier, loamy soils in eastern Jutland and on the islands (Figure 4). These differences also formed an underlying

basis for different faunal developments and economic preferences (Odgaard 1994, Odgaard and Rasmussen 2000, Vinter 2011). Furthermore, the different culture-historical developments and landscape uses in these regions have clearly affected the preservation conditions of archaeological traces of physical boundaries that are vulnerable to cultivation and modern building works (cf. Baudou 1985).

TECHNOLOGY No. 1: plot definition on landscape level

In the Late Bronze Age/Early Pre-Roman Iron Age, large areas were subject to a plot definition where the individual field plots became surrounded by earthen banks, lynchets, or banks of field stones (Celtic fields). The changing horizons underneath the banks indicate that the field systems were sometimes applied onto land already allocated for heath and pastures. In other cases, forest appears to have preceded them (Hatt 1949, Becker 1971, Rindel 1999, Nielsen 2007). The sizes of the individual plots as well as these allocated areas reflected a significant variation where some can be proven never to have exceeded a few hectares, others exceeded several hundred hectare (Figure 5) (cf. Nielsen 2000, fig. 170, p. 185, Egeberg 2011).
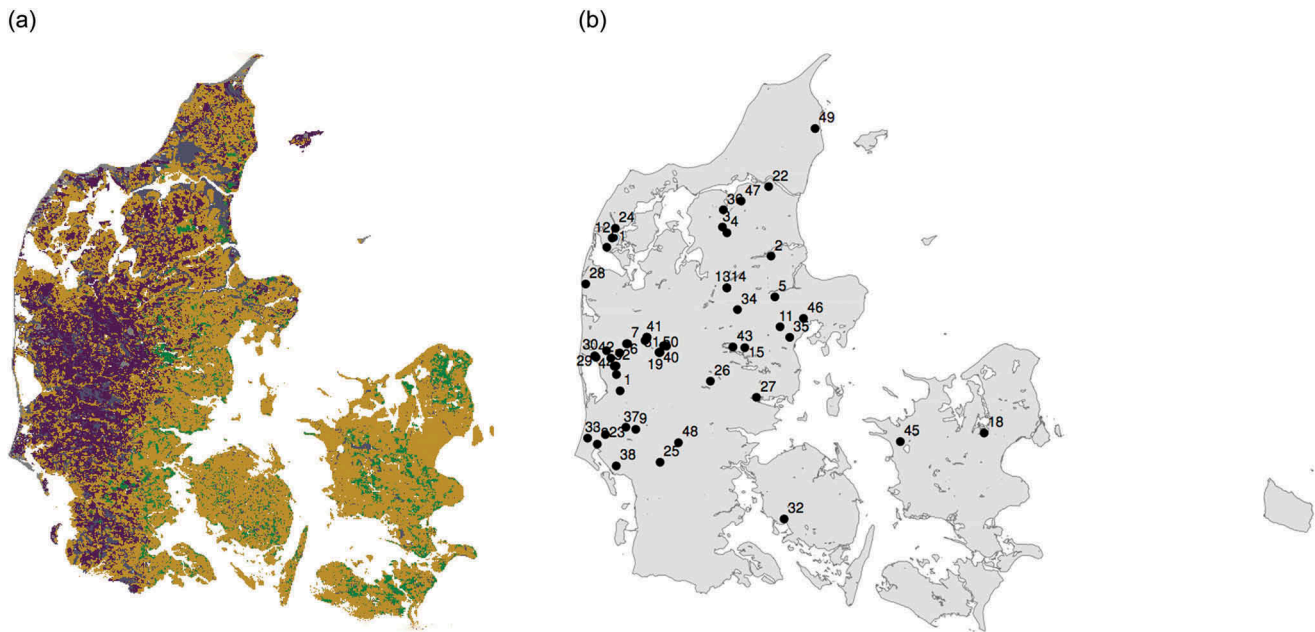

Figure 4.   (a): Main landscape types of Denmark according to the VSK economic map (heathland; forests; and cultivated land). (b): the distribution of all sites mentioned in this article. 1: Agerhøj, 2: Alstrup Krat, 3: Baunehøj 3, 4: Borremose, 5: Frederiksdalsvej, 6: Grøntoft, 7: Grøntoft Hede, 8: Hesselmed, 9: Hodde, 10: Holing, 11: Humlehaven, 12: Hurup, 13: Hvilmose Nord, 14: Hvilmose Syd, 15: Højlund I, 16: Lyngsmose, 17: Lysgård, 18: Margrethehåb, 19: Munksgårdkvarteret, 20: Møgelhøje, 21: Norgesvej, 22: Nr. Tranders, 23: Nybro, 24: Nørre Hedegård, 25: Nørre Holsted, 26: Nørre Snede, 27: Priorsløkke, 28: Rammedige, 29: Rindum Ny Skole, 30: Rindumgård Nord, 31: Rosenholmvej, 32: Sarup, 33: Selager, 34: Skallegård Syd II, 35: Skejby, 36: Skørbæk Hede, 37: Snorup, 38: Solbakkegård, 39: Spjald Syd, 40: Stenbjergkvarteret, 41: Sverigesvej, 42: Sønder Brorstrup, 43: Torslund Bakke, 44: Troldebanke, 45: Ubby, 46: Vendehøj, 47: Vokslev Hede, 48: Vorbasse, 49: Øksenhede, 50: Ørskovvej, 51: Øster Helligsøgaard, 52: Øster Lem Hede.
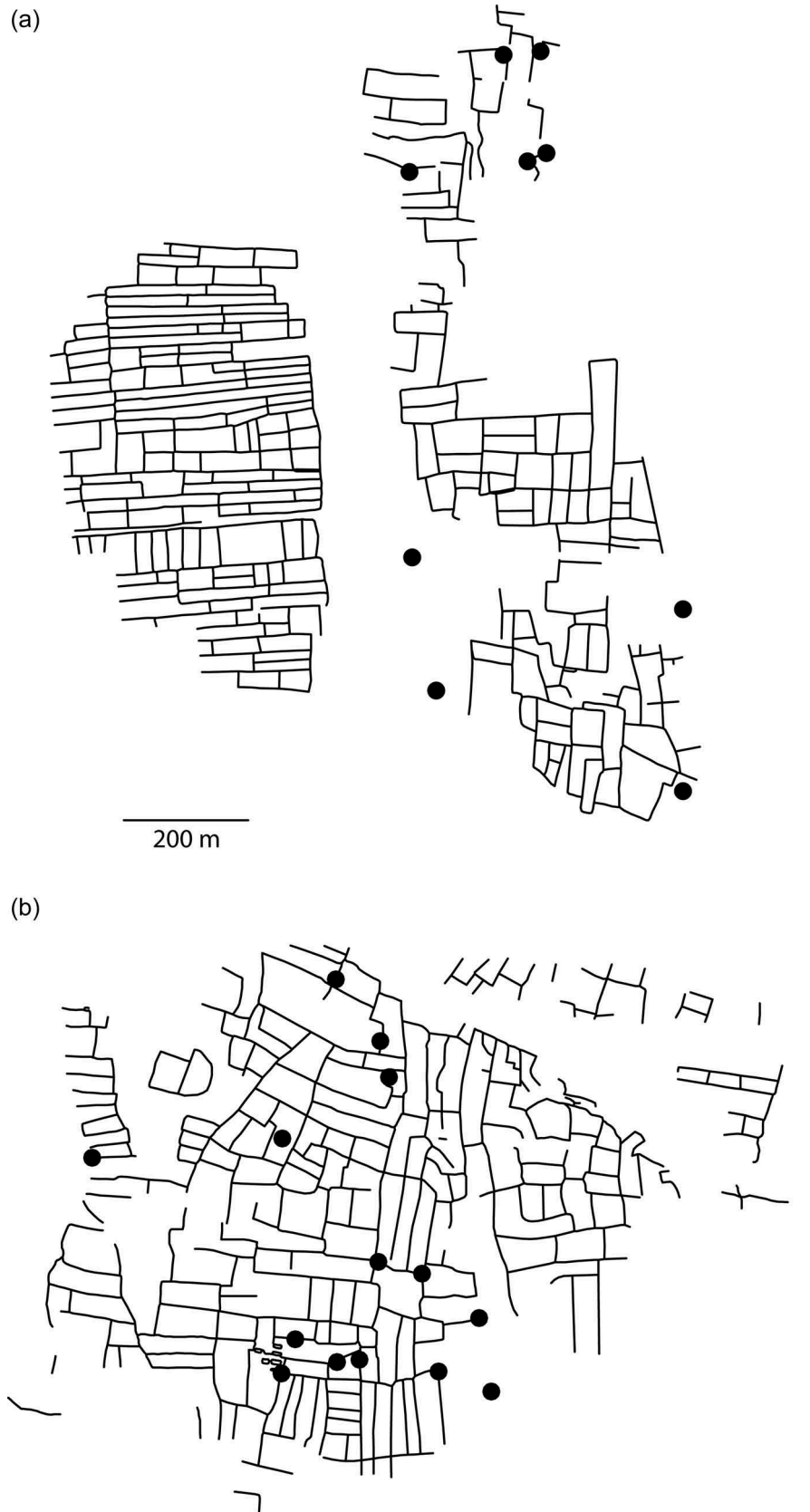
(a)

200 m

(b)

Figure 5.   Examples of plot definition on landscape level (Celtic field systems); black dots are round barrows. (a) Byrsted Hede (Hatt 1949). (b) Skørbæk Hede (Hatt 1949). In none of these examples does 'plot definition/parcelling' occur as a single topological principle. Rather, different parts or chronological horizons within the systems relied on different topological principles, such as the arrangement according to one dominating line, juxtaposition of individual plots in piecemeal fashion, or filling-in of superior compounds and empty areas.

The topological principles upon which these field systems were based were extremely wide ranging and complex.[2] However, some comparable principles can be identified. These included so-called aggregate or add-on principles where individual plots adjoined and accumulated in a piecemeal fashion. Others divided up already naturally delimited areas into parcelled areas (Vinter 2011, fig. 7, p. 142). Others were based on one or several dominating axes that were laid out in the initial phases of the field systems and along which the individual plots accumulated (Hansen 1980, fig. 4, p. 142, Hatt 1949, pl. IX). Others again were applied as large compounds, subject to later adjoining and disintegration into smaller units. It has been suggested that these different principles reflect a successive development of organisational principles from the unorganised organic systems with ad hoc adjoining to the regular organised systems, for example, represented in Sørensen's categorisation of A–B–C types of field systems (1982, fig. 2–4). However, this is unsubstantiated by the available dates, and rather it appears that parcelled field systems developed from multiple topological principles (also see Nielsen 2000, p. 376).

As a spatial technology, the parcelled field systems represented a physical delimitation of the cultivated soils, which in some cases obtained an obvious time depth. The parcelling also worked as a distribution of the landscape among people, who thus became increasingly associated with the local area: if you had an enclosed field plot, you were likely to be living and buried close to it. The individual field boundaries often took a starting point in older barrows or encircled them within individual plots. The field systems are assumed to have been associated with a fallow-system, which implied a continuous and cyclic return to the same plots and as such entailed a place-specific spatial continuity, demanding new, more explicit regulations and ways of dealing with rights to land. Furthermore, this physical landscape parcelling naturally entailed that extensive areas were confiscated and the landscape became increasingly 'filled-in'.

As a social technology, the plot definition on landscape level allowed a new coordination of people beyond the household level and the creation of a common sense of purpose as well as common spatial strategies. Furthermore, the distribution of land in relatively uniform pieces could have been a way of making an equal distribution and downplaying social differences.

These enclosed field systems were particularly concentrated in northern and western Jutland (Hatt 1949, Sørensen 1975), but also present in large numbers in southern and eastern Jutland, Bornholm, and the islands (Sørensen 1982, Nielsen 2000, 2010), which is likely to be related to the different geographical preservation conditions.

TECHNOLOGY No. 2: plot definition on settlement level

The second principle of landscape regulation appeared from the transition to Pre-Roman Iron Age and onwards with a strong concentration on the heavier, loamy soils in northern Jutland. In the archaeological record, it is expressed through settlement parcelling and houses situated in systematically arranged or conspicuous spatial alignments (Figure 6). This was pronounced on settlement mounds but also on sites without any demonstrable culture layer, often combined with parcel-shaped fences (see No. 3). Similar to the landscape parcelling (No. 1), settlement parcelling and plot definition demonstrated a significant topological complexity. It involved aggregate principles where individual enclosures were applied in an add-on, piecemeal fashion (Frederiksdalvej (ERIA), Vendehøj). Others appeared as a parcelling of already delimited areas (Nr. Tranders). Others again were arranged in a linear fashion or along a road (Øster Helligsøgaard, AUD 1999, no. 329).

As a technology, the settlement parcelling worked along similar lines as the landscape parcelling (No. 1). They divided up already bounded 'islands' or relatively fixed and demarcated areas, which explains the symmetrical shapes and the continuous maintenance of the same parcel-shaped plots. In some cases, this involved a gradual establishment of defined plots that, over time, accumulated and came to define an increasingly distinct parcelling. In northern Jutland, in particular, settlement parcelling did not articulate as constructed boundaries but appeared as spatial separations, which, however, did not exclude the possibility of being marked in other ways with, for example, hedges or stone rows (Runge 2009, fig. 95, 86 and fig. 119, 96). Accordingly, there were also dynamic differences between the often unmarked, however, apparently very stable parcelling of the village mounds and the more dynamic, physically marked, settlement parcelling of eastern/mid Jutland.

Whatever the manifestation, the parcelling constituted a chronologically stable subdivision of particular areas within which the settlement obviously aligned according to relatively fixed plots. Their regular appearance, as well as the combination with conservatism in the alignments and individual plots, suggests that settlement on these sites was aggregated and kept within specific areas rather than spread across the landscape. Initially, this grid afforded a spatial freezing and less freedom to manoeuvre, displace, or expand (cf. No. 5–7). At the same time, it outlined a spatial separation of each social unit or plot, which concurrently were included in a subdivision dependent on larger groups of people. Therefore these examples of parcelling appeared to build on the same principles as the landscape parcelling that similarly covered and subdivided entire demarcated areas. Furthermore, there is a classificatory slipping slope between settlement parcelling
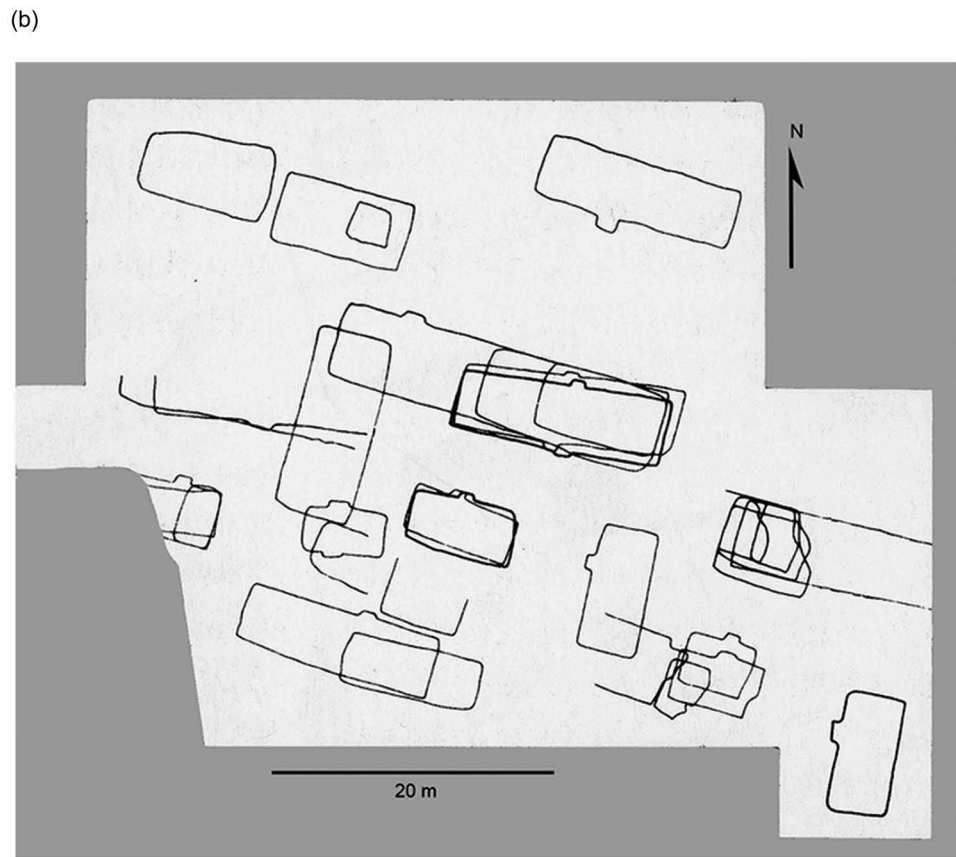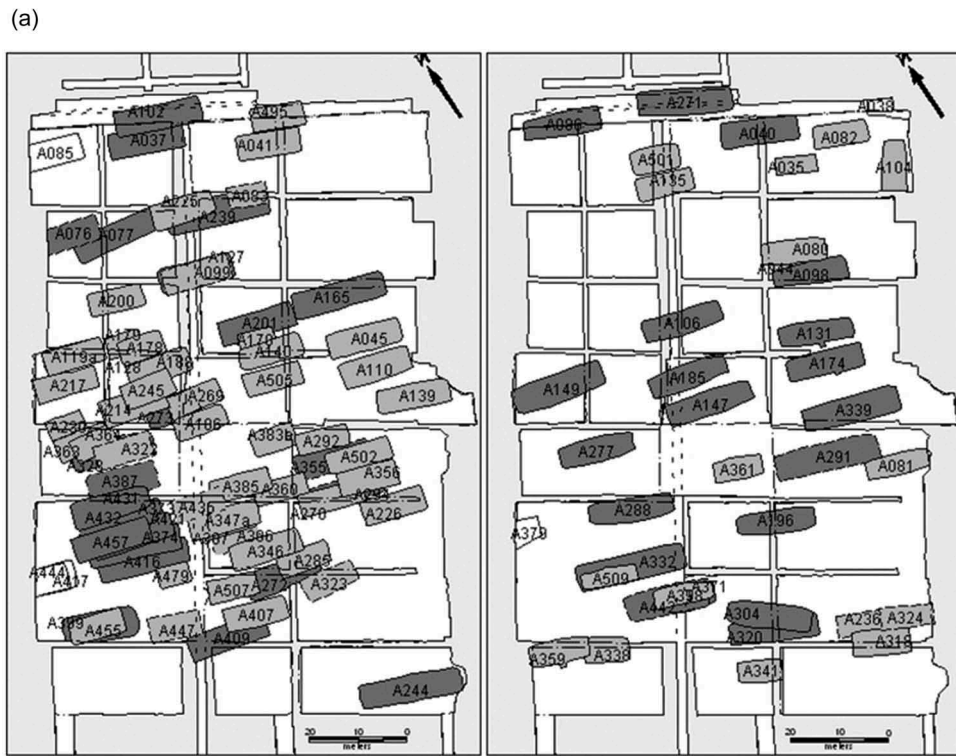
(a)

(b)

Figure 6.   Examples of plot definition on settlement level (village mounds). (a) Nørre Tranders (Haue 2012, fig. 116, p. 144). (b) Hurup (Jensen 1976, fig. 4, p. 68).

and houses situated directly within field systems, as known for example from Grøntoft, Skørbæk and Øster Lem Hede (Hatt 1949, 1957).

TECHNOLOGY No. 3: plot definition on farmstead level

Comparable features were expressed as parcel-shaped fences that surrounded the longhouses and their associated out-buildings. Such features can be identified from the transition to Late Pre-Roman Iron Age, but were primarily a post-1 AD phenomenon. In northern Jutland, such farmstead parcelling most often appeared in isolation with a fortified appearance, for example Baunehøj III (Terkildsen and Clemmensen 2005), Alstrup Krat (Bech 2003), and Øksenhede (Andersen 2005).[3] On Mid- and East Jutish settlement sites, it was more common to have multiple parcel-shaped enclosures, which adjoined in an aggregate manner (Figure 7). In this way, the plot definitions appeared as a kind of template-like formalisation of enclosed space with stackable affordances, which seemed morphologically related to the banks surrounding the fields.

The plots showed a significant size-wise differentiation from smaller enclosures at, for example, Vendehøj (~200 m^2) to larger enclosures at, for example, Rosenholmvej (~1700–2200 m^2), Øksenhede (~1800–2300 m^2), and the recently discovered enclosed village at Skejby (~10,000 m^2) (Skousen 2010). Concurrently, there were trends towards a standardised size, averaging 550 m^2 (Hvass 1985, Jöns 1993, Terkildsen and Clemmensen 2005, Haue 2012, p. 265).

In this way, parcelling and plot definition occurred on multiple levels, here described at

- Landscape level, as Celtic field systems (No. 1)
- Settlement/'house owners' association' level, as aligned settlements (No. 2)
- Farmstead level, as individually fenced farmsteads (No. 3)

The expansion in spatial parcelling and plot definition bears witness to an explicit regulation of particular areas, which in some cases must have reached a maximum capacity in population density and resource exploitation. For example, the regular orientation and dense character of the settlement at Grøntoft together with environmental evidence and new estimations of the extent of the field systems indicate a densely settled area with an extensive parcelling (Rindel 1999). Similarly, case studies which include various mapping methods such as has been carried out at St. Binderup and Gundersted show that the parcelled field systems almost entirely filled in the available land (Vinter 2011).

The morphological regularity and conservatism in the field plots indicate a well-defined and relatively fixed landscape zoning between fields and pastures. These parcelled up areas built on a principle of self-organisation through mutual

regulation: fitting each plot into a defined areal parcelling entailed an integration of independent social units, such as farmsteads and family groups, into an interdependent spatial network of physically interconnected plots. And unlike the closely set fences (No. 7), the parcel-shaped fences created standardised spaces outside the longhouse, where one at one and the same time could be outside the house and still within a private sphere.

TECHNOLOGY No. 4: demarcation on landscape level

A very different form of landscape regulation appeared in Late Bronze Age per. VI and Early Pre-Roman Iron Age in western Jutland, in particular. Such features were predominantly represented by pit zone alignments, which at present have been dated to no later than the middle of the Pre-Roman Iron Age. There are, however, still only few absolute dated sites, and thus a general ascription to the Early Pre-Roman Iron Age cannot be taken for granted. For example, the pit zone alignment at Rammedige was situated along an undated 'folke-vold', suggesting that there could be a temporal overlap between these different material constructions (Olesen 2003, Eriksen and Mauritsen 2011, p. 163). Furthermore, comparable technologies are the field systems organised according to one dominating axis, which equally related to particular communication lines (Løvschal in press), just as fence-like structures and ditches have been discovered along pit zone alignments (cf. Olesen 2009, fig. 2, 76).

Pit zone alignments were built as closely set open holes, sometimes accompanied by pointed sticks. Labour divisions as well as their often several kilometre-long courses indicate that they were probably not built by or for individuals but coordinated by larger groups of people (Rasmussen 2007).[4] Since none of them have yet been excavated in their entirety, very little is known of the exact nature of this feature type. Also, they were rarely associated with concurrent archaeological traces (cf. Olesen 2009) and equally cannot be coupled to specific farmsteads or settlement sites.

Since they were probably almost invisible in the landscape, they primarily appear to have reflected a need of a common defensive and regulatory technology rather than an explicit social symbol of a particular group of people. Such features have been proposed to be strongly connected with the communication lines, which were indicated by the linear arrangements of barrows as well as extensive traces of hollow roads, trackways, and historical roads and fords (Steen 2006, Olesen 2009, Løvschal in press). Also, the pit zone alignments were mainly situated in the transition zones between the moraines and the marshland and flat heath plains (Løvschal in press). They lack the same explicit landscape distribution as Celtic fields; instead, their linear course entailed that they demarcated and separated areas but did not define the precise extent of a certain 'piece of land'. Thus, culture-topographically, they were situated in ways that made them likely as obstructions of access to the less intensively cultivated and

(a)

(b)

Figure 7. Examples of plot definition on farmstead level (combined with plot definition/parcelling on settlement level). (a): Vendehøj near Hornslet, Late Pre-Roman Iron Age (Ejstrud and Jensen 2000, fig. 30, p. 44). (b): Frederiksdalvej near Randers, ERIA (Christiansen 1996, fig. 1, p. 104).

settled areas. Here they appeared as short-term regulations on a territorial level in a kind of 'no-man's-land'. Such regulations would have made sense in landscapes where access to particular areas was important and with movement by people (and livestock) who were not necessarily familiar with the landscape. If these landscapes were relatively marginal, then there is also reason to believe that there existed another, more 'loose' understanding of who owned this land or particular parts of it.

Accordingly, linear pit zone alignments were situated at central positions on some of the main communication lines and at the same time in transition areas between different kinds of landscape where claims to land were less settled and where the definition of community ties were still relatively fluid. Such landscape technologies probably reflected informal, intergroup, and landscape regulations in highly competitive environments.

TECHNOLOGY No. 5: demarcation on settlement area level

Another related form of landscape regulation appeared in Late Bronze Age–Early Pre-Roman Iron Age and concentrated in Late Pre-Roman Iron Age. It was expressed as curvilinear pit zones that were explicitly, spatially associated with settlement sites, as well as other morphologically composed settlement demarcations that enclosed larger inhabited compounds (Figure 8).

The demarcated area far exceeded the inhabited area and thus appeared to demarcate not only the extent of a settled area (as No. 6–7) but also a substantial area beyond it. The early constructions of these boundaries with, for example, pit zones were primarily concentrated in western Jutland. They suggest that such linear boundaries were very flexible and easily subject to adjustments. Later demarcations had a more equal geographical distribution and are known from, that is, Sarup (Andersen 1984, fig. 1, p. 83), Kirstinebjerg (Henriksen 2005), Margrethehåb, Rindumgård Nord (Egeberg and Posselt forthcoming), and Ubby (Bican 2004), where they appeared with a much more elaborate and stable expression, consisting of up to several courses of deep ditches and/or palisades (also see Fonnesbech-Sandberg 1990, Madsen 1999, Andresen 2007, Martens 2007).

In this way, principles of demarcation occurred on
- landscape level, as pit zone alignments and access regulations (No. 4)

and
- settlement level, as pit zone demarcations, ditches and areal boundaries (No. 5)

TECHNOLOGY No. 6: enclosure on settlement level

Another regulation principle involved settlement enclosure concentrated from the transition to Late Pre-Roman Iron Age

and onwards. It was expressed as common-fenced settlement enclosures situated closely around the inhabited space and were often only restructured in their entirety (Figure 9).

What differed from the curvilinear farmstead enclosures (No. 7) and the landscape enclosures (No. 5) is that the construction of these enclosures was deeply dependent on collective labour investment and signalled social collaboration and affiliation. For example, very elaborate constructions such as palisades (Hodde, Lysgård) and moats with pointed sticks (Lyngsmose), combined with very broad or numerous entrances indicate a social symbolism and collective association rather than primarily a practical purpose (cf. Becker 1976, Martens 1990, 2007, p. 96, Rindel 1993, p. 23).

Common-fenced settlements remained a predominantly western Jutish phenomenon throughout the entire period. Offshoots, however, are known from, for example, Borremose near Aars in northern Jutland (Martens 1990).

These sites were primarily concentrated on the boundaries between typical agrarian and grazing land, such as the edges of moraines facing the flat surrounding heath or in the vicinity of grassable wetlands (Møller 2013, Løvschal in press). They were situated in areas with short access to apt pastures (Hvass 1985, 184) and, consequently, appear to reflect a landscape technology connected to a form of community-based cattle management.

The enclosed settlements were associated with a significant morphological complexity and varying expressions of household autonomy ranging from no internal divisions (Grøntoft, Lyngsmose), to a combination of regular farmstead enclosures and more scattered barriers of specific buildings and areas (Hodde), to a consequent enclosure of each farmstead (Lysgård). As a result there was a sliding transition from common-fenced enclosures to curvilinear-farmstead enclosures (No. 7) as well as a pronounced inter-site, size-wise differentiation.

TECHNOLOGY No. 7: enclosure on farmstead level

Another form of curvilinear enclosure was more specifically coupled to the level of the individual household. Such enclosures were initially based on the same morphological principles as the closely set fences surrounding villages (No. 6). In the archaeological record, such regulations occurred from Late Bronze Age and throughout the Pre-Roman Iron Age as irregular farmstead fences running closely around the walls of the longhouses.

There were two main morphological variants of this kind of enclosure: one where the fences enclosed the longhouse and (potential) outbuildings separately and another where both longhouse and outbuildings were kept within the same enclosure. Examples of such features are known from, for example, Agerhøj (SKJ 839), Hodde (Hvass 1985), Munksgårdkvarteret (Pedersen 2007), Nybro (Nielsen and Mikkelsen 1985), Rosenholmvej (Møller-Jensen 2006), Selager (Knudsen and Rindel 1989, Møller 2011), and
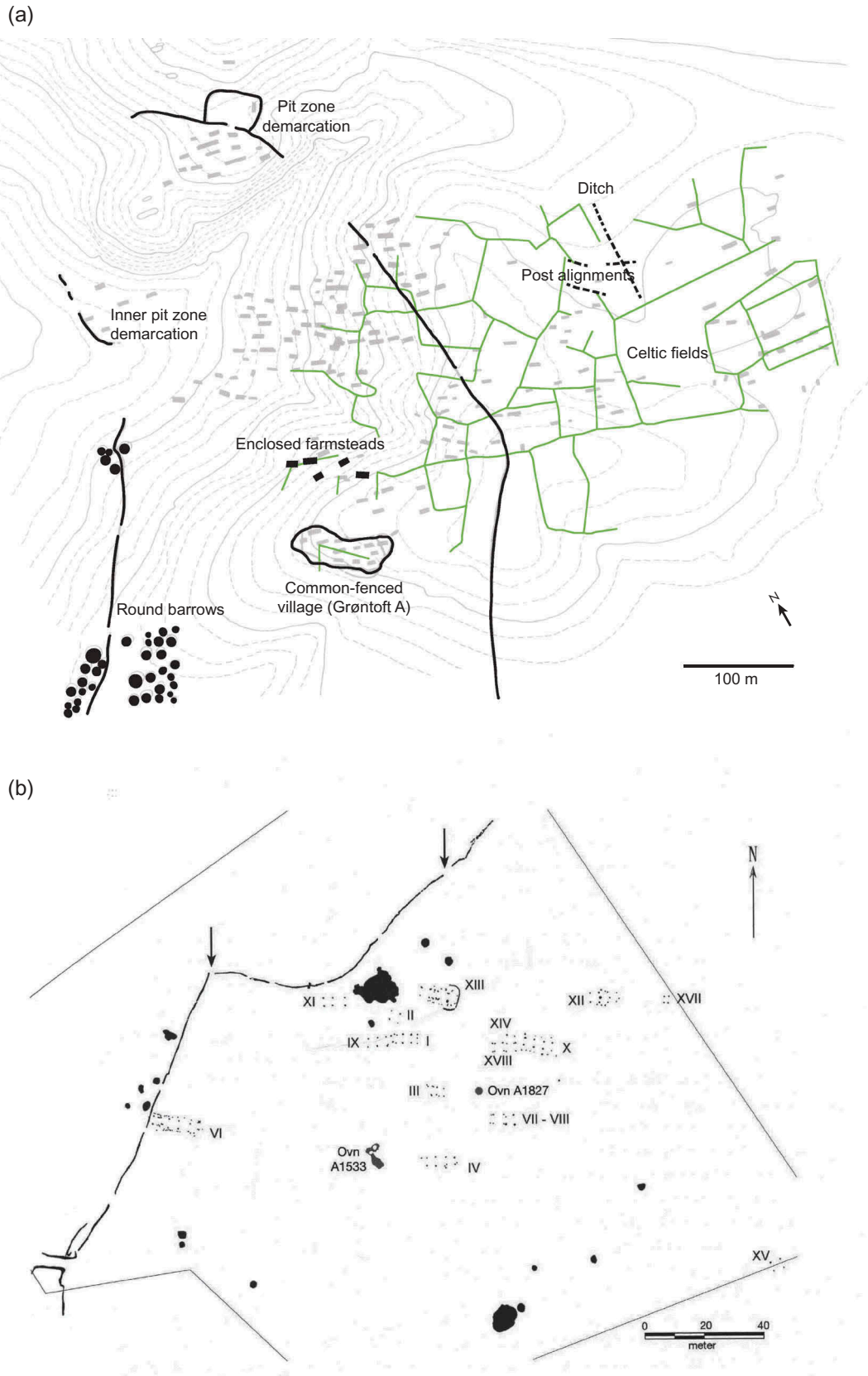
(a)

(b)

Figure 8. Examples of demarcations on settlement level. 8 (a) The pit zone boundary at Grøntoft, demarcating an area of min 130,650 m^2 (Løvschal 2014a, fig. 1, p. 726, author's elaboration of an excavation plan kindly provided by P. O. Rindel, University of Copenhagen). 8(b) The ditched boundary at Lysehøj, demarcating an area of ~74,200 m2 (after Meistrup-Larsen and Moltsen 2011, fig. 13, p. 109).
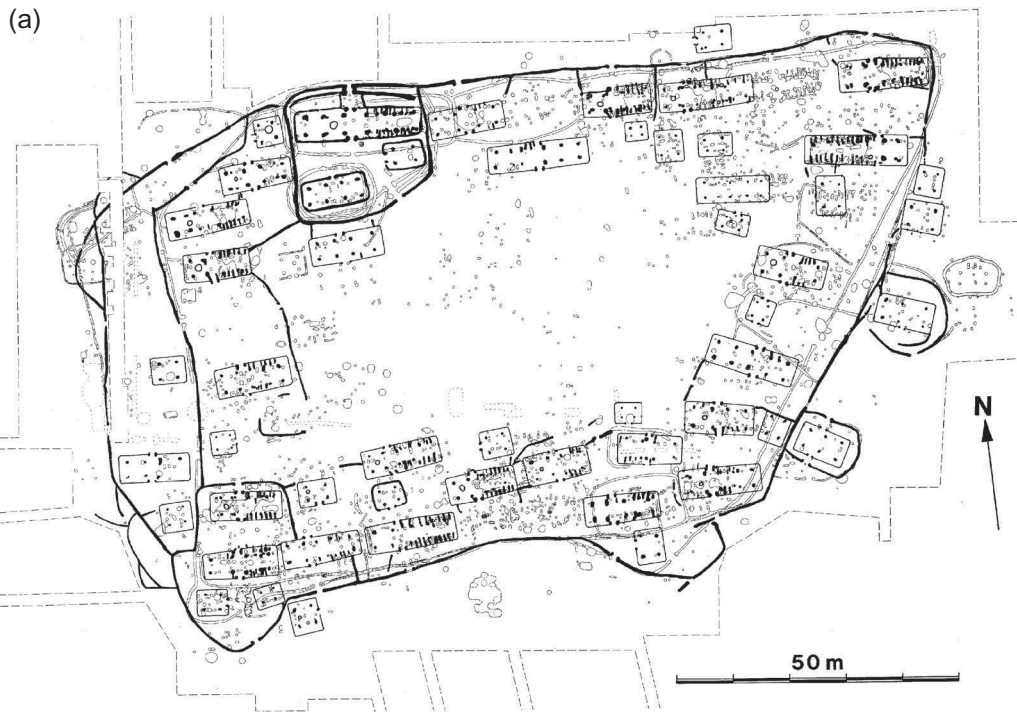
Figure 9. Examples of enclosure on settlement level (common-fenced settlements with inner divisions). (a) Hodde between Varde and Grindsted, Late Pre-Roman Iron Age (Hvass 1985, pl. 92, p. 309). (b) Lysgård near Herning, Late Pre-Roman Iron Age (plan kindly provided by Museum Midtjylland, light grey colour indicate modern disturbance).

Spjald Syd (Jørgensen 2011). This was also the most widespread kind of fence-enclosure outside western Jutland. A third way of fencing the farmstead was by using fences as demarcations which did not fully enclose the farmsteads but adjoined the corners of longhouses or outbuildings, making parts of the farmsteads directly exposed to the surrounding landscape, which was particularly common in southern Jutland (cf. Knudsen and Rindel 1989, Eriksen and Rindel 2003, fig. 3, p. 126, Møller 2011, 2013, fig. 5.40, p. 123, Løvschal 2014b, fig. 7).

As a social technology, these fences were oriented 'outwards' (opposite No. 3): they did not mark out a significant area within the fences and thus primarily appeared as a demarcation against livestock, people, or other farmsteads. Since the fences were not allocations but situated close to the walls in a curvilinear fashion, they were primarily coupled to the houses rather than a specific matrix for form or size such as the farmstead parcelling (No. 3). These fences held a double-edged quality, in that they facilitated both proximity and distinction. Most of them were situated within settlement concentrations where they made it possible for people to live closer together while still maintaining their status as individual farmsteads.

Enclosed farmsteads often emerged in areas which showed no or few traces of preceding Bronze Age settlements, for example, along the western edge of Skovbjerg Moraine. Furthermore, their organic layout indicates that they emerged in areas which had not been explicitly divided into equally sized pieces according to a fixed boundary of the area allocated for settlement (cf. No. 2). Rather, they accumulated in a piece-by-piece manner, taking up as little space as possible (Figure 10). Being situated closely around the farmsteads, these fences expressed no explicit wish to expand the size of the individual farmstead plot, and they were rarely repaired or re-erected on the same spot. This

suggests that although these areas showed evidence of dense settlements, they were also characterised by a highly dynamic landscape appropriation and settlement pattern. Primarily, the shape of the enclosures would have made sense if livestock were put out to pasture in the surroundings of the houses with no pressure from a boundary that forced a formalised subdivision.

Comparable examples of farmstead enclosure are rediscovered at Humlehaven (150603-34), Agerhøj (SKJ 839), and Højlund I (160105-273).

In this way, principles of enclosure (curvilinear) occurred on:

- settlement level, as common-fenced villages (No. 6) and
- farmstead level, as individually fenced farmsteads, sometimes adjoined in an aggregate manner (No. 7)

Sites representing these technologies were probably situated in areas that would have been characterised by a large degree of flexibility and openness in the organisation of land which it was possible to draw advantage of by introducing another kind of order such as the new physical boundaries. They were characterised by a more labile and informal regulation than the parcelling (No. 1–3). Regarding their size, there appeared to be a sliding transition between multiple spatial levels varying from the individual long-house to larger, nucleated villages.

A new technology: variation and constriction

The above section has outlined a number of scenarios, involving the application of artificial lines in southern Scandinavia during the Late Bronze Age and Pre-Roman Iron Age. In contrast to previous landscape approaches
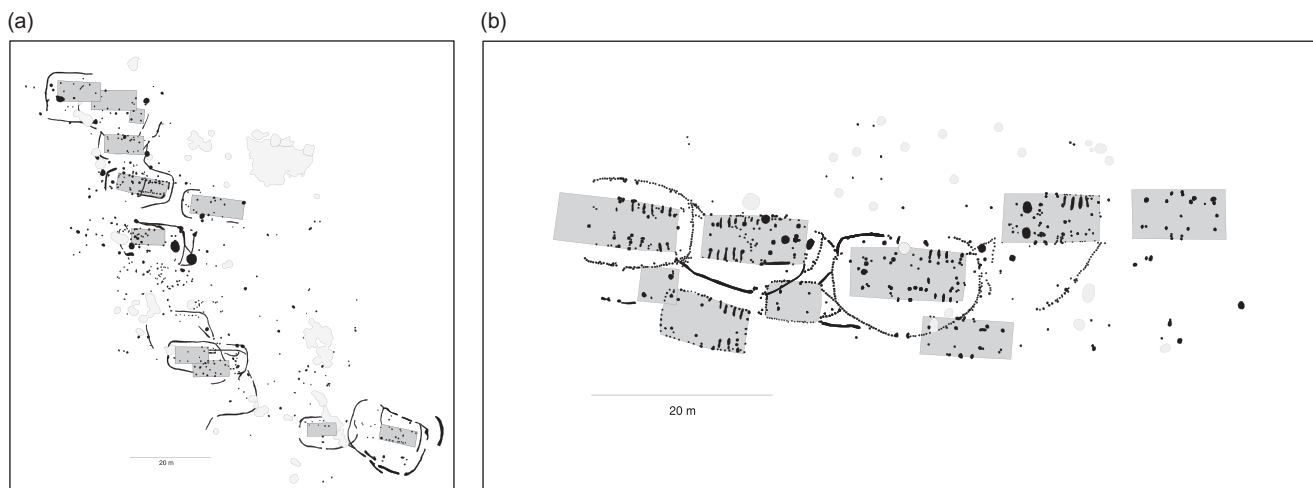

Figure 10. Examples of enclosure on farmstead level (tightly fenced farmsteads which are hypothetically situated in open pastures). (a) Torslund Bakke, Early Pre-Roman Iron Age (after Isler 2012; light grey colour indicates larger pits). (b) Spjald Syd near Videbæk, Late Pre-Roman Iron Age (after Jørgensen 2011).

(cf. Introduction - Research history), the section exposes a technological creativity that questions the way in which typical feature types such as settlement fences and pit zone alignments are defined and delimited and suggest the existence of much more dynamic, transferable principles. Furthermore, it exposes the existence of a number of conflicting approaches to and ambiguities in landscape and settlement organisation in Pre-Roman Iron Age societies, which are rarely studied in the material. The operation of fences, ditches, and earthen banks are characterised by a significant social ambiguity, organisational autonomy, and economic flexibility. It hints at other underlying dynamics than the consolidated village chieftain, egalitarian communities, or agricultural intensification and identifies a focus for considerable social attention, which must have required significant efforts to establish, align, and maintain.

The repertoire involved a palette of new different material technologies, including fences, ditches, palisades, stone banks, earthen banks, moats and pit zones. They were also applied in different ways, including parcelling/plot-definition, demarcation, and enclosure and on several spatial and demographic level, including farmstead/household, settlement, and landscape (Figure 11). These lines would, with time, have created a landscape where both visual appearance and general mobility changed significantly.

In this sense, this repertoire afforded a *technological opening* generating a very flexible system with multiple material applications that opened up for significant margins for variations in the material. This variation was manifested in pronounced differences in size, shape, building material, duration, demographic association, as well as scale. For example, parcelling was not only associated with a segmentation of the landscape but also involved in the internal regulations of settlement sites as well as demarcating the extent of the individual farmsteads. As a

result, different principles of spatial regulation diffused into multiple scales and created an association between different parts of the repertoire, such as the landscape parcelling that farmsteads sometimes moved within and the parcel-shaped fences that were built explicitly according to farmsteads. Furthermore, there appeared to be a clear correlation in the operations from small scale to large scale. Some of this combinatory openness was probably intimately associated with the emerging character of the repertoire.

However, the data show certain preferences in the selection and combinations of components, which are outlined as the seven landscape technologies: No. 1–7. These are, as already emphasised, considered stereotyped combinations within the repertoire that were not clearly delimited as topological principles. One technology, for example, landscape parcelling/plot definition (No. 1), could involve numerous different topological principles, such as alignment, enclosure, compound, and parcelling, just as the farmstead parcelling (No. 3) could involve principles of proximity similar to the farmstead enclosures No. 7. Besides from the listed principles, there were numerous other ways of using linear demarcations such as fences connecting different parts of the settlement sites, for example as seen at Kjærsing (Christiansen 1985), Mellanbyn (SE) (Friman 2008), and Selager (Møller 2011) or settlements which were aligned on an existing road or an apparently unmarked line. Still, there appeared to be certain constrictions as well as chronological and culture-historical causalities implied in this repertoire (Figure 11).

Second, there appears to be causality in the chronological development of the operations and combinations. The boundaries were introduced and intensified at different points in time; however, they were all present in the data from *c.* 400/200 BC. Accordingly, the application
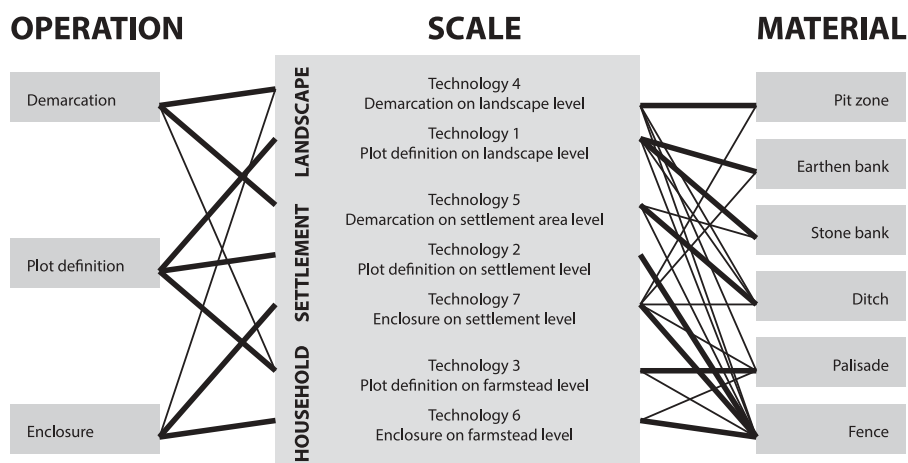

Figure 11. Schematic exemplification of all known combinations in the repertoire (thin lines) and the regional preferences in the combinations (thick lines), outlined as TECHNOLOGY No. 1–7.

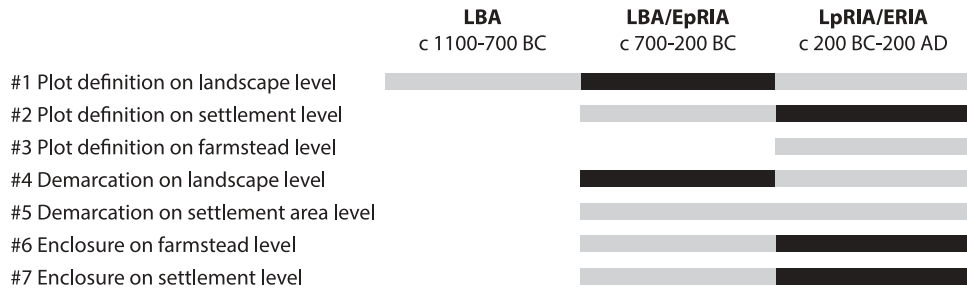|	LBA c 1100-700 BC	LBA/EpRIA c 700-200 BC	LpRIA/ERIA c 200 BC-200 AD
#1 Plot definition on landscape level			
#2 Plot definition on settlement level			
#3 Plot definition on farmstead level			
#4 Demarcation on landscape level			
#5 Demarcation on settlement area level			
#6 Enclosure on farmstead level			
#7 Enclosure on settlement level			

Figure 12. Generalised overview of the time at which the outlined landscape technologies occur in the archaeological material. Lines indicate chronological centres of mass, dotted lines indicate early stages with few occurrences, often connected with dating or interpretative uncertainties.

principles and their materialisations developed in a highly generalised chronological sequence (Figure 12).

Third, there were some clear preferences in the interpretation and selection of landscape technologies according to particular ecological circumstances and culture-historical trajectories and which consequently appeared in regional 'centres of mass'. In the centuries predating the Late Bronze Age (*c.* 1100 BC), the societies of southern Scandinavia were generally characterised by a dispersed habitation pattern, sometimes occurring as very large longhouses (Boas 1993, Bertelsen *et al.* 1996, Earle *et al.* 1998). Such longhouses were probably an important focus for the institutional regulation of extended households (also see Boric 2007, 2008). Activities connected to the building of barrows would equally have constituted important mechanisms of social coordination in an otherwise dispersed settlement pattern as well as regulation of the access and rights to the landscape (Holst and Rasmussen 2012). The stripping of the soil for turf naturally created certain visible patterns in the landscape, for example, 'heath corridors', as well as vegetation differences in the surrounding landscape dependent on labour divisions (Doorenbosch 2013). Furthermore, a boom in barrow building has been demonstrated *c.* 1450 BC with approximately half of the 86.000 preserved and recorded barrows in Denmark having been built or extended within less than two centuries; this would have accentuated these trends and had radical impact on the landscapes (Thrane 1984, pp. 152–153, Holst *et al.* 2013, pp. 270–271).

The arrangement of barrows in linear distributions was particularly strong in western and southwestern Jutland.[5] As far as these barrows were situated along roads (Müller 1904), the majority of these communication lines probably continued in the last millennium BC. Although linear arrangements of barrows are clearly discernible in other parts of southern Scandinavia, they tended to be shorter and less consistent in, for example, northern and eastern Jutland and on the Islands. In these areas, linear arrangements were superseded by more dispersed patterns, local clusters, scattered distributions, as well as trends towards

more centralised landscape organisational patterns (Jensen 1983, Thrane 1984).

The understanding of these variations remains limited and the covering of their complexity is far from fully exploited. Some were inevitably the result of source-critical circumstances and historical uses of the landscape. However, they probably also reflected regional ways of appropriating these landscapes, which formed very different backgrounds for the described infrastructural and organisational long-term trajectories.

Thus, on the one hand, the landscape technologies appeared as (partly) concurrent but sometimes conflicting solutions (spatial and chronological mutual exclusion as well as regional preferences), which conflict with a picture of a succession of principles in a unilinear development. On the other hand, there were clear chronological causalities in their emergence, for example, the articulation of landscape parcelling predated the emergence of other technologies, which conflict with a purely ahistorical explanation. In the following section, we wish to discuss these aspects of the concept of a repertoire in relation to previous approaches introduced in the beginning of the article.

Discussion
Elements of development
As the boundaries were operated with different layout principles, they also provided the basis for a complex associative repertoire of different spatial solutions to associated problems that appeared on the settlement sites as well as in the surrounding arable land, such as maintaining access to valuable soil and marking insiders from outsiders (also see Thomas 1997). At the same time, there are some clear elements of development between the different technologies. For example, the principles of articulated landscape parcelling appeared, at least chronologically, to form an underlying basis for the articulated farmstead and settlement parcelling. Several centuries probably passed where the materialisation of linear boundaries was restricted to a landscape level. Landscape parcelling did not only constitute explicit separations of two or more field plots

but also induced an increased juxtaposing of the landscape: it created a kind of equivalence and a physical framing of certain areas wherein certain social rules applied and people necessarily had to agree on what they meant. Furthermore, it built on principles of allocation by means of axes, add-ons, parcelling, or compounds, which allowed a large degree of flexibility and variation. The often symmetrical morphology would have made it easy to copy and created new possibilities of equalisation, local standardisation, and formalised comparison.

Different elements that formed part of the repertoire held some clear, intrinsic communicative potential: the boundaries were easy to apply and potentially they had a very broad social and regulatory applicability. When people started recognising and negotiating these generative potentials, they could be applied and developed within other contexts as well, which probably was part of what opened up for the immense variation that unfolded and escalated at the transition from Early to Late Pre-Roman Iron Age.

Compatible and incompatible technologies

The landscape technologies entailed a break in the organisational logic that was incompatible with previous ways of organisation: they defined enclosed margins within which certain rules applied and were difficult to combine with non-boundaries because they created an expectation of reciprocity; if a neighbour's field was marked by banks or walls, others were likely to follow his example and do the same.

Many of these new explicit principles of landscape regulation appeared compatible with one another, and on many sites, multiple forms of regulation existed side by side. Grøntoft contained a palimpsest of boundaries, including a common-fenced village, Celtic fields, pit zone demarcation, dispersed fences, and ditches, as well as possible farmstead enclosures, of which at least some of them must have been contemporaneous. At Øster Lem Hede, the Celtic field system, Late Bronze Age/Pre-Roman Iron Age, was situated next to an adjacent settlement site with enclosed farmsteads, Late Pre-Roman Iron Age (Møgelhøje), and a pit zone alignment, possibly Early Pre-Roman Iron Age (Sønder Brorstrup). The common-fenced site Borremose was equally situated within a landscape surrounded by parcelled up areas (Jensen 2003, p. 220).

Other applications appear to have had mutually excluding effects. The construction of common fences sometimes directly excluded previous farmstead enclosures. Taking Grøntoft as an example again, single-fenced farmsteads were probably erased shortly before the common fence was built (Rindel 2010). Another example is Lyngsmose (Late Pre-Roman Iron Age) where two separately enclosed farmsteads were possibly removed shortly before the construction of the common enclosure (Eriksen and Rindel 2003).[6] Thus, in some

locations, these particular landscape technologies would have represented incompatible institutional realities (for a counter example, see Hodde cf. Hvass 1985). This trend increased during the last centuries BC and significantly during the following centuries, which will be discussed briefly below.

### Landscape technologies in a long-term perspective

Towards the end of the Pre-Roman Iron Age, there appeared to be a gradual narrowing down of combinations and an increasing alignment between principles applied in landscape and intra-site settlement regulation. Similar to the landscape parcelling, the parcel-shaped farmstead enclosures were built with a consistent morphology in standardised sizes (p. 12). Farmstead enclosure became a more consequent principle on the settlement sites, and fences were increasingly maintained on the same spot (Løvschal 2014b). This indicates a growing conceptual alignment between the explicit regulations associated with plot definition and parcelling on a landscape and settlement level.

In a long-term perspective, applying these different principles of spatial regulation can be followed far into the Iron Ages and possibly later. On the Early Roman Iron Age settlement sites, the parcel-shaped layout developed into a highly formalised regulation principle (Holst 2010). Similar to the Pre-Roman Iron Age, parcel-shaped farmstead enclosures appeared within a limited area with an even more regular and standardised morphology. This phenomenon can be traced on numerous well-preserved sites in the Herning area, such as Stenbjergkvarteret (Olesen 2007), Holing, Norgesvej, Sverigesvej, and Ørskovvej (Olesen 2012), as well as the classical sites from western and southern Jutland, including Vorbasse (Hvass 1978, 1983), Nørre Snede (Hansen 1988, Holst 2010), Snorup (Mikkelsen and Nørbach 2003), and, in the extreme, in the newly excavated Rindum Ny Skole (RSM 10013, Posselt 2012) (Figure 13).

Later elements such as the 'langvolde' (Jørgensen 1988) can be considered an articulation of a comparable technology as the linear landscape demarcations (No. 4). Dates from such features appear from the first centuries AD and throughout the Iron Ages. They too related to communication lines and were probably, in several cases, constructed with a situation-specific purpose. However, their material configuration in much more lasting rampart constructions made them consequently obtain very different long-term effects.

Therefore, it is likely that principles of spatial regulation from much younger sites, that is, Roman and Germanic Iron Age, drew on principles that had already been introduced and tested during the Late Bronze Age and Pre-Roman Iron Age.

(a) Nørre Snede

100 m
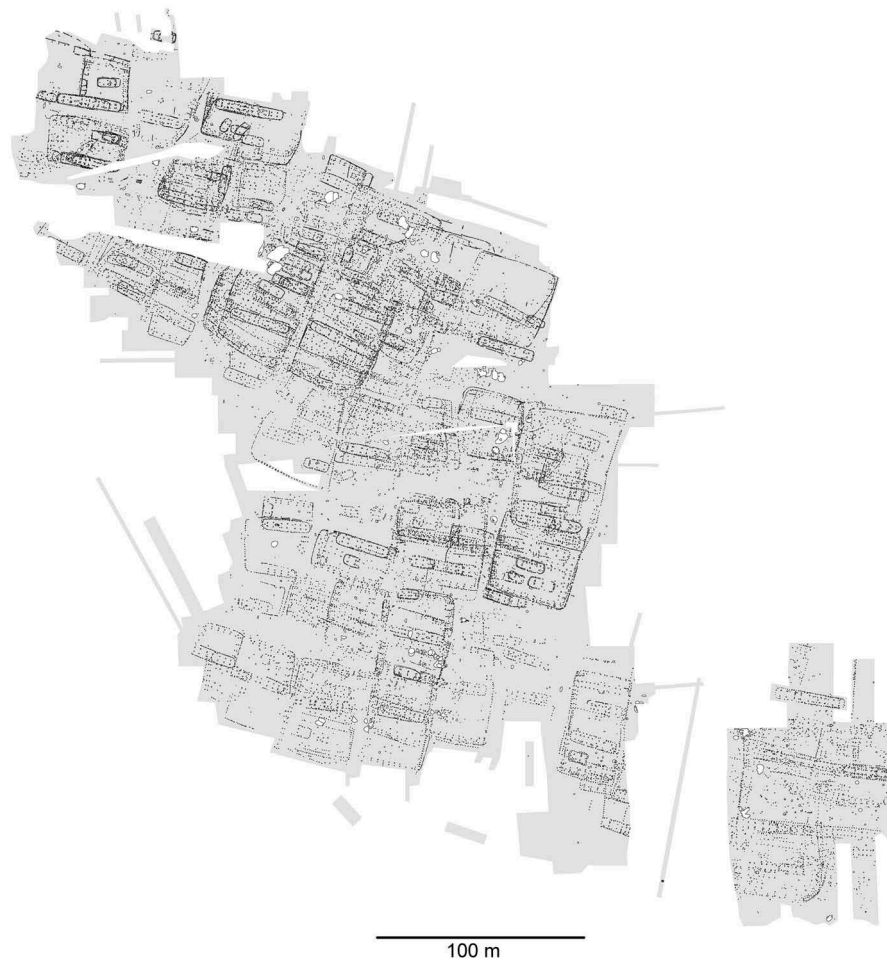
(b) Ørskovvej

Figure 13. (a) Nørre Snede, mid Jutland, Early Iron Age. (b) Ørskovvej, western Jutland, Late Pre-Roman Iron Age-Early Iron Age (plan kindly provided by Museum Midtjylland).

The relevance of the concept of a repertoire

Following the above arguments, the landscape technologies No. 1–7 worked as part of a 'repertoire' of spatial solutions, characterised by a multi-layered application as well as, sometimes, mutual geographical exclusion. Different elements in this repertoire could be applied in a wide range of situations, that is, as means of regulating access to particular areas, controlling and channelling movement of livestock and humans, making territorial claims to the landscape, reorganising and allocating landscape, providing solutions to drainage and land erosion, aggregating otherwise dispersed social units, coordinating labour, as well as defending farmsteads and communities against raids and animals. Thus, the repertoire was associated with a number of social, regulatory processes that evidently did not have a 1:1 association. However, over a significant time span, the repertoire was increasingly merged with institutionalised principles and ideas contributing to its standardisation and localisation.

This repertoire was not characterised by a package-like introduction or diffusion. Rather, it emerged during the Late Bronze Age–Pre-Roman Iron Age and was formed, formalised, and redefined over several centuries. It originated in specific landscapes, however, with a degree of alignment in the culture-historical trajectories and feedback dynamic with broader culture-historical developments of north-western Europe (Løvschal 2014b). Therefore, the concept of a 'repertoire' did not implicate a clear cultural coherency across time or space. People did not necessarily have equal access to it and it did not necessarily develop in an evolutionary fashion. Instead, the different sets of solutions to particular problems may have occurred at different places at different times during the Pre-Roman Iron Age. Parts of it were forgotten, became redefined, or were used in other ways.

The suggested process of transferring or aligning regulation principles from one domain with another, for example, from landscape regulation to farmstead regulation, naturally demanded that spatial structuring increasingly became a known concept and a repertoire of spatial solutions that, at given points in prehistory, could be applied detached from their local landscape. By doing so, it became possible to actively and purposely act through these structures to establish, modify, and transform new forms of organisation. In a long-term perspective, this meant that applying linear boundaries as a spatial response to different issues became increasingly more likely to be evoked than other solutions. And that regional preferences in the selection and application of the repertoire formed the basis of the geographic concentrations (Figure 3a–g), which too became increasingly pronounced in the succeeding centuries (cf. Ringtved 1988).

Conclusion

This article has provided a study of how, in the Late Bronze Age and pre-Roman Iron Age, an increasing part of the landscape was confiscated by means of linear boundaries. In this period, people began to organise according to new regulations on architecture, economy, burials, as well as an increased zoning of the landscape. These regulations sometimes manifested as linear, physical boundaries when certain relations were somehow challenged; a boundary was not constructed unless there was a particular need for it. These concretisations held a double-edged quality. On the one hand, they were based on extremely normative principles and principles of equality, equal distribution, and disintegration of hierarchical differences. On the other hand, they created a new material condition for social and spatial differentiation. We suggest a gradual development of principles of spatial regulation of which the earliest are probably associated with landscape parcelling, which form a repertoire of spatial solutions to different social and economical issues. This development was probably part of what opened up for the variation in the material that was pregnant during the pre-Roman Iron Age and of which certain elements became part of an increased formalisation, the long-term social and juridical effects of which can be traced far into the Late Iron Age societies.

Notes

1. A recent discovery has been made of yet another pit zone alignment at Rødby Havn, Lolland by Museum Lolland-Falster (personal communication Anders Rasmussen, August 2014), which is not on this map.
2. The genesis of the British rectilinear field systems has been subject to a similar discussion by several authors (cf. Fleming 1987, Johnston 2005, Roberts 2013, p. 538).
3. Also see Rosenholmvej near Herning (Møller-Jensen 2006) and Skallegård Syd near Viborg (VSM 08938).
4. Also see Hvilmose Nord (131208-90) and Hvilmose Syd (131211-125) near Viborg, which possibly constituted an interconnected pit zone alignment, running for several kilometers across a ridge.
5. It has recently been suggested that the distinct linear arrangements were associated with regulation of the landscape based on long-distance herding (Holst and Rasmussen 2013) where pastoral resources potentially were situated a large distance from the settlement sites. If we accept this suggestion, obviously it would have left parts of the landscape particularly vulnerable to intervention.
6. Also see Priorsløkke, AD 0 to AD 180 (Kaul 1985, 1989).

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