New Europe College Yearbook 2024-2025

Volume 2

BOJAN BAĆA
PANTELIS CHARALAMPAKIS
AUGUSTA DIMOU
DAVID DO PAÇO
LÁSZLÓ FERENCZI
VICTORIA FOMINA
ANA GRGIĆ
IRINA KOTKINA
JONATHAN LARCHER
PATRICK LAVIOLETTE
LOLA SAN MARTÍN ARBIDE
ANDREA TALABÉR

Editor: Andreea Eșanu

ISSN 1584-0298

New Europe College
Str. Plantelor 21
023971 Bucharest
Romania
www.nec.ro; e-mail: nec@nec.ro
Tel. (+4) 021.307.99.10

LÁSZLÓ FERENCZI

NEC UEFISCDI Award Fellow

Affiliation: Post-doctoral researcher at Charles University, Prague

Biographical note

PhD in Medieval Studies, Central European University, Budapest (2018), with the dissertation *Management of Monastic Landscapes. A Spatial Analysis of the Economy of Cistercian Monasteries in Medieval Hungary*. He was research associate at Eötvös Loránd University, Department of Archaeology (2005–2007).

He has published articles on the landscape archaeology of Cistercian estates, settlement changes in the Great Hungarian Plain, late medieval and early modern cattle trade, medieval water management. He has presented papers at conferences and workshops in Hungary, UK, Germany.

THE LANDSCAPE IMPACT OF CISTERCIAN MONASTERIES: PERSPECTIVES FROM HISTORICAL TOPOGRAPHICAL, LANDSCAPE ARCHAEOLOGICAL, ENVIRONMENTAL DATA, AND GIS ANALYSIS

László Ferenczi

Abstract

After an introductory review of the traditional historiographical narratives, and their deconstruction, the paper discusses the impact of the Cistercian economy on the landscape through the lens of topographic, landscape archaeological, and environmental data, focusing on the problem of manorial farms (granges) and drawing on examples from different regions (the medieval Kingdom of Hungary, Bohemia, Wales) that were – in some respects – marginal to the expansion of the Cistercian order. In addition to administrative and logistical considerations, environmental conditions (soil, relief) are highlighted as determining factors in the site selection strategies of abbeys and granges. Two conflicting narratives are outlined: one that sees the monks settling next to villages (as an adaptive strategy), and the other that emphasizes their preference for settling in areas where land reclamation is possible by using advanced techniques of farming (heavy plough) and water management. As a methodological intervention, the use of GIS techniques is presented, underlining also the necessity to systematically integrate environmental data in discussions on the problems of regionalization (diversity-unity) and marginality related to the expansion of the Cistercians in different parts of Europe.

Keywords: landscape impact, grange economy, soil, GIS, Cistercians, marginality

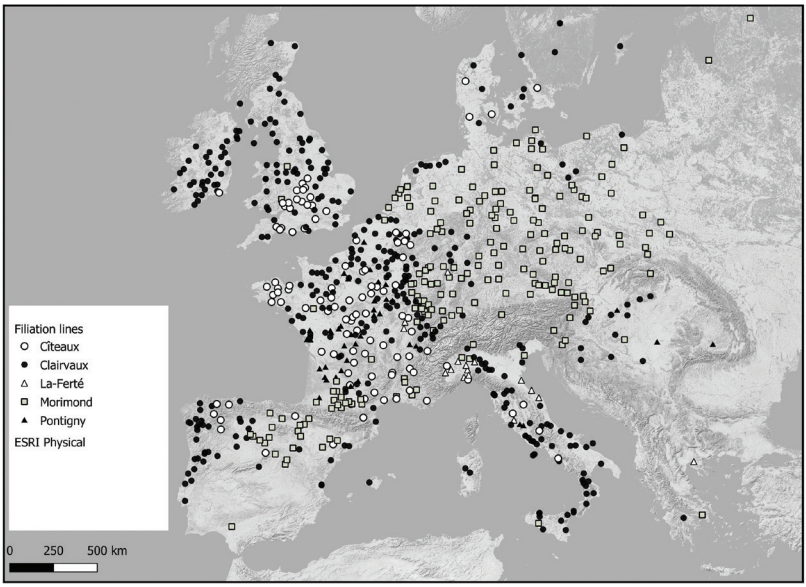
The problem of unity and diversity

Noting that political boundaries have changed frequently and considerably in our region, a recent overview[1] emphasized that "a history of monasticism in the core areas of east-central Europe cannot be properly considered

without adopting a broader historiographical approach". Another study pinned down the conflicting or divided loyalties of the religious orders that affected "their self-understanding and theoretical conception", emphasizing that they cultivated "a pan-European identity that allowed them to symbolically transcend all the geographical, political, and cultural bonds in medieval Europe. On the other side, however, they were centrally within the contemporary mainstream of secular and external developments and as such were not only prone to individualistic tendencies, but actively supportive to the building of regional identities and cultural traditions. A broad range of historical evidence, both written and archaeological, reveals that in the regions, the orders often developed a 'diversitas' that seemed to fragment rather than unify the universal form of their life."[2]

In the case of the Cistercians (and here more specifically their economic activities and impact on the landscape), such considerations are particularly relevant. Among the various medieval religious communities, they were portrayed as the *first order* – the first example of a centrally organized religious *ordo.*[3] They established a corporate institution under a central administration with headquarters in Citeaux, called the 'general chapter', that introduced normative rules and internal supervision,[4] based on five branches headed by the arch-abbeys of Cîteaux, Clairvaux, La Ferté, Pontigny and Morimond. (Fig. 1) These branches – especially those of Clairvaux and Morimond – spread out into different geographical and political regions, covering most of Europe. The rapid, dynamic and centrally coordinated expansion of the Cistercian order during the 12th and 13th centuries was a unique phenomenon, spectacular enough to attract the attention of contemporaries. The scale of this process was such that it sometimes provoked reactions comparable to those of our modern times; in 1152 a construction ban had to be introduced to temporarily halt new projects and during the early decades of the 13th century the general chapter also introduced measures against the excessively growing process of incorporating female religious communities into the order. It is not by chance that historians often compared the Cistercians to modern multinational companies, for example, as a "franchise institution".[5] Although such comparisons may sound anachronistic, the adaptive strategy of this complex international network is an interesting economic-historical problem that lends itself to comparative research beyond national boundaries and local historiographies.

Fig. 1. Filiation lines of the Cistercian network



Traditional works on the history of the order (*Ordensgeschichte*) typically did not consider explaining the broader socio-economic, or religious historical contexts that influenced the histories of individual houses and estates. Mostly linked to subsequent generations of monks and clerical scholars, traditional scholarship typically displayed a narrow sphere of interest, reflecting antiquarian and archival approaches studying the self-representation of the order. Driven by admiration and piety, most of these authors focused on the role of the founding fathers, describing the origins of the order, the early normative texts (issued by the general chapter), and literary production (the works of monastic chroniclers). This explains partly their bias to interpret Cistercian practices as uniform, as well as their inability to recognize diversity and regional differences.

The perspective of art historical/architectural and literary studies

Initially, art historical and architectural research also helped to reinforce this view. Architecture, as the 'vertical' element of the anthropogenic landscape, has been seen generally as an instrument for expressing the spiritual idea and message of the reform. Although there were considerable differences in the grandiosity of the individual building projects, the general quality of the built heritage and the systematic arrangement of the buildings (around the cloister, in the outer courts, within the monastic precincts) reflected uniform principles of design, the so-called "Cistercian style", which has been described as "gebaute Unanimitas".[6] The disciplinary character and design of the landscape in the immediate vicinity of the monastic sites was yet another aspect of materiality that reflected the ideological reform to follow the Rule of Saint Benedict more closely, i.e. emphasizing not only contemplation, but also action (physical work). The best known textual source to illuminate how the Cistercians perceived this space is the *Descriptio Positionis seu Situationis Monasterii Clarae-vallensis*, commonly referred as the *Description of Clairvaux*.[7] The anonymous Cistercian author eloquently described the idealized environment around the monastery – the valley of the River Aube, fishponds, orchards, workshops, mills – and explained how the river served the agricultural and industrial activities of the community. His text is also famous for its use of water as a metaphor for spiritual work,[8] and for expressing the monk's overwhelming joy in seeing the beauty of nature as God's work. Discussing this source, Elizabeth Freeman wrote: "It seems that Cistercians saw in the natural world correlations with the divine harmonies that they hoped for in paradise. Following this, the 'taming' of the land from secular to religious uses was akin to the soul's journey back to God."[9] This emphasis on the spiritual power of the landscape due to "God's work" (nature) seems to deliberately downplay the significance of "people's work", i.e. the monks' efforts to transform the landscape. This may seem paradoxical, but also understandable from the point of view of Cistercian theology and monastic *humilitas*. Furthermore, the comparison of narrative sources from earlier and later periods reveals an interesting trajectory in the use of narrative *topoi*, which reflects the shifting spiritual focus of Cistercian communities. While earlier sources often emphasize the horror of the *desertum* and *eremum* when describing the site of the abbeys,[10] the 13th-century foundation histories tend to refer

to them as pleasant place, *locus amoenus*.[11] In contrast to this, the motif of transformed, tamed landscapes appear in connection to the distant world (in the context of *weeding and planting the lord's 'vineyards*). Although this motif can be found already in the letters of Bernard of Clairvaux, it is characteristic of later literary products (sermons), which manifest the efforts of the Cistercians in the early 13th century, who turned their ideological and institutional power against the Cathar heretics in Southern France.[12]

"Rodungsorden" as a socio-economic paradigm and its critique

In addition to the institutional, architectural, and literary achievements of the Cistercians, the intellectual gravity of the reform movement was also translated into the economic sphere. Apparently, neither the symbolic-figurative language of narrative sources, nor the normative regulations of the general chapters reflect realistically the – often very spectacular – transformation of Cistercian landscapes through economic management. Various economic and social historical studies appraised the pragmatic attitude and interest of the monks, forging the literary motif of the "taming the wilderness" into a paradigmatic socio-economic model, a "frontier thesis", that explained the economic conquest of the frontiers, settlement expansion, monastic colonization and the emergence of urban economies as connected phenomena. Known also as *grands défrichements*, this paradigm was advanced by George Duby and Richard W. Southern, who argued that "the age of medieval rural prosperity is the age of land reclamation" and that the Cistercians developed an economic system, which responded to the alimentary needs of the 12th century and to the increasing pressure on land by the more effective exploitation of local natural resources and by drawing new lands into agricultural production.[13] As Bruce M.S. Campbell sums it up, the "widespread and well-documented process of reclamation and colonization" was a physical expression of the demographic and economic expansion of the 12th and 13th centuries.[14]

The portrayal of the Cistercians as a "Rodungsorden" (i.e. an institution that played a significant role in woodland clearance and colonization), and as puritan frontiersmen, expert managers, and technological innovators became a widely accepted point of reference in scholarly works and beyond.[15] Isabel Alfonso has demonstrated that the idea of the "Rodungsorden" was still very much present in the scholarship of the 1980–1990s.[16] As a general model, however, it could be contrasted with

local data, bringing up the question of whether the monasteries significantly transformed the landscape or simply adapted to local conditions. Indeed, this became a central controversy,[17] as the accumulation of data from systematic and critical investigations of the archival sources (in the form of case studies or regional studies), as well as the results of archaeological surveys led to a gradual revision of earlier assumptions.

Views about the monks' excellence in technological innovation and their role as rural entrepreneurs and cultural 'missionaries' in less developed regions have been challenged, including, for example, their pioneering role in introducing new techniques of agricultural cultivation (the three-field system) in Scandinavia,[18] their impact on upland management in Wales[19] or their role in introducing water technology in Ireland.[20] It has also been argued that land clearance may have been more often the initiative of the tenants of the abbeys rather than the Cistercians, and either did not occur on a significant scale or was largely unrecorded.[21] Such reviews have effectively argued on the basis of archaeological evidence, pointing out that the emergence of technologies, management techniques, or the colonization process of marginal landscapes either preceded the settlement of monastic communities, or that clear evidence of monastic agency was simply lacking. There now seems to be a consensus among historians of religion,[22] historical ecologists[23] and economic historians[24] that the Cistercians' eminent role in the reclamation or conquest of wastelands was rather self-proclaimed, and that their impact on the landscape has been overemphasized.[25]

The contribution of archival research concerning monastic farms

Research into local monastic archives has significantly contributed to this "revisionist" trend, by systematically collecting topographical data about monastic lands, identifying the location of monastic farms and other properties, delineating their boundaries, and studying their economic functions. The grange system was the cornerstone of Cistercian estate organization, as the Cistercians introduced this new element into the traditional bipartite management model of medieval estates, which were divided into manorial demesne and tenanted lands. They managed their most important lands as grange farms, involving members of the monastic community known as lay brothers. Comparative analysis revealed some

variation in the number and size of such farms,[26] but most granges featured exceptionally large arable fields, often measuring around 100–300 hectares. Consequently, the focus of economic production was typically on crop farming, as evidenced by the terms *grangia* or *grangia frumentaria*, referring to the barn where grain was stored. However, one must also acknowledge the bias present in historical data: arable land and crop farming were generally the most significant sources of revenue, leading to the size of arable land being recorded in relevant documents such as land transactions and litigations. In contrast, other properties – such as meadows and woodlands – were often not described in detail. As a result, it is frequently difficult to assess the significance of other agricultural practices compared to crop farming based solely on written sources.

An important finding of historical topographic research is that the establishment and management of the grange system were often intertwined with the history of pre-existing, traditional manorial farms. The locations of these farms and villages influenced the site selection of granges, but in a manner contrary to what traditional research suggested. The monks did not seek solitude and virgin ground; instead, earlier manorial sites were often utilized and converted into granges, while others continued to operate according to traditional manorial arrangements.[27] For example, among the farms donated to the Abbey of Ebrach (Bavaria, Germany), those deemed unsuitable (due to size or location) were left unchanged, while only the suitable ones were converted into granges. In the case of the Welsh monasteries (Strata Florida, Whitland), an in-depth study of the historic landscape revealed that the granges "preserved the vestiges of the early medieval clas-church estates," specifically highlighting the "pre-conquest territorial elements based on the cwmwd-maenor-tref system."[28]

Regarding the spatial distribution of grange farms, the literature frequently cites a well-known normative rule: the general chapter prescribed a maximum geographical distance within which the abbey farms had to be located, specifically within a day's journey from the abbey (approximately 20–25 km), as this allowed the lay brothers to return to the monastery.[29] From a managerial perspective, control over more valuable or labor-intensive resources—such as animal farms and industrial sites—was considered a priority, so these resources ideally needed to be located in close proximity to the abbeys.[30] The results of topographic studies typically confirm this organizational principle, as many granges were indeed often situated centrally. This pattern can also

be observed in the case of abbeys founded in the medieval kingdom of Hungary, such as Klostermarienberg (now in Austria) and Szentgotthárd. Interestingly, the more distant farms of Klostermarienberg, Szentgotthárd, and of the Abbey of Topusko (in Croatia) were typically referred to in the sources not as *grangia*, but as *praedium/predium* or *curia*.

It is also important to note the divergence from this pattern in the case of distantly situated granges. It has been argued that some of these farms could have functioned as administrative centers for those parts of the estates that could not be conveniently accessed due to their remote locations.[31] In this capacity, these granges were quite similar to the dependent houses of Benedictine abbeys, where small groups of monks typically resided. On the other hand, their administrative function was often linked to their significant economic role. The configuration of the road network was typically an important factor in the site selection of such granges. Some were characteristically located along the main roads and in the vicinity of towns, providing access to urban markets and "symbiotically" connecting to other urban properties of the abbeys within the town.[32] In the case of the Cistercian estates in medieval Hungary, the granges of Topusko and the "satellite" properties of the Abbey of Petrovaradin/Pétervárad (in Kelenföld, near the castle of Buda) and Pilis (in Čakany/Pozsonycsákány, near Bratislava) seem to illustrate this pattern.

Overall, the mixed character of the Cistercian lands (with villages, traditional manors, and granges) does not seem atypical, contrary to what antiquarian research has suggested. This character is well documented in several regions of Western and Central Europe, including Germany, [33] Bohemia,[34] and Poland.[35] According to the foundation charters and later documents, the economy of the Hungarian abbeys also relied predominantly on revenues collected from villages and manorial holdings. As a general pattern, topographic data underscores the economic significance of the ancient countryside – referred to as "Altsiedelland" in German scholarship – which is the part of the countryside that had been colonized earlier. In the German lands, the abbeys "were by no means founded in the deepest wastelands but were actually established on the edge of older settlement areas, from where they were involved to varying degrees, but always decisively, in the transformation of the cultural landscapes they encountered." [36] Similar observations have been made regarding French abbeys, which were located "near previously settled areas, built their estates on pre-existing economic units, and often removed existing settlements and populations to create artificially

isolated zones."[37] In addition to this geographical context of settlement, the generally weaker social background of the monasteries in Central Eastern Europe – particularly the shortage of lay brothers – explains why the monks had to increasingly rely on tenant labour. The mixed character of monastic lands, which included villages, typically centrally located grange sites, and more distantly located traditional manors, further illustrates the pragmatism of Cistercian estate management. However, upon examining the local topographical context, it is evident that grange farms were often directly adjacent to the villages of the tenants, existing in a "symbiotic" relationship. The practical differences in the management of granges and other manorial farms may have been insignificant, as it is plausible that the operation of those farms identified as *grangia* in the documents also depended on the labour services of tenants.

Landscape archaeological research and environmental perspectives

Landscape archaeological research employs a combination of various non-destructive recognition techniques (e.g. airborne laser scanning, ground penetrating radar, magnetometer surveys, paleoenvironmental research) alongside more traditional methods (e.g., interpretation of cartographic materials, aerial photography, field surveys, and architectural surveys) to gather data about the changes in past landscapes. Landscape archaeological studies also integrate the results of archaeological excavations and scientific (environmental) investigations to reconstruct human-nature interactions and the anthropogenic impact on past environments. In a narrower sense, landscape archaeology focuses on past land-use patterns, in contrast to settlement archaeology, which focuses on archaeological phenomena related to the settlement core, and historical ecology, which examines the chronological changes of anthropogenic interaction with nature. Notably, landscape archaeological knowledge, – specifically regarding relict landscape features associated with past land-use –, is intimately linked to historical-topographical reconstructions of monastic landscapes.

C. James Bond's book on monastic landscapes and his concordance table of 'field and documentary evidence for features on estate manors'[38] highlight the differing availability of historical and landscape archaeological data for topographic reconstructions, illustrating how our

understanding depends on the varying preservation of evidence. Notably, archaeological and landscape archaeological data seem particularly relevant regarding industrial activities, as these are rarely documented in the written record. This bias can partly be explained by the fact that such activities were usually centrally located near the abbey and that those lands were typically not contested, meaning they were rarely mentioned in litigations or transactions, which constitute the bulk of the surviving archival materials. [39] The role of animal husbandry – labeled as the "other economy" – also remains largely obscured, as "in contrast with the abundant literature devoted to cereal agriculture, only a scattering of data exists…". [40] More generally, the management of rural resources is less traceable in the archival record than activities related to urban spaces (i.e., trade). A detailed analysis and evaluation of agricultural practices are only possible where suitable administrative records are available, providing in-depth information on the history of land management and particularly crop production (see, for example, the studies on Peterborough, [41] Canterbury,[42] or Chaalis[43] abbeys). Such records are especially important for assessing temporal changes in estate management, such as the adoption of different economic regimes in response to environmental factors.

The main contribution of landscape archaeological studies is that they balance out the conservation bias of historical sources. Furthermore, a landscape-level assessment of environmental conditions is essential for understanding how the environment may have influenced the spatial configuration of management patterns. Stephen Rippon's study of the estate of Glastonbury Abbey (Somerset Levels, SW England) exemplifies multidisciplinary research that combines landscape archaeological and environmental data with the analysis of archival records. Rippon explains the segmentation of the local landscape according to different management regimes in response to environmental conditions. The Glastonbury manors featured both wetland and dryland components, and differences in demesne land use were reflected in the written records. "Fen-edge manors had, on average, 64% arable land, 28% meadow, and 5% pasture, whereas the wholly dryland manors averaged 69% arable, 12% meadow, and 10% pasture. Meare, by contrast, had 46% of its demesne sown as arable, 41% meadow, and 12% pasture, though in practice, the area available for grazing was much larger due to the common moors and heaths." Rippon suggested that while earlier studies "recognized that wetlands can provide fertile arable land, they were particularly suited to meadow and pasture," and that "the essentially wetland manors had diverse cropping regimes,

including a significant proportion of legumes, as well as wheat and, to a lesser extent, oats." [44] In conclusion, this diversity – revealed by the excellent historical records of the abbey – cautions against deterministic and simplistic assessments regarding land management preferences in different environments. However, the lack of such data often prevents us from offering interpretations of similar complexity.

Soil topography and water management – aspects of site selection of abbeys and grange farms

In addition to the previously mentioned factors – such as the pre-existing settlement network, the location of earlier farms, the road network, and administrative/logistical concerns – the landscape character (including terrain, dominant land use/land cover, access to water, and soil properties) should also be considered in the site catchment of abbey sites and monastic farmlands. In the case of centrally located grange farms, fertile alluvial soil could be the primary factor explaining site location, which is typical for river valley environments. A scattered distribution of grange farms could sometimes be attributed to high relief terrain and dense woodland cover (e.g., near royal forests). It is likely no coincidence that there is no evidence of centrally located grange farms around the abbeys of Topusko, Pilis, and Zirc, as these abbeys are situated in landscapes characterized by hilly terrain, low hills, and plateaus segmented by small rivers. Pilis and Zirc were adjacent to royal forests. These abbeys only had a few – distantly located – manorial farms (with large blocks of arable land), which were situated in landscapes where environmental conditions were more favourable for agricultural cultivation. Topusko's granges tend to be located along main roads that traverse the region and connect the abbey with important urban centres. In the case of Plasy Abbey (in Western Bohemia), both archaeological and historical data can be considered in connection with the scattered location of granges. It has been argued that even though the Cistercians received a large area of uncultivated land (woodland), they began establishing their granges by relocating existing villages, which proved to be a resource-efficient and time-saving solution. Although the relocation of settlements is poorly substantiated by the available historical data (i.e., there is no solid evidence of systematic relocation), the topographic reconstruction of Cistercian farmlands indeed

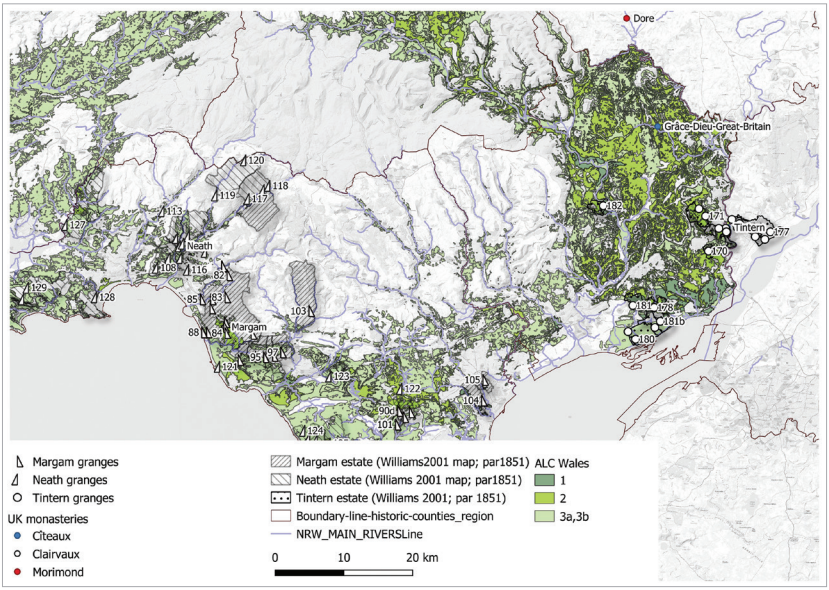
suggests that the farms occupy areas of better-quality soil, while the adjacent settlements are situated on poorer soil.[45]

More generally, soil quality has been considered one of the underlying distinguishing factors between the ancient countryside and newly settled lands in Western Europe. According to Oliver Rackham, the ancient countryside can be characterized by more dispersed, segmented patterns of settlement and greater diversity of soils, whereas the newly settled "planned" countryside is marked by open fields (champion landscapes).[46] In the case of Western Poland, Richard C. Hoffmann also emphasized the significance of soil and observed that more fertile micro-regions (with loess and black earth soils) were characterized by a dense network of small hamlets. After the Mongol invasion, the wooded, formerly empty areas were also settled, however, the impact of the demesne economy remained limited ("demesne farms were small or absent, so lords had little need for forced labor"), as the emerging landscape took the form of large open-field villages.[47]

The comprehensive historical topographical data on the Welsh Cistercian monasteries, collected by David H. Williams, are particularly useful in demonstrating the importance of soil in the site selection of monastic farmlands. His gazetteer of Cistercian lands provides a convenient starting point for comparative analysis, to create a digital map of Cistercian lands and grange sites, combined with the Ancient Parishes of England and Wales, 1500–1850' database,[48] (Fig. 2). The estates of Strata Florida, Neath, Margam, and Tintern were selected for demonstration because detailed landscape archaeological surveys were also available,[49] and their larger estates are better suited for illustrating the contrast in environmental conditions between grange sites and other monastic lands on a broader scale. To assess soil quality, the Predictive Agricultural Land Classification (ALC) map was used.[50] Figure 2 illustrates that many of the grange farms were established in the more fertile coastal zones and along the low-lying areas of the river valleys. As shown by the ALC categorization (coloured areas represent higher quality, Grade 1–3 agricultural lands), crop farming was feasible at most grange sites there. This is not surprising; as noted by C. Platt, lowland granges focused predominantly on arable farming, while upland areas were used extensively as pasture.[51] It is also noteworthy that the location of certain granges correlates strongly with high-quality agricultural land, suggesting that these sites were chosen or acquired by the Cistercians for their better soil quality. In sum, soil topographic data can serve as indirect evidence to identify those granges where crop

farming had greater potential. Other sites, such as the upland granges of Strata Florida, were more likely used for animal husbandry (sheep and cattle), as supported by historical data. According to data from the Domesday Book, the region was underpopulated before the arrival of the Cistercians: "restraints imposed on agriculture by the terrain were clearly among the reasons for this scarcity, but the distribution of soils also played a role." The belt of low-lying land along the valley of the Severn River is characterized by medium loam soils and was three times more populated than other parts of the country. In contrast, "there can be no doubt of the great importance to the uplands' economy of pasture, and especially of cattle-rearing. As in northern Britain, there was a predominance of 'horn over corn'."[52]

Fig. 2. Granges and estates of Margam, Neath and Tintern abbeys, overlaid on the Agricultural Land Classification map (Classes 1 to 3) of Wales



The soils of the floodplains were rich in organic matter, but difficult to work. Environmental conditions destined the monks to undertake extensive melioration, reclaiming land by building dikes across their land to drain

excess water. As Rippon summarizes, "a particular feature of monastic communities was their ability to manage and exploit water, and their role in the reclamation of wetlands, reflecting the increasing intensity with which the landscape was being exploited during the High Middle Ages, is relatively well known" and "Cistercian water management demanded an unparalleled understanding of the hydrometeorologic and hydrogeologic controls on water budgets and quality"[53]

Two hypotheses may be particularly illuminating regarding the Cistercians' preferences. One is termed the "sophisticated geography hypothesis," or "reversal of fortune," which suggests that initially unfavourable conditions turned out to be valuable (high risk-high reward). The other considers the "distributed-ness" of the landscape concerning technologies and technological innovation, arguing that specific technologies provided access to specific environments, resulting in landscapes becoming "distributed" among different socio-economic agents.[54]

The aerial photograph (Fig. 3) of the area surrounding the Cistercian Abbey of Meaux (Yorkshire, UK)[55] aptly demonstrates the point that "landscapes are environmental ramifications of technologies."[56] The fields to the north of the abbey have preserved traces of ridge and furrow cultivation, a technique based on the use of the asymmetric heavy plough, which was an invention of the Middle Ages that predates the Cistercian era. The use of this technology (Fig. 4) apparently contributed to agricultural expansion during the Cistercian reform era, as the heavy plough enabled the cultivation of heavier (clayey) soils and facilitated the turning of sods into high ridges, thus aiding in the drainage of excess water – particularly important in areas with a more humid climate.[57] Traces of this cultivation typically survived because the arable land was later abandoned, enclosed, and converted to pasture. When overlaid on a map of soil classes in the UK (Fig. 5), the geographic distribution of 756 aerial photographs documenting ridge and furrow cultivation shows a rough correlation with areas dominated by heavy (clayey) soils, confirming the widespread application of this technique across the country. Unfortunately, modern land use has severely compromised the preservation of such features, and their current distribution reflects historical conditions only fragmentarily.[58] However, other examples similar to those around Meaux highlight the importance of agricultural activities in Cistercian sites and the potentially significant role of monastic management in spreading this technology in certain (micro)regions.

Fig. 3. Medieval ridge and furrow, N of Meaux Abbey, Yorkshire (Cambridge University Collection of Aerial Photography, n. FU44; 17 June 1951, © copyright reserved)

Fig. 4. The formation of ridge and furrow (source: available under Public Licence at https://en.wikipedia.org/wiki/Ridge_and_furrow#/media/File:Ridge_and_furrow-en.svg)

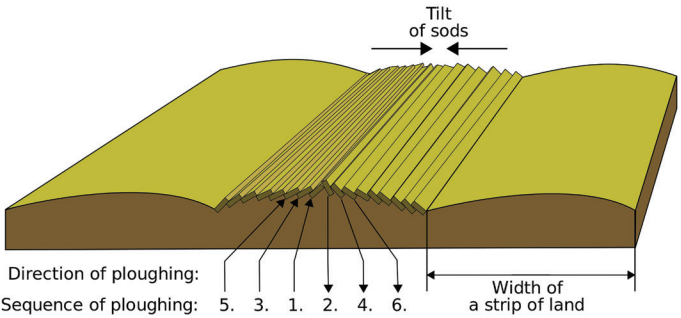
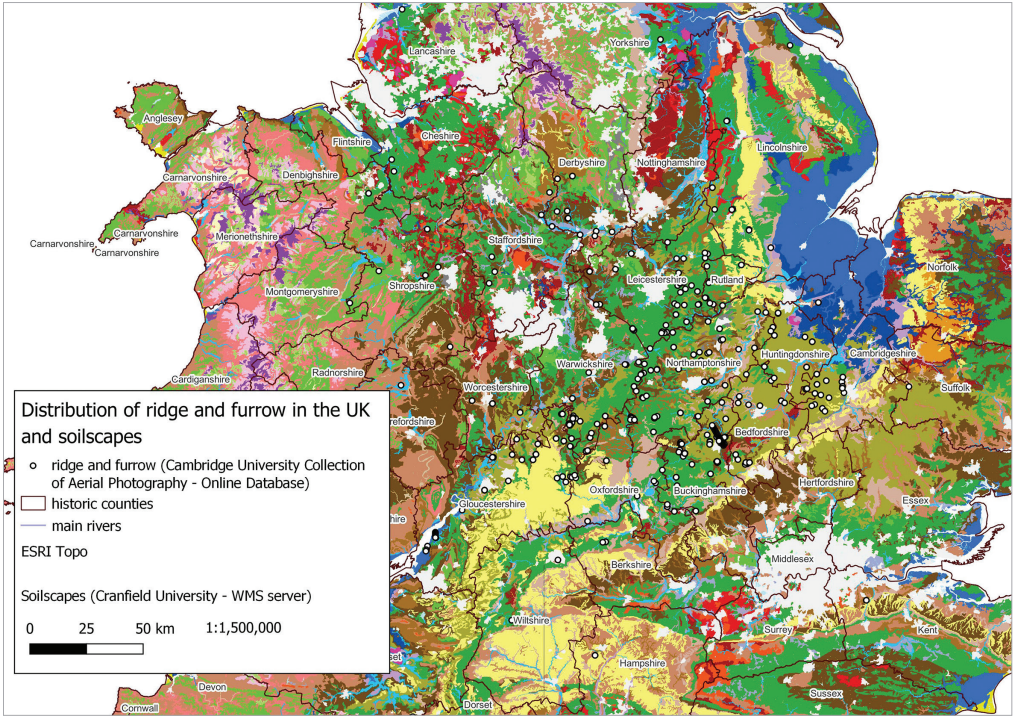


Fig. 5. The distribution of aerial photos documenting ridge and furrow topography (source: derived from interrogation of the Cambridge University Collection of Aerial Photography (CUCAP) database available at: https://www.cambridgeairphotos.com/)



The example of Meaux is particularly illustrative due to the narrative context preserved in the monastery's chronicle,[59] which describes in detail how the site of the abbey was selected. Following negotiations with the founder, a delegation was sent to inspect the future site of the abbey (on a small hill, surrounded by wetland), In fact, this was a formalized, institutionalized process known as "site inspection" (*inspectio loci*), according to the normative rules of the order. Although the Chronicle of Meaux incorporates symbolic elements – depicting Adam as an "expert," a masonic monk from Fountains Abbey, who sticks his staff in the ground and announces that the "place shall in the future be called the door of life, the vineyard of heaven" – such procedures certainly had practical goals as well, including an on-site assessment of soil quality. The Chronicle mentions that prior to this event, Adam toured the lands and possessions of the count's estate, and only then did he choose the site for the monastery.

Deciding whether the Cistercians were truly the "first agriculturists who brought intellect and science to bear on the cultivation of the soil" or whether this is merely "fulsome praise" [60] is often complicated by the lack of convincing evidence regarding whose technology and agency are documented in the landscape record. Distinguishing the impact of Cistercian management from the activities of their tenants has already been noted as a problematic issue. Based on what has been presented so far, systematic landscape archaeological analysis – compiling topographic evidence about monastic lands, identifying relict landscape features, and studying environmental factors such as soil, relief, and vegetation – provides an opportunity to reflect on the "distributed-ness" of the landscape and to study the impact of monastic economies comparatively.

Unlike surface traces of past cultivation, the management of watercourses and the creation of ponds were much more striking elements of monastic landscape transformation. Monastic pond systems had a distinctive character.[61] Watercourses in the vicinity of monasteries and granges needed to be regulated to avoid damage to industrial and agricultural assets, particularly mills, croplands, and pastures. Thus, the construction of ponds served not only for food (as fish was an essential part of the monastic diet) but also as part of complex water management plans, including drainage and irrigation works, to regulate the natural water table and protect sites from extreme weather events. Landscape archaeological studies of the morphological characteristics of pond systems indicate that multiple pond systems were particularly typical at monastic sites and granges.[62] Although R.C. Hoffmann highlighted that "recent

scholarship is no longer convinced that the Cistercians, whose waterworks became the stuff of later legend, were notably any more innovative than their lay neighbours and kin," many of the examples he draws upon are connected to Cistercian monasteries and their granges (such as Lac d'Annecy, Maubuisson, Vauclair in France, the Yorkshire monasteries in the UK, and Waldsassen and Altzelle in Germany). He concludes that the late medieval period witnessed a more active construction of ponds, with numbers increasing in Central Eastern Europe as well.[63] Since the most economically active period for the Cistercians in Central Eastern European regions was in the 13th and 14th centuries, the Cistercians (and other monastic orders) could have significantly contributed to this trend. Although the scope of their activities remained local, concentrated around the abbeys and granges, monastic waterworks sometimes preceded larger projects carried out later. Such was the case with the construction of the Třeboň fishpond system in the 16th century in the largest wetland area in Bohemia, along the Lužnice River, north of the Rožmberk Castle estate and the Cistercian Abbey of Vissy Brod.[64] The Opatovický Canal (along with a mill) was part of this system, and its construction is dated to the end of the 15th century, though it underwent modifications during the construction of the Golden Canal at the beginning of the 16th century. Historical and landscape archaeological evidence suggest that its origin dates back to the 13th century, and it was part of a Cistercian grange belonging to the Abbey of Zwettl – hence the name Opatovice (Abbot's village).[65]

Concluding remarks – the uses of a comparative landscape archaeological approach and GIS

Returning to the problem of regionality (and diversity/unity), it is important to reiterate the contribution of landscape research. The terms 'landscape'/'Landschaft' and 'region' are not necessarily interchangeable concepts, although they often appear to be so in the literature. The reconstruction of a 'monastic landscape' or 'Klosterlandschaft' typically implies an inventory-like, synchronic view of its anthropogenic and natural-physical qualities. However, in the context of regionality the interpretation of a monastic landscape should be more complex and chronologically layered. It can be defined not only as a synchronic phenomenon (the space comprising monasteries or estates that form a 'homogeneous' group according to certain criteria or qualities – physical or

otherwise), but also as a diachronic one. The concept of 'region' is similarly understood in both static and dynamic terms,[66] and this ambivalence must be kept in mind when discussing the problem of regionality from an economic-historical perspective. Both the static (physical landscape environment) and the temporally dynamic understanding (economic processes) of diversity and unity are relevant.

Ideally, such an approach should focus also on studying medieval socio-economic processes and estate management at the landscape level, which is, nonetheless, a very challenging task. The underlying problem is that the history of estate management practices is represented by a heterogeneous mosaic of data available in different types of documents related to different estates or administrative units (e.g., financial accounts, land registers, management accounts),[67] and/or there is a lack of quantifiable information. Although archaeological and architectural investigations can provide proxy data relevant from a historical-ecological perspective,[68] these issues often preclude a long-durée approach and systematic comparative study of the continuities and discontinuities of processes. As Richard C. Hoffmann emphasizes, "regional variation and local diversity come to light best where especially good documentation allows close study to probe behind the general pattern of anthropogenic change."[69] However, comparative perspectives are problematic not only in a chronological/diachronic context but also in a spatial/synchronic one. Moving away from the complexities of local data necessitates simplification and generalization, which may overlook important details (as discussed, for example, in the case of Glastonbury).

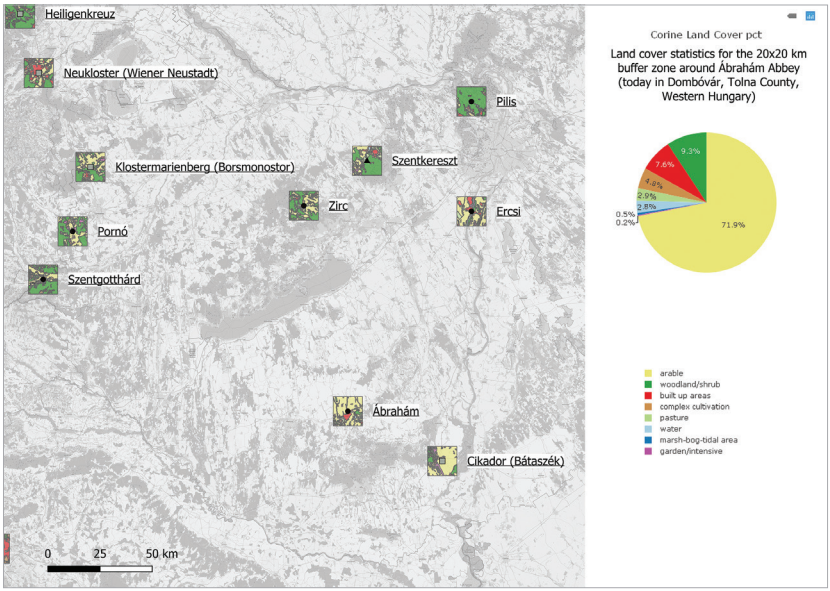
Beyond the descriptive, synchronic level of analysis, comparative studies have the potential to identify historical drivers and agents of socio-economic transformations (economic historical trajectories that lead to success or failure), as well as the incidental consequences or side effects of these processes.[70] From a landscape perspective, one should fully agree with the premise that "the very nature, extent, and durability of the Cistercian settlement afford an invaluable and hitherto underestimated resource for our understanding of later medieval environments."[71] The marginal character of Cistercian landscapes is a key theme that received considerable attention due to the historiography outlined above, influenced by traditional narratives about the settlement strategy of the monasteries and the "frontier thesis" as an economic-historical paradigm. Marginality can be considered at both a local scale (as landscapes dominated by mountains, forests, fens, marshlands are agriculturally peripheral

environments), and a larger scale (as geographic regions that were peripheral from the perspective of settlement colonization and Cistercian expansion).[72] In local contexts, marginal landscapes are associated with extreme risks, and are viewed as sensitive, fragile, and metastable systems.[73] For instance, Kenneth Addison mentions the turbulent impact of the14th century crisis (the Black Death),[74] and his characterization of marginality also emphasizes an ecological view in connection to an optimal niche or habitat, i.e., considering landscapes with crop-based agriculture as optimal and more resilient to the crisis.[75] Studies revisiting the traditional narratives on Cistercian colonization and the frontier thesis point out that Cistercian estates often had diverse ecological backgrounds as their typical situation at the margins of the "ancient landscapes" could be economically advantageous during critical times. Some Cistercian monasteries were better prepared to respond flexibly to the crisis (e.g. to the labor shortages during the late 14th century) by reorganizing their holdings through a series of land transactions.[76] The success of these mitigation strategies had long-term consequences, influencing their later economic development. For example, at Strata Florida Abbey, part of the estate situated in the upland region (suitable for animal husbandry) was already considered invaluable in the 15th century.[77] In addition to physical landscape characteristics, however, sensitivity or resilience is understood also as a social issue.; i.e. the social and institutional "landscapes" or backgrounds could also influence and constrain the success of adaptation strategies. This is to underline the complexity of studying resilience, both from environmental and social viewpoints, as landscape geographical marginality (of "frontier zones") intersects with social geographical ones (of "frontier societies").[78]

My final remarks concern the use of GIS, which has become an essential tool for conducting landscape-level, macroscale, comparative analyses, thereby reinforcing top-down perspectives on the problem of regionality. Fig. 6 provides a simple demonstration of this, showing the results of a spatial statistical evaluation of current land-use patterns within buffer zones of 20 by 20 km around the abbeys. Percentages of land cover types based on CORINE Land Cover data can be used, for example, to filter for heavily urbanized or forested environments, as well as to illustrate landscape level differences in agricultural regimes (pastoral or crop farming). Based on this quantification of modern land use, large-scale differences can be assessed, groupings or categorizations can be established, which can be further refined by incorporating data on terrain, soil hydrology and other

factors. Apparently, in addition to the detailed analysis of site selection strategies based on a combination of different environmental parameters (as illustrated above) GIS based approaches can elevate the comparative analysis to another level.

Fig. 6. Cistercian abbeys in Western Hungary with 20x20km buffer zones showing Corine Land Cover data - CLC statistics, pie chart for Ábrahám Abbey (Dombóvár, Co. Tolna)



Based on GIS capabilities, different disciplines developed systematized approaches, such as Landscape Character Assessment (LCA), and Historic Landscape Characterization (HLC). While these approaches effectively combine different types of information, they also illustrate the above-described epistemological problem of generalization in comparative analyses, which can lead to a loss of focus on details.[79] From the perspective of cultural heritage management and planning, this is not so much of a concern, as the application of GIS primarily serves the purpose of inventorying cultural heritage assets and providing a digital platform for the visualization of such data, as demonstrated by recent projects focusing on the Cistercian landscapes in Central Europe.[80] In this context,

the main added value of GIS lies in its potential to integrate topographic data about the various elements of the historic landscape, including those – such as granges, mills, fishponds, hollow-ways –, that often receive little or no attention in current heritage management and protection policies. The ratification of the European Landscape Convention has not significantly improved this situation and many of these features remain unprotected. In cultural heritage projects, cartographic representations and gazetteers are produced with GIS, handling a large amount of spatial data, which can be utterly complex and frustrating for non-professionals, when presented on printed maps. As a skeleton of knowledge, these inventories would be incomprehensible for the general visitor when printed out as interpretive signs to be placed at points of interest – as the most conservative visual demonstration tool. However, GIS may serve also as a planning and design tool to better "animate" this body of spatial data, helping professionals in the creation of more immersive experiences, based e.g. on augmented or virtual relity technologies, when creating educational paths, walking trails. Thereby, the task of "mapping" should reach beyond the physical landscape itself. As the visitor experience often lacks interactive engagement and emotional connection, heritage interpreters are encouraged to prepare "deep maps" of the landscape – similar to Clifford Geertz' thick description –, "to record and represent the substance, grain and patina of a particular space, through juxtaposition of and interweavings of the historical and the contemporary, the political and the poetic, the factual and the fictional, the academic and the aesthetic".[81]

Endnotes

1 Jamroziak 2020.
2 Müller 2015: 345.
3 Berman 2000; Freeman 2002.
4 Oberste 1994.
5 Davidson 1995.
6 For a comprehensive survey of art-historical studies and on the contemplative character of Cistercian architecture cf. Kinder 2002; Untermann 2001a, Untermann 2001b.
7 Matarasso 1993.
8 Smith 2017.
9 Freeman 2002b: 141–146.
10 Hoffmann 2014: 104.
11 Freeman 2002b, ibid.
12 Kienzle 2001: 150.
13 Southern 1990: 225.
14 Campbell 2000: 11.
15 The Wikipedia article is illustrative on the popularization of this idea: "The most striking feature in the reform was the return to manual labour, especially agricultural work in the fields, a special characteristic of Cistercian life. The Cistercians also made major contributions to culture and technology in medieval Europe: Cistercian architecture is considered one of the most beautiful styles of medieval architecture; and the Cistercians were the main force of technological diffusion in fields such as agriculture, hydraulic engineering."
16 Alfonso 1991.
17 Puls and Puls 1996: 42–43.
18 Christiansen 1994.
19 Fleming-Barker 2013.
20 Rynne 2000; Lucas 2006: 195–200.; Lucas 2010: 980.
21 Campbell 2000: 11.
22 Constable 1996: 120
23 Aberth 2013.
24 Hoffmann 2014; Loveluck 2013; Pollard 1997.
25 Bond 2000.
26 See e.g. Wichert 2000: 71–72; Pollard 1998: 173–174.
27 Alfonso 1991 discusses how Cistercian practices maintained – to some extent – the feudal character of manorial organization.
28 Bezant 2009: 7.
29 See e.g. France 2014: 118–119.

30 This is exemplified by the so called *Rinthof* in case of the Bohemian abbey of Plasy (Charvátová 1993: 134), and similarly by the *grangia pecudum* in case of the German abbey of Kamp (Janssen 1983: 218). The industrial farm of the Pilis monastery in Hungary was also a few kilometers away (at Pomáz-Nagykovácsi-puszta) Cf. Laszlovszky et al. 2014. The central location of industrial facilities is noted also by Benoit 1994.

31 Referred in the German literature as *Ferngrangie*, see e.g. Gahlbeck 2009: 544 (in connection to some granges of Lubiąż.)

32 There are several case studies illustrating this pattern, see e.g. Picart 1994 on Preuilly (France), Reimann 1998 on Dargun (Germany), Söder 2010 on Eberbach (Germany). For a comparative survey on economic functions see: Schich 1998.

33 See e.g. works of Weiss 1962 on Ebrach, Rösener 1974 on Salem, Ribbe 1976 on Zinna; and Mossig 1978 on Eberbach.

34 On Plasy Abbey see Charvátová 1993.

35 Hoffmann 2014: 129-130.

36 Hardt 2014: 576.

37 Oram 2020:

38 Bond 2004: 23.

39 Benoit 1994.

40 Biddick 1989: 1.

41 Ibid.

42 Mate 1984.

43 Higounet 1965.

44 Rippon 2005: 106–107.

45 For Topusko cf. Ferenczi 2006; for Plasy cf. Charvátová 1993: 123; For a large-scale soil map of the region see Seel 2018: 10., most recently see Ferenczi 2024, 78.

46 Rackham 1986.

47 Hoffmann 2014: 131.

48 Kain and Oliver 2020.

49 See Procter 2018 on Tintern, and Roberts 2014 on Margam, Neath and Tintern.

50 Provided by the Welsh Government: https://lle.gov.wales/catalogue/item/PredictiveAgriculturalLandClassificationALCMap/?lang=en; It has been suggested that the fundamental composition of soils probably did not change much - in northern France cf. Comet 1997: 23. Thus, modern typologies or classifications could be relevant for assessing medieval conditions.

51 Platt 1965: 71.

52 Liebermann 2010: 29–32.

53 Addison 2006: 224.

54 On the sophysticated geography hypothesis see Acemoglu et al. 2002, especially p. 1260: "with the arrival of 'appropriate' technologies, temperate areas became more productive". See also Michael 2000, especially Chapter 3. on heterogeneity / ditributedness in the environment and technological implications in regard to that.

55 'Cambridge air photos' database, Department of Geography, Cambridge University. Available at: https://www.cambridgeairphotos.com/search/

56 Lekan and Zeller 2014: 353.

57 See on this technological issue specifically Hopcroft 1999 (2002): 28–31, reviewing Marc Bloch's idea and more recent literatures.

58 For example, Catchpole and Priest 2012: 31 found that 12% of ridge and furrow recorded in 1999 has been already destroyed or badly damaged: https://research.historicengland.org.uk/redirect.aspx?id=6950%7CTurning%20the%20Plough%20Update%20Assessment%202012 (Last accessed: 13 July 2020).

59 Burton 2012.

60 Pollard 1997: 166.

61 Aston (ed.) 1988.

62 Preliminary fieldwork has been carried out by the author so far at the monasteries of Pilis (2012–2013), Szentgotthárd (Hungary), Klostermarienberg (Austria), and Plasy (Bohemia) (2020). For similar phenomena in case of Pauline monasteries in Hungary, see Pető 2018.

63 Hoffmann 1996: 660. Ibid.: "eighty-seven new building projects are recorded between 1347 and 1418. Large and complex hydraulic works were again undertaken by Czech lords between 1450 and 1550, resulting by the latter year in an estimated 26,000 artificial ponds covering thousands of hectares" For data on Bohemia cf. also: Přikryl 2004; Although systematic data is not available, similar tendencies are suspected in case of medieval Hungary. See: Ihrig (ed.): 35; Ferenczi 2018: 242.

64 See on this Hoffmann 1996: 667; Lhotský 2010: 53.

65 Nováková 2005.

66 For theoretical points on regionality as a socially constructed space / "Gesellschaftliche Raumlichkeit", see e.g. Butlin 1992; Werlen 1993.

67 Röhrkasten 2014

68 Astill 1993.

69 Hoffmann 2014: 133.

70 Kehnel 2007.

71 Addison 2006: 212.

72 Cf. Pollard 1998: 11–12.

73 Addison 2006: 232–233: "Certainly, in occupying marginal landscapes by choice, the Cistercians also inevitably exposed their system to greater economic and environmental risk, sensitivity, and (inevitably) fragility."

74 Ibid.

75 The ecological definition of niches, and marginality – as outlier groups – is, however, not as straightforward as it seems. Hirzel and Le Hay 2008, p.1 explains that "The concept of the ecological niche relates a set of environmental variables to the fitness of species, while habitat suitability models (HSMs) relate environmental variables to the likelihood of occurrence of the species. In spite of this relationship, the concepts are weakly linked in the literature, and there is a strong need for better integration." Besides, there are no sharp boundaries, but rather zones of transition and there is a different understanding of marginality in socio-ecological systems, as biophysical factors are superimposed by technological and sociological ones. Cf. Callo-Concha et al. 2014: 59–60; Renes 2015: 4 warns that historical explanations on marginality are rather simplistic, in as much as "Many regions that we now regard as peripheral were in fact connected to systems of exchange on different scales."

76 Janssen 1983.

77 Bond 2005: 57.

78 Regarding Cistercians in frontier regions / frontier societies, see e.g. Jamroziak 2008; Jamroziak and Stöber (eds.) 2013.

79 From this point of view, the relevance of HLC has been criticized by Austin 2007.

80 „Sharing Heritage" Projekt „Vielfalt in der Einheit – Zisterziensische Klosterlandschaften in Mitteleuropa": https://sharingheritage.de/en/projects/cistercian-landscapes-in-central-europe-2/ (Last accessed: 13 July 2020).

81 Pearson 2010: 32.

List of Figures

Bibliography

Aberth, J., *An Environmental History of the Middle Ages: The Crucible of Nature*, Routledge, London, 2013.

Acemoglu, D., Johnson, S., and Robinson, J.A., "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution", *The Quarterly Journal of Economics*, 117, 2002, pp. 1231–1294.

Addison, K., "Changing Places: The Cistercian Settlement and Rapid Climate Change in Britain", in Lees, C. – Overing, G. (eds.), *A Place to Believe In: Locating Medieval Landscapes*, The Pennsylvania State University Press, Pennsylvania, 2006, pp. 211–38

Alfonso, I., "Cistercians and Feudalism", in *Past & Present*, 133, 1991, pp. 3–30.

Astill, G., *A medieval industrial complex and its landscape – the metalworking watermills and workshops of Bordesley Abbey* (Council for British Archaeology Research Reports, 92), CBAR, York, 1993.

Aston, M., *Monasteries. Know the Landscape*. London: Batsford, 1993.

Aston, M. (ed.), *Medieval Fish, Fisheries and Fishponds, 2 vols*, BAR British Series No. 182, Bar Publishing, Oxford, 1988.

Aston, M., *Monasteries in the Landscape*. Tempus, Stroud, 2000.

Austin, D., "Character or Caricature? Concluding Discussion", *Landscapes*, 8, 2007, pp. 92– 105, http://dx.doi.org/10.1179/lan.2007.8.2.92

Benoit, P., "L'espace industriel cistercien à la lumière des exemples bourguignons et champenois", in Pressouyre, L. (ed.), *L'Espace cistercien. Colloque L'Espace cistercien, abbaye de Fontfroide, 24–27 mars 1993, Léon*, Comité des travaux historiques et scientifiques, Paris, 1994, pp. 378–390.

Berman, C.H., *The Cistercian Evolution. The Invention of a Religious Order in Twelfth-Century Europe*. University of Pennsylvania, Philadelphia, 2002.

Bezant, J., *Medieval Welsh Settlement and Territory Archaeological evidence from a Teifi Valley landscape*. BAR British Series No. 487, Bar Publishing, Oxford, 2009.

Biddick, K., *The Other Economy: Pastoral Husbandry on a Medieval Estate*, University of California Press, Berkeley, 1989.

Bond, C.J., "Landscapes of Monasticism", in Hooke, D. (ed.), *Landscape: The Richest Historical Record, SLS Supplementary Series 1.*, Amesbury, 2000, pp. 63–72.

Bond, C.J., *Monastic Landscapes*. Stroud: Tempus, 2004.

Bond, C.J., "The location and siting of Cistercian houses in Wales and the West", in *Archaeologia Cambrensis*, 154, 2005, pp. 51–80.

Bond, C.J., "Monastic water management in Great Britain: a review", in Keevill, G., Aston, M. and Hall, T. (eds.) *Monastic Archaeology,* Oxbow, Oxford, pp. 88–136.

Burton, T., *Chronica Monasterii de Melsa, a Fundatione usque ad Annum 1396* (Cambridge Library Collection - Rolls), ed. by E. Bond, Cambridge University Press, Cambridge, 2012.

Callo-Concha, D., Sommer J.H., Kleemann J., Gatzweiler F.W., and Denich M., "Marginality from a Socio-ecological Perspective", in von Braun, J. and Gatzweiler, F., *Marginality. Addressing the Nexus of Poverty, Exclusion and Ecology*, Springer, Dordrecht, 2014, pp. 57–65.

Campbell, B. M. S., *English Seigniorial Agriculture 1250–1450* (Cambridge Studies in Historical Geography, vol 31), Cambridge University Press, Cambridge, 2000.

Catchpole, T. and Priest, R., *Turning the Plough Update Assessment*. Summary Report. Gloucestershire County Council and English Heritage, Gloucestershire, 2012.

Charvátová, K., "Settlement Patterns within the Domain of Plasy Abbey, Bohemia 1100–1400 A.D.", in *Památky Archeologické*, 84, 1993, pp. 120–147.

Christiansen, E., "The Messengers of Medieval Technology? Cistercians and Technology in Medieval Scandinavia' by Anna Götlind. A review", in *The English Historical Review* 109, 1994, p. 411.

Comet, G., "Technology and Agricultural Expansion in the Middle Ages: The Example of France North of the Loire", in Langdon, J., Astill, G., and Myrdal, J. (eds), *Medieval Farming and Technology*, Brill, Leiden, 1997, pp. 11–39.

Constable, G., *The Reformation of the Twelfth Century*, Cambridge University Press, Cambridge, 1996.

Davidson, A., "The medieval monastery as franchise monopolist", in *Journal of Economic Behavior and Organization & Organization*, 27, 1995, pp. 119–128.

Ferenczi, L., "Estate structure and development of the Topusko (Toplica) Abbey: a case study of a Medieval Cistercian Monastery," in *Annual of medieval studies at Central European University Budapest*, 12, 2006, pp. 83–99.

Ferenczi, L., "Monastic manors and the landscape impact of Cistercian estate management: A landscape archaeological and historical ecological project on Plasy Abbey", in Sawicki, J. and Vargha, M. (eds.) *Proceedings of the Postgraduate and Early Career Conference in Medieval Archaeology* Wroclaw: Yellow Point Publications, Prague, 2022, pp. 69–86, https://zenodo.org/records/10865503

Ferenczi, L., "Water Management in Medieval Hungary", in Laszlovszky, J., Nagy, B., Szabó, P. and Vadas (eds.), *The Economy of Medieval Hungary*, Brill, Leiden-Boston, 2018, 238–252.

Fleming, A. and Barker, L., "Monks and local communities: the late-medieval landscape of Troed y Rhiw, Caron Uwch Clawdd, Ceredigion", in *Medieval Archaeology*, 52, 2008, pp. 261–90.

France, J., *Separate but Equal: Cistercian Lay Brothers 1120–1350* (Cistercian Studies, 246), Cistercian Publication, Collegeville, 2014.

Freeman, E.M., "What Makes a Monastic Order? Issues of Methodology in The Cistercian Evolution", in *Cistercian Studies Quarterly,* 37, 2002, pp. 429–442.

Freeman, E.M., Narratives of a New Order. Cistercian Historical Writing in England, 1150–1220. (Medieval Church Studies, 2), Brepols, Turnhout, 2002.

Gahlbeck, Ch., "Die Ausbreitung der Zisterzienser in den Herzogtümern Polens bis zur Wende vom 12. zum 13. Jahrhundert", in Felten, F.J. and Rösener, W., *Norm und Realität Kontinuität und Wandel der Zisterzienser im Mittelalter*, Lit Verlag, Berlin, 2009, pp. 489–547.

Gilchrist, R. and Mytum, H., *The Archaeology of Rural Monasteries,* BAR British Series No. 203, Bar Publishing, Oxford, 1989.

Hardt, M., "Subsistenzwirtschaft – Vergetreidung – Dörfer. Schritte auf dem Weg zur hochmittelalterlichen Kulturlandschaft in Ostmitteleuropa", in *Præhistorica*, 31, 2014, pp. 569–583.

Hervay, L.F., *Repertorium historicum ordinis Cisterciensis in Hungaria*, Editiones Cistercienses, Roma, 1984.

Higounet, Ch., *La grange de Vaulerent. Structure et exploitation d'un terroir cistercien de la plaine de France. XIIe-XVe siècle*, S.E.V.P.E.N., Paris, 1965.

Hirzel, A.H. and Le Lay, G., "Habitat suitability modelling and niche theory", in *Journal of Applied Ecology*, 2008, 45, pp. 1372–1381.

Hoffmann, R. C., "Economic Development and Aquatic Ecosystems in Medieval Europe", in *The American Historical Review*, 101, 1996, pp. 631–669.

Hoffmann, R., *An Environmental history of medieval Europe*, Cambridge University Press, Cambridge, 2014.

Hopcroft R. L., *Regions, Institutions, and Agrarian Change in European History,* The University of Michigan Press, Ann Arbor, 1999 (2002).

Ihrig, D., *A magyar vízszabályozás története* [The History of Water Regulations in Hungary], Országos Vízügyi Hivatal, Budapest, 1973.

Jamroziak, E., "East-Central European Monasticism: Between East and West?", in Beach, A. and Chochelin, I. (eds.), *The Cambridge History of Medieval Monasticism in the Latin West*, Cambridge University Press, Cambridge, 2020, pp. 882–900.

Jamroziak, E., "Cistercian monasteries on the northern frontiers and their social context: comparative study of Scotland and Pomerania (an overview of the project)", in Czaja, R., Heimann, H.D., and Wemhoff, M. (eds.), *Klosterlandschaften. Methodisch-exemplarische Annäherungen*. Wilhelm Fink, München, 2008, pp. 127–140.

Jamroziak, E. and Stöber, K., (eds.), *Monasteries on the Borders of Medieval Europe*. Conflict and Cultural Interaction (Medieval Church Studies, 28), Brepols, Turnhout, 2013.

Janssen, W., "Zisterziensische Wirtschaftsführung am Niederrhein: Das Kloster Kamp und seine Grangien im 12.-13 . Jahrhundert", in Janssen, W. and Lohrmann, D. (eds.), *Villa - Curtis - Grangia. Landwirtschaft zwischen Loire und Rhein von der Römerzeit zum Hochmittelalter. Économie rurale*

entre Loire et Rhin de l'époque gallo-romaine au XIIe–XIIIe siècle (16. Deutsch-französisches Historikerkolloquium des Deutschen Historischen Instituts Paris, Xanten, 28.9.–1.10, 1980) (Beihefte der Francia, 11), Artemis, München, 1983, pp. 205–221.

Kain, R. J. P., and Oliver, R. R., *Historic Parishes of England and Wales: an Electronic Map of Boundaries before 1850 with a Gazetteer and Metadata* [data collection]. UK Data Service. SN: 4348, http://doi.org/10.5255/UKDA-SN-4348-1

Kehnel, A., "Heilige Ökonomie. Ansätze zu einer systematisch vergleichenden Erforschung der Wirtschaftsorganisation mittelalterlicher Klöster und Orden", in Melville, G. and Müller, A. (eds.), *Mittelalterliche Orden und Klöster im Vergleich. Methodische Ansätze und Perspektiven* (Vita regularis, 34), Lit Verlag, Berlin, 2007, pp. 269–320.

Kienzle, B.M., *Cistercians, Heresy and Crusade in Occitania, 1145–1229: Preaching in the Lord's Vineyard*, Boydell & Brewer, New York, 2001.

Kinder, T.N., *Cistercian Europe: Architecture of Contemplation*, Eerdmans Publishing, Grand Rapids (MI), 2002.

Laszlovszky, J., Mérai, D., Szabó, B., and Vargha, M. "The 'Glass Church' in the Pilis Mountains – The Long and Complex History of an Árpád Period Village Church." *Hungarian Archaeology. E-journal* 2014 winter; avalaible at: http://www.hungarianarchaeology.hu/wp-content/uploads/2015/01/Laszlovszky_E14T.pdf (Last accessed: 2020.07.13)

Lekan, T. and Zeller, T., "Region, Scenery, and Power: Cultural Landscapes in Environmental History", in Isenberg, A.C. (ed.), *The Oxford Handbook of Environmental History*, Oxford University Press, Oxford, 332–368.

Lhotský, R., The role of historical fishpond systems during recent flood events. Journal of Water and Land Development 14 (2010), pp. 49–65

Liebermann, M., *The Medieval March of Wales. The Creation and Perception of a Frontier, 1066-1283*, Cambridge University Press, Cambridge, 2010.

Loveluck, Ch., *Northwest Europe in the Middle Ages. ca. A.D. 600–1150*, Cambridge University Press, Cambridge, 2013.

Lucas, A., *Wind, Water, Work: Ancient and Medieval Milling Technology*, Brill, Leiden, 2006.

Lucas, A., "Narratives of Technological Revolution in the Middle Ages", in Classen, A. (ed.), *Handbook of Medieval Studies: Terms, Methods and Trends*, De Gruyter, Berlin, 2010.

Mann, M., *The Sources of Social Power. Vol. I. A history of power from the beginning to A.D. 1760*, Cambridge University Press, Cambridge, 1986.

Matarasso, P. (ed.), *The Cistercian World: Monastic Writings of the Twelfth Century*, Penguin, London, 1993.

Mate, M., "Agrarian Economy After the Black Death: The Manors of Canterbury Cathedral Priory, 1348–91", in *Economic History Review*, 37, 1984, pp. 341–354.

Mossig, Ch., *Grundbesitz und Güterbewirtschaftung des Klosters Eberbach im Rheingau: 1136 – 1250. Untersuchungen zur frühen Wirtschaftsverfassung der Zisterzienser* (Quellen und Forschungen zur hessischen Geschichte, 36). Hessische Historische Kommission, Darmstadt-Marburg, 1978.

Müller, A., "Divided Loyalties in Religious Orders: Structures and Patterns in Cistercian Wales and Ireland", in Sonntag, J. and Zermatten, C. (eds.), *Loyalty in the Middle Ages: Ideal and Practice of a Cross-Social Value* (Collected Essays in European Culture, 5), Brepols, Turnhout, 2015, pp. 345–360.

Nováková, R., "Opatovický mlýn – na počátku byla grangie cisterciáků? [Opatovice mill – was there originally a Cistercian grange?]", *Vlastivědný sborník Dačicka, Jindřichohradecka a Třeboňska*, 17, 2005, pp. 7–33. Available at: https://digi.ceskearchivy.cz/1580/23/1109/261/25/0 (Last accessed: 2020.07.13)

Oberste, J., *Visitation und Ordensorganisation. Formen sozialer Normierung, Kontrolle und Kommunikation bei Cisterziensern, Prämonstratensern und Cluniazensern (12.- frühes 14. Jahrhundert)* (Vita regularis 2), Lit Verlag, Münster, 1996.

Oram, R., "Landscape, Land Use, and the Environment", in Kaczynski, B. M. (ed.), *The Oxford Handbook of Christian Monasticism*, Oxford Handbooks, ed. (2020; online ed., Oxford Academic, 8 Oct. 2020), https://doi.org/10.1093/oxfordhb/9780199689736.013.19 (Last accessed2024.01.18).

Pearson, M., *Site Specific-Performance*, Palgrave, London, 2010.

Pestell, T., *Landscapes of monastic foundations. The Establishment of Religious Houses in East Anglia* (Anglo-Saxon Studies 5), Boydell Press, Woodbridge, 2004.

Pető, Zs., *Hermits in the Heart of the Hungarian Kingdom* (Series Minor, 41), Archaeolingua, Budapest, 2018.

Picart, N., "Le domaine de Preuilly." in Pressouyre, L. (ed.), *L'Espace cistercien. Colloque L'Espace cistercien, abbaye de Fontfroide, 24–27 mars 1993, Léon*, Comité des travaux historiques et scientifiques, Paris, 1994, pp. 568–580.

Pollard, S., *Marginal Europe: the contribution of the marginal lands since the middle Ages*, Clarendon Press, Oxford, 1997.

Pollard, S., "Regional character: the economic margins of Europe", in Royle, E. (ed.), *Issues of regional identity: in honour of John Marshall*, Manchester University Press, Manchester, 1998, pp. 14–24.

Puls, U. and Puls, K., "Agrarwirtschaft der einstigen Zisterzienserklöster in Brandenburg", in Schmidt, O.H. and Schumann, D. (eds.), *Zisterzienser in Brandenburg* (Studien zur Geschichte, Kunst und Kultur der Zisterzienser, vol 1), Lukas Verlag, Berlin, 1996, pp. 42–43.

Přikryl, I. "Historický vývoj našeho rybníkářství a rybničních ekosystémů," [Historical fishponds and fishpond ecosystems], in *Veronica*, 1, 2004, pp. 7–10.

Procter, E.J., *The topographical legacy of the medieval monastery: evolving perceptions and realities of monastic landscapes in the southern Welsh Marches (volume 1 of 2)*. PhD thesis, University of Exeter, 2018. Available at: https://ore.exeter.ac.uk/repository/handle/10871/37382 (Last accessed: 2020.07.13)

Rackham, O., *The history of the countryside*, Dent, London/Melbourne, 1986

Reimann, H., "Die Historische Bedeutung des Zisterzienserklosters Dargun für die mittelalterliche Entwicklung eines magdeburgisch-pommerschen Grenzgebietes", in Schich, W. (ed.), *Zisterziensische Wirtschaft und Kulturlandschaft*, Lukas Verlag, Berlin, 1998, pp. 57–63.

Renes, H., "Historic Landscapes Without History? A Reconsideration of the Concept of Traditional Landscapes", Rural Landscapes: Society, Environment, History, 2, pp. 1–11.

Ribbe, W., "Sozialstruktur und Wirtschaftsverhältnisse in den Zinnaer Klosterdörfern auf dem Barnim", in Ribbe, W. (ed.), *Zisterzienser-Studien III*, Colloquium Verlag, Berlin, 1976, pp. 107–139.

Rippon, S., "Water and wetlands in medieval estate management: Glastonbury Abbey, Meare and the Somerset Levels in South West England", in Klápšte, J., *Water management in medieval rural economy. Ruralia V. (27e septembre - 2e octobre 2003. Lyon/Villard-Sallet, Région Rhône-Alpes, France* (Památky archeologické. Supplementum, 17), Institute of Archaeology, Prague, 2005, pp. 93–112.

Roberts, R., *Cistercian Granges in Glamorgan and Gwent*, The Glamorgan-Gwent Archaeological Trust Ltd, report no. 2014/023, Swansea, 2014. Available at: http://orapweb.rcahms.gov.uk/coflein//6/630493.PDF (Last accessed: 2020.07.13)

Röhrkasten, J., "Zur Übertragung von Wirtschaftsdaten im Kontext der mittelalterlichen Klosterwirtschaft", in Andenna, C., Herbers, K., and Melville, G., *Netzwerke: Klöster und Orden im Europa des 12. und 13. Jahrhunderts*, Franz Steiner Verlag, Stuttgart, 2012, pp. 55–76.

Rösener, W., *Reichsabtei Salem. Verfassung und Wirtschaftsgeschichte des Zisterzienserklosters von der Gründung bis zur Mitte des 14ten Jahrhunderts* (Konstanzer Arbeitskreis, Vorträge und Foschungen, 13), Jan Thorebeke Verlag, Sigmaringen, 1974.

Rynne, C., "Waterpower in Medieval Ireland", in Squatriti, P. (ed.), *Working with Water in Medieval Europe – Technology and Resource-Use*, Brill, Leiden, 2000, pp. 1–50.

Schich, W., "Grangien und Stadthöfe der Zisterzienserklöster östlich der mittleren Elbe bis zum 14. Jahrhundert", in Schich, W. (ed.), *Zisterziensische Wirtschaft und Kulturlandschaft* (Studien zur Geschichte, Kunst und Kultur der Zisterzienser 3), Lukas Verlag, Berlin, 1998, pp. 64–98.

Seel, E., *Vielfalt in der Einheit - Zisterziensische Klosterlandschaften in Mitteleuropa"Klosterlandschaft Plasy*, Internet publication, available at:

file:///C:/Users/36304/Desktop/Prague/cistercscapes.eu/Plasy_KLI_Bericht.pdf (Last accessed: 2020.07.13)

Smith, J. L., *Water in Medieval Intellectual Culture. Case-Studies from Twelfth-Century Monasticism*, Brepols, Turnhout, 2017.

Southern, R.W., *Wester Society and the Church in the Middle Ages*, Penguin, London: 1990.

Söder, D., "Klosterlandschaft Eberbach. Das Kloser Eberbach als Wiertshaftsbetrieb und seine Spuren in der Rheingauer Landschaft", in Meier, J. (ed.), *Klöster und Landschaft. Das kulturräumliche Erbe der Orden*. Aschendorf Verlag, Münster, 2010, pp. 39–60.

Untermann, M., *Forma Ordinis Forma Ordinis. Die mittelalterliche Baukunst der Zisterzienser*, Deutscher Kunstverlag, Munich, 2001.

Untermann, M., "Gebaute unanimitas. Zu den 'Bauvorschriften' der Zisterzienser", in Knefelkamp, U. (ed.), *Zisterzienser. Norm, Kultur, Reform*. Berlin/Heidelberg/New York 2001, pp. 239–266.

Weiss, H., *Zisterzienserabtei Ebrach. Eine Intersuchung zur Grundherrschaft, Gerichtsherrschaft und Dorfgemeinde im fränkischen Raum*, Gustav Fischer Verlag, Stuttgart, 1962.

Werlen, B., *Society, Action and Space: An alternative human geography*, Routledge, London, 1993.