



The Saale-Unstrut cultural landscape corridor

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Abstract

Cultural landscapes are the result of long-term human–environment interaction, but they are nevertheless worldwide vulnerable to processes of global change such as land-use change, urbanization, neglect and abandonment. The cultural landscape mosaic along the rivers Saale and Unstrut (Germany, Central Uplands) provides many features of (pre-)historical human activities, in particular since the Middle Ages. Most of these elements occur in what can be defined as “cultural landscape corridor” along the river valleys, thus conveying a broad insight in historic land-use, including viticulture, and architecture of the past centuries in a nutshell. The area has been nominated for inscription in the List of World Heritage, due to its famous components in Naumburg, Freyburg and Pforta that representatively reflect cultural processes of the High Middle Ages. However, population loss and land-use change as well as neglect of lower-ranking monuments may lead to a gradual decline of the historical cultural landscape and its multiple elements. In this contribution, we summarize the landscape development in the Saale-Unstrut area and discuss measures to raise awareness of selected elements of a coherent cultural landscape corridor.

Keywords Cultural landscape · Cultural heritage · Historic monument · Monument preservation

Introduction

In our intensively used landscape, human-made structures such as transport routes lead to progressive fragmentation of natural habitats. Apart from the degradation of biotopes,

habitat fragmentation is regarded as one of the biggest problems in the conservation of endangered animal and plant species (e.g., Tillmann 2005 and references therein). Therefore, the reconnection of habitat fragments is considered as an important goal of nature conservation. Wildlife corridors (habitat corridors) link biotopes (e.g., Jaeger et al. 2011), prevent further decline of populations of endangered animal and plant species and allow (re-)immigration of species into an area. These corridors are usually linear structures such as

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hedges or wild bridges creating the impression for an animal of not leaving its natural habitat.

A “cultural landscape corridor” is an integrative concept allowing the (human) visitor to get the experience of not leaving a cultural landscape—with respect both to semi-natural habitats and to historic land-use, landmarks, architecture etc. This cannot be achieved entirely, of course, since historic landscapes are the result of a long-term development and contain, in varying proportions, multiple items of different epochs.

The area along the river valleys near the confluence of Saale and Unstrut in Saxony-Anhalt (Germany) offers many features for a “cultural landscape corridor.” This term should be understood as it is used for the “Erie canalway national heritage corridor” extending nearly 600 km between Albany and Buffalo, NY (Anonymous 2006). For this project, a comprehensive plan for a corridor was established, protecting historic landmarks and natural habitats, in order to support the conservation of an extended area along the Erie Canal, in particular as tourist attraction. One focus was the importance of a waterway for the economic development during the past 200 years.

However, “corridors,” if too extensive, may lose their function as a link between too far apart places of interest. This issue was discussed for the entire system of silk roads as a world heritage site (or some smaller sections of them),

extending over wide parts of central Asia (Anonymous 2013a; Williams 2014). The Upper Middle Rhine Valley is another example for a “corridor,” renowned for its high number of important monuments in a cultural landscape bordering a 65 km section of the river Rhine. The area has been approved as World Heritage site in 2003, though high traffic load in the valley is considered as a major drawback in view of its attractiveness for visitors (Anonymous 2008, 2013b).

The area discussed here, the lower Unstrut and parts of the middle Saale valley, is, compared to the examples mentioned above, a small “corridor” (50 km between Wendelstein/Memleben and Naumburg). Waterways and paths along the rivers guide, along cliffs and vineyards through a hilly terrain, to many features and important landmarks of a cultural landscape (Figs. 1, 2). Climatic, topographic and soil conditions promoted intensive settlement activity along the lower Unstrut and the middle Saale. From prehistory to present, the cultural landscape incorporates relicts of the cultural history of all epochs. Most of them are accessible during a short round trip, in particular important and identity-generating historic monuments of the High Middle Ages (Schmitt 2014).

In the present article, starting with a geological and ecoregional outline of the Unstrut and the Unstrut/Saale river mouth area, several aspects of the cultural landscape are addressed,

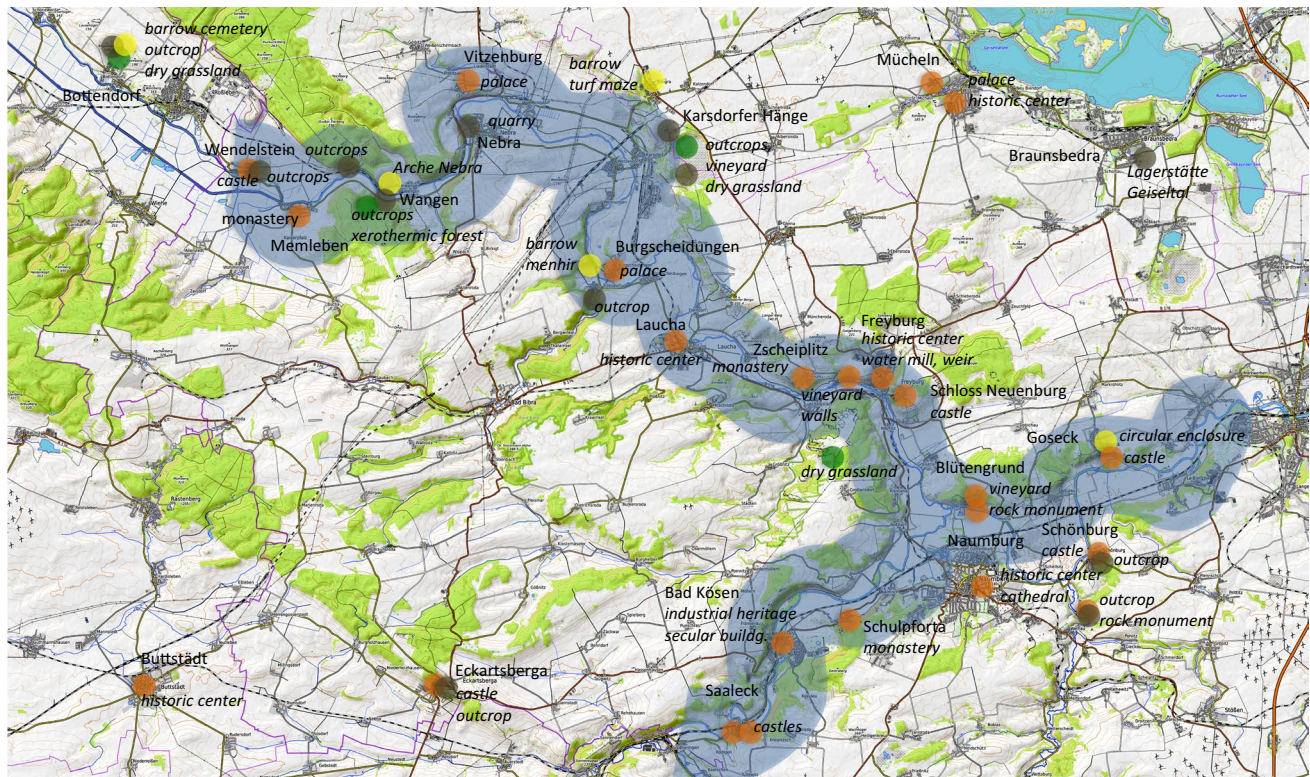


Fig. 1 The cultural landscape corridor delineating the courses of the rivers Unstrut (upper left to lower right part of the image) and Saale (lower right). Important elements of the landscape are marked by dots

(brown—geosites, yellow—prehistoric sites, orange—architecture, green—important habitats). The map shows a 45 × 25 km section. (Base map according to opentopomap.org.)



Fig. 2 Aspects of the relief, geology and viticulture and early industrial architecture of the Saale-Unstrut cultural landscape corridor. **a** Floodplain of the Unstrut near Zscheiplitz. **b** The old, pre- and interglacial valley of the Unstrut near Zscheiplitz. **c** Limestone outcrop near Zeddenbach (Lower Muschelkalk). **d** Middle Buntsandstein

outcrop in Schönbürg (Saale). **e** Vineyards at the location Nüssenberg (near Weischütz; above the vineyards dry grassland on Muschelkalk). **f** The Zeddenbach water mill near Freyburg, a monument of the industrial age around 1900

thereby exemplifying specific problems, and attempting to raise public awareness and to highlight local preservation measures.

The Unstrut—evolution of a cultural landscape

The current valley of the lower Unstrut was formed during the Drenthe stage of the Saale glaciation (300,000—130,000 years BP; cf. Fig. 2a, b). Today, the Unstrut

valley cuts through the Muschelkalk ridge “Hainleite” (the “Thuringian Gate”) and passes the medieval castle ruin “Wendelstein,” crowning a gypsum rock of the Kyffhäuser fault zone. In its lower course, the Unstrut valley forms steep slopes, cutting through the Lower Triassic Middle Buntsandstein. Between Wendelstein and Nebra, the Buntsandstein strata dip toward north and the soft clays of the Upper Buntsandstein form the northern slopes of the valley that opens southwards to a wide basin. Near Karsdorf, the bedrock consists of Muschelkalk, forming steep slopes between Laucha and Freyburg. North of Naumburg, the

Unstrut flows into the river Saale. The northern slopes of the river valley at the “Blütengrund,” again, consist of Middle Buntsandstein.

Presence of humans in the region dates back to the Middle Pleistocene (Holstein interglacial) well before the current Unstrut riverbed was shaped (e.g., Vlček et al. 2000). During the last glaciation, the Weichselian, the deposition of loess provided the basis for fertile soils and hence the development of agriculture. Archeological sites of the Neolithic Linear Pottery Culture are regularly associated with loess deposits (e.g., Bahn 2014). Accumulated deposits of loam in floodplains may be an indicator for increasing erosion of soil due to intensification of agriculture. At that time, the first cultural landscape along the river may have been shaped (cf. Jäger 1962; Litt and Wansa 2008; Bahn 2014). By Middle Neolithic, a regional population density similar to that of the Middle Ages may be assumed. For Linear Pottery culture and Stroked Pottery culture extensive settlement activity along the Lower Unstrut was revealed; an important prehistoric landmark of that time, the Goseck circle, has been reconstructed (Bertemes and North 2011). The following Funnelbeaker culture extended the settlement activity of its predecessors. The construction of a new railway route in southern Saxony-Anhalt between 1994 and 2010 provided further insight in the prehistoric development of the region. Settlement activity of the Corded Ware culture and the Funnelbeaker culture (3rd century BC) was documented. The latter forms the transition from the late Neolithic to early Bronze Age. The spectacular Nebra sky disk from a “wealth deposit” near Nebra was assigned to the Bronze Age Únětice culture. Analysis of trace metals revealed extensive trading networks for copper, tin and gold used for manufacturing the disk (e.g., Ehser et al. 2011). The Únětice culture settlements near Wennungen (Karsdorf) were partially superimposed by layers of settlements of the late Bronze Age/early Iron Age. The use of iron, which could be mined from many local pits, greatly simplified ore prospection.

Many settlements along the Unstrut and Saale documented the upcoming of the Celtic La Tène culture of the pre-Roman Iron Age; also settlement of Germanic tribes immigrating from the north was evident. Many artifacts assigned to the following time of the Roman Empire were also found along the lower Unstrut and the Saale area. These find-spots are mostly associated with still existing towns, indicative for a permanent settlement at specific locations over nearly 2000 years (Bahn 2014). Many trading activities are also reflected by the course of the Via Regia during the time of the Holy Roman Empire, crossing the river Unstrut near Naumburg.

During the twelfth century, monks from the Cistercian monastery of Walkenried as well as Flemish settlers were active in the Unstrut valley, constructing drainage ridges and dams. A “Flemish ditch” in the Ritteburg/Gehofen

sector was still mentioned in a sixteenth century document (Schmidt 1934) and the village Flemmingen (Naumburg) is reminiscent of the Flemish. Not just in the name of the village, but also in its site complex, Flemish settlement activity is still identifiable (Schlesinger 1975). In the Early Modern Age, along with rapid development of technology, the number of documents describing the economic use of the river Unstrut increased. Water mills and weirs were constructed, the river was excavated, meanders were removed, tow-paths and locks were constructed. By the end of the eighteenth century, the river was a navigable waterway. This, of course, essentially changed the appearance of the river until today (Fig. 2f).

The courses of the rivers Unstrut and Saale mark the landscape corridor within an area of few kilometers. Besides stone monuments (castles, monasteries, secular buildings) and other historic landmarks, landscape elements associated with viticulture are of major importance (Figs. 1, 2).

Viticulture and related vegetation

Vineyards and viticulture have been recorded since the end of the tenth century (cf. Wittmann 2008 and references therein). The area under cultivation fluctuated during the Early Modern Age and reached a minimum in the late nineteenth century during the time of the *Phylloxera* epidemic. Currently, 750 ha are under cultivation. Still, all landmarks of the long history of viticulture will promote the identification as a wine-producing region (cf. Fig. 2e). Arranged parallel to the upper course of the Unstrut (and Saale as well), they delineate the cultural landscape corridor. As large machinery can only be employed in flat or moderately sloped terrain but not on the steep narrowly terraced traditional vineyard slopes, the future of viticulture on some of the historic vineyards is uncertain. Some vineyards have been abandoned, and many vineyard walls are disintegrating. The preservation of viticulture on important traditional sites (e.g., Schweigenberge/Freyburg) was achieved by incentive programs supporting agriculture on marginal lands (e.g., Anonymous 2015). The abandonment of terraced vineyards goes along with a loss of vineyard specific herbs that depend on the traditional manual ways of tillage (Bergmeier and Möhler 2014). Among other rare plants of regularly hoed ground, the so-called “Hackflora,” early flowering geophytes with bulbs as storage organs have been identified in vineyard complexes of the Lower Unstrut: *Gagea villosa* (hairy star-of-Bethlehem), *Muscari neglectum* (grape hyacinth), *Ornithogalum nutans* (drooping star-of-Bethlehem) and *Tulipa sylvestris* (wild tulip). In the last 3–4 decades, modern viticultural methods such as herbicide application, deep tillage, and greening of lanes between the grapevine lines with perennial grasses contributed to the “Hackflora” decline.

Muscari and *Tulipa* reproduce mainly asexually by bulbils, while the others reproduce also sexually and disperse by seeds. Generally, *Gagea villosa* and *Muscari neglectum* grow predominantly on steep sunny slopes in vineyards, where weeds are traditionally removed by hoeing (but not by deep plowing). Hoeing affects chiefly competitive plants but favors bulbous plants and annuals developing early in the year. *Ornithogalum nutans* and *Tulipa sylvestris* have largely disappeared from the cultivated sections but may still be observed at the margins of vineyards, in semi-shaded, mesic locations with reasonable water supply.

Other important features in the local cultural landscape are historic vineyard terrace walls and ruins. Generally, human-made walls copy natural rock outcrops (the latter are uncommon in much of Central Europe) and are of particular interest as they represent semi-natural and cultural landscape elements at the same time. Some old terrace walls are relevant for the conservation of rare animal and plant species as well as whole plant communities and ecosystems. Such plant ensembles, sometimes tightly packed with species of *Sedum* (stonecrops) and *Asplenium* (spleenworts), with *Cymbalaria muralis* (ivy-leaved toadflax), rarely even with naturalized *Antirrhinum majus* (snapdragon), provide “eye-catching” aspects to the vegetation cover. The ruderal vegetation of vineyard margins and castle ruins consist of species-rich plant communities, chiefly of thermophilous tall thistles and mulleins such as *Onopordum acanthium*, *Verbascum densiflorum*, *Echinops sphaerocephalus*, *Carduus nutans* and *C. acanthoides*. The large size of these biennial or perennial plants and their large flowers add seasonal aspects and contribute, if unconsciously for most, to the individual perception of the cultural landscape. Moreover, the rather long flowering season and the enormous nectar and pollen supply add considerably to the available food resources for beetles, butterflies, moths and other insect groups. The same applies to the vegetation of neglected vineyards (Fig. 3) and roadsides, which includes *Daucus carota* (wild carrot), *Picris hieracioides* (hawkweed oxtongue), *Reseda lutea* (wild mignonette) and *R. luteola* (weld), *Echium vulgare* (viper’s bugloss), *Tragopogon dubius* and *T. orientalis* (western annual goat’s beard and eastern goat’s beard). On wall bases and limestone debris, pioneer communities with *Galeopsis angustifolia* (red hemp-nettle), *Pseudofumaria lutea* (yellow corydalis), *Antirrhinum majus* (snapdragon) and *Asplenium ruta-muraria* (wall-rue) may be found in wall gaps.

Dimension stone in the Saale-Unstrut region

The Variscan foreland basin (Germanic basin, *Germanisches Becken*) was formed in the Upper Permian, covered almost the whole of present-day Central Europe and existed



Fig. 3 Ruderalized sites are not necessarily home to endangered species (other than, e.g., dry grassland), but provide resources to many species of fauna and flora and add substantially to local biodiversity. Moreover, they add interesting phenological aspects to a cultural landscape (ruderalized vineyard near Karsdorf, midsummer aspect)

until the end of the Triassic. Volcanic deposits and erosional products of the Variscan Mountains (Rotliegend) formed the initial stratigraphic units. Later on, transgressions and regressions resulted in alternating continental, fluvial, lacustrine and marine depositional environments and thus in a large variety of the resulting rock types. In the Saale-Unstrut area, the almost complete occurrence of the Germanic Triassic supergroup (Buntsandstein, Muschelkalk, Keuper; cf. Fig. 2c, d), including Zechstein (Upper Permian) manifest as outcrops in the area of the cultural landscape corridor (Müller et al. 2014). While all these rocks are important resources for dimension stone throughout Germany, long-term resistance to weathering of rocks from different strata is extremely variable (Stück et al. 2013, 2018, Fig. 4).

The reddish colored Buntsandstein and limestone from Muschelkalk strata were attractive building stones for representative church and secular buildings, which are now among the most important tourist attractions in Germany. Usable dimension stone was gained from specific strata, like the “Schaumkalk” limestone beds of the Wellenkalk formation or the Nebra sandstone (Solling Formation of the Middle Buntsandstein). Some important buildings, Saaleck and Rudelsburg, the inner ward of the Neuenburg, the former monastery Schulpforte, the Naumburg Cathedral, and many smaller historic buildings are mainly built of “Schaumkalk” limestone. The castle Schönbürg (Saale), erected on a sandstone cliff east of Naumburg, was constructed from outcropping Buntsandstein of the Hardeggen (reddish) and Solling formation (gray yellow). A unique stone monument, the “Stone Album” (“Steinernes Bilderbuch,” see below), the largest relief group in Germany, also consists of Buntsandstein. The Stone Album is a 200-meter-long relief of twelve pictures, of which eleven biblical themes are devoted to viticulture; the twelfth shows Duke Christian



Fig. 4 Analysis of weathering phenomena. Left: artificially weathered building stone samples subjected to “salt splitting tests” by several cycles of soaking with sodium sulfate solution and subsequent drying. As also documented for stones in a wall section (right), resist-

ance against salt crystallization considerably differs among varieties of Buntsandstein rock. Except from Seebergen and Friedewald, all other localities are in the Saale/Unstrut area (cf. Stück et al. 2018)

II of Saxony-Weißenfels on horseback. The rock monument is exposed to severe weathering, and long-term preservation may be difficult (Wedekind 2014, Fig. 5).

At the Wendelstein rock, the bright, grayish-white Werra anhydrite (Zechstein series) rises over the valley of the Unstrut. The partially ruined Wendelstein castle, likewise consists of anhydrite, is situated at the hilltop above a river bend. Due to successive hydration of the anhydrous calcium sulfate and re-transformation to gypsum, along with substantial volume increase of the anhydrite the ruins show peculiar weathering phenomena (Fig. 6). Furthermore, intense karst phenomena are visible.

An important architectural feature of the region is the dry wall used for the terracing of vineyards. Walls to stabilize terraces are built of the various locally available rocks, mostly without mortar. Running parallel to the river valleys the walls are taking up the linearity of the “corridor”. This is perhaps the most typical element of the cultural landscape (Fig. 7). Some of the terraces are protected monuments (Seyfried et al. 2003). Chiefly, the walls prevent soil erosion, but they are important in many respects. They add the “green terrace texture” to the landscape. As mentioned above, they constitute an important habitat for rock-dwelling fauna and flora. Due to their heat storage capacity, they influence the microclimate of the vineyard terraces. However, from today’s vintners’ point of

view, they are often problematic, since their preservation is complex and elaborate, and employment of machines in the vineyard is proved difficult. There is also a tendency to replace the laborious viticulture on terraced steep slopes by culturing in rather plain terrain, which leaves the abandoned vineyards and terraces gradually decaying.

Challenged cultural heritage in a cultural landscape corridor: some examples and measures for restoration

Besides natural and human-influenced habitats, architectural monuments are essential features of the cultural landscape corridor and it is a continuous task to keep them visible. Damage and neglect of monuments need to be detected and mapped, and monitoring helps to improve knowledge on the dynamics of decay phenomena and reveals restoration success or failure. A few examples may illustrate typical decay phenomena associated with local building stone (cf. Stück et al. 2018).

Monastery Memleben

Memleben is located about 4 km west of Nebra at the river Unstrut. The monastery was founded close to the



Fig. 5 The “Stone Album” (near Großjena) showing various weathering phenomena on the outcropping rock (Middle Buntsandstein). **a** overview, **b** small, heavily weathered section



Fig. 6 Ruined tower of the Wendelstein castle (Memleben). Volume expansion of building stones upon uptake of water of the anhydrite causes inclination or bending of walls, but also refilling of existing clefts

imperial palace of Memleben (the precise location is still not known—perhaps at the site of the Wendelstein castle)



Fig. 7 Terraced vineyards with walls and vineyard cabins (Schweigenberge, Freyburg)

by emperor Otto II in 979 AD and gained the status as an abbey and imperial immediacy for a short time, until 1015 AD (Wittmann 2001). Hence, the building may be considered as one of the most important historic landmarks in the region. The foundations of the monumental Ottonian church, some sidewalls and the southeastern parts of the exterior wall of the nave (including a side portal) are preserved. A smaller second church was erected northeast of the first building in the Thirteenth century. Here, the ruins of all walls, and a crypt, are preserved. The exterior walls consist of stones taken from Lower and Middle Buntsandstein strata. Weathering phenomena observed for the building stones depend on their lithotypes as well as on their positions in the wall (Stück et al. 2018; Fig. 8). Generally, the long-term durability of the of the Bernburg Formation sandstones (Lower Buntsandstein) is higher than that of the Middle Buntsandstein (e.g., Nebra Sandstone, Hardegsen Formation; cf. Fig. 4). For future restoration, use of the more durable sandstone should be considered.

The rock relief Stone Album (“Steinernes Bilderbuch”)

This extraordinary monument is located directly at the Unstrut near Großjena. Despite progressive disintegration (Stück et al. 2018; Fig. 5), many details are still clearly visible, or have been reconstructed during past restoration efforts. However, reasons for progressive decay are not well understood and may in outcropping rocks differ from decay of building stone. Moisture, penetrating from the vineyard terrace above the monument is one possible reason for mobilization of salts (Wedekind 2014). Resulting salt burst may be the main cause for the reported surface disintegration. Recent monitoring and restoration measures started by the

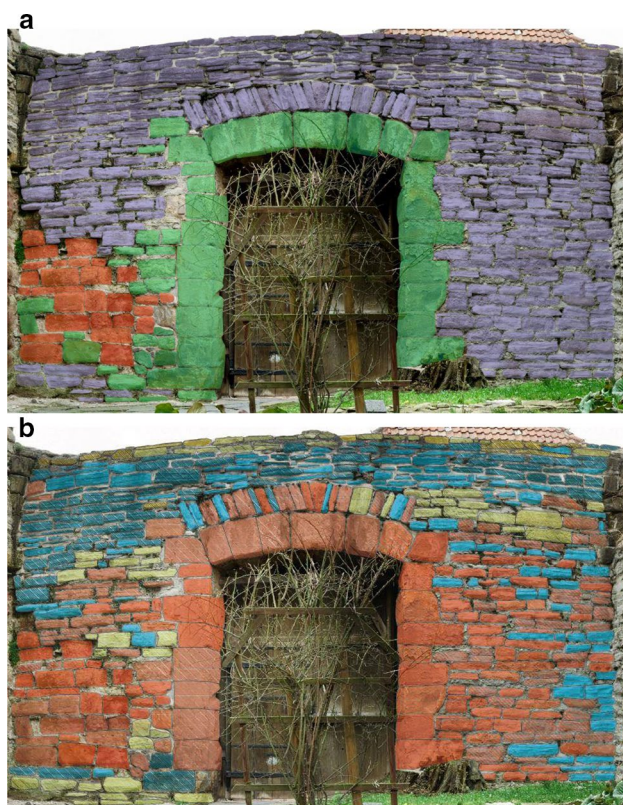


Fig. 8 Monastery Memleben, lithologies (**a**) and weathering phenomena (**b**) at a portal (cf. Stück et al. 2018). **a** Purple: Bernburg sandstone, green, red: sandstones taken from Middle Buntsandstein strata (green: Nebra sandstone). **b** Orange/red: formation of chips/scales; yellow: growth of lichens/algae; blue: backweathering

end of the last century and are continued under guidance of the restorer Peter Fiedler (Moritzburg). The restoration measures included scaffolding and strengthening the rock as well as renewal of dry walls, removal of soiling and fouling and applications of salt storage plasters for desalination.

Exemplary restoration of a vineyard cabin

In the past, vineyard houses were small but significant agricultural buildings. Vineyard guards stayed in the cabins to prevent theft of the ripe grapes. Tools were stored in the cabins and vineyard workers had a place for recreation and shelter. In the nineteenth century, more prestigious cabins served as belvedere and summer house.

A small modest cabin on the Kathert vineyard near Karsdorf is rather typical of its kind. With a ground area of approx. 4×6 m, walls of limestone rubble and a saddleback roof the cabin sits on a steep slope (Fig. 9). It is divided into a narrow vestibule and a main room. From the vestibule, a ladder provides access to a narrow attic. Both vestibule and attic provide storage space for farming tools. The main room was heatable.



Fig. 9 The Kathert vineyard near Karsdorf with vineyard cabin and adjacent dry grassland and shrubs

The cabin dates back to the first half of the past century. The plastered walls of the main room are decorated above the windows with circular stencil ornamentation. On the walls, in black letters, various aphorisms referring to viticulture were added in later times. Elaborate restoration would be inadequate for the unpretentious cabin, but the vineyard itself and its surroundings are representative of traditional viticulture in the cultural landscape (e.g., Bergmeier and Möhler 2014, see below). Although roof tiles were missing or broken and the mortar damaged, the construction as a whole was not affected. Restoration aimed at maintaining the status quo and improving the appearance of the interior (Fig. 10). To this effect, cracks were closed, and missing plaster areas were complemented with clay mortar. Detached areas of the distemper paint were glued onto the clay plaster with the aid of injected tylose (methyl cellulose) solution. Cyclododecane was used as a protective finish. The banners were supplemented. Sagged cement tiles of the floor were picked up, the floor was stabilized and the tiles re-laid. Torn tiles and joints were covered with a thin, fluid mortar. Missing shingles were replaced by traditional brick shingles. Backweathered mortar in the masonry was repaired with lime mortar.

The house is now in a condition ready to be entered by visitors. Along with several information boards (Fig. 11), it is part of the cultural landscape trail of the vineyard and its surroundings.

The Kathert vineyard

This vineyard is not only an example for the development of viticulture in the region but also an important part of the entire cultural landscape. The vineyard is embedded in the semi-natural dry grassland complexes of the “Karsdorf slopes.” The location of the vineyard on the edge of the Querfurt plateau with the Unstrut valley in front below is an appropriate site to understand the development of the



Fig. 10 Kathert's vineyard cabin after restoration. **a** Behind the cabin, limestone tiles for a small terrace were laid. **b** Restored floor tiles of the central room. **c** Wall section with banner

landscape—it presents much of the cultural landscape in a nutshell. Non-intensive traditional land-use, the proximity to other important cultural landmarks and the small-scale patterned landscape around makes this site ideal for setting up a cultural landscape trail. This trail is designed to convey key aspects of landmarks, viticulture and surrounding natural vegetation to visitors (Fig. 11).

Currently, there are about 1000 grapevine plants in the vineyard in a mixed set with at least 19 different grape cultivars. Among them are rare varieties, some endemic, which are no longer cultivated commercially, such as Schwarzer Heunisch, Tauberschwarz, Affenthaler or Clairette. The plants are ungrafted, the planting year can be assumed well before 1900.

The surrounding dry grassland influences the plant and animal communities on the vineyard itself. On an area of just 5 hectares, nearly 300 species of flowering plants were

found (Bergmeier and Möhler 2014). On the vineyard, rare ruderal plants (*Anchusa officinalis*, *Nepeta cataria*, *Torilis arvensis*) as well as species from the adjacent dry grassland and coppice margins occur (e.g., *Allium oleraceum*, *Asparagus officinalis* and *Prunus mahaleb*). Although the land-use is non-intensive and herbicides are not applied on the vineyard, bulbous and nutrient-demanding species of the typical “Hackflora” (see above) are absent because manual hoeing has been abandoned in the past decades. Adjacent coppice woodland (with *Corylus avellana*, hazel, prevailing) exhibits *Viola mirabilis*, *Polygonatum odoratum*, *Orchis purpurea*, *Epipactis atrorubens*, *E. helleborine*, *Cephalanthera damasonium* and *Anthericum ramosum*, to name but some of the remarkable species. Characteristic plants of the dry grassland adjacent to the vineyard (on gypsum and limestone soils) are *Sesleria caerulea*, *Teucrium montanum*, *T. chamaedrys*, *Adonis vernalis*, *Festuca valesiaca*, *Thymus praecox*, *Helianthemum canum*, *Allium senescens*, *Campanula glomerata*, *Cuscuta epithymum*, *Stipa capillata*, *Carlina acaulis* and *Gentianopsis ciliata*. This plant community (Teucrio-Seslerietum) represents the most typical dry grassland in the area (cf. Becker 2000).

The ruderalized vineyard/dry grassland/shrubland complexes are also important hotspots for arthropods, in particular hymenopterans, lepidopterans and orthopterans (Epperlein et al. 2014). Among the solitary bees on the vineyard complexes, eighteen species are on the red list of Saxony-Anhalt. Typical species present on the Kathert vineyard are *Halictus subauratus*, *Lasioglossum glabriusculum* and *L. interruptum*. *Lasioglossum clypeare* and *L. pygmaeum*, generally very rare species, were also observed. *Osmia bicolor* is generally quite frequent on calcareous soil, but is threatened with extinction in Saxony-Anhalt and was also found on the vineyard. *Osmia* nests in empty snail shells. *Nomada distinguenda*, a “cuckoo bee” parasitizing other bee species, notably *Lasioglossum villosulum*, is also threatened by extinction.

Several other peculiar species are the emerald wasp *Chrysura trimaculata*, the sphecoid wasp *Psenulus brevitarsis*, the pollen wasp *Celonites abbreviatus* and the tiphiid wasp *Tiphia villosa*. The crabronid wasp *Trypoxylon beaumonti* was recorded for the first time in Saxony-Anhalt.

Among grasshoppers, in addition to frequent generalists, the rare *Stenobothrus nigromaculatus* should be mentioned. The species is found on dry open, stony ground. The blue-winged grasshopper, *Oedipoda caerulescens*, is frequent on the vineyard and adjacent areas. Other species are *Stenobothrus stigmaticus* and *S. lineatus*, *Omocestus haemorrhoidalis*, *Chorthippus brunneus*, *Platycleis albopunctata*, *Gomphocerippus rufus* and *Tetrix tenuicornis*, which are all typical for xerothermous biotopes.

More than 20 butterfly species were recorded on the vineyards and neighboring dry grassland areas. *Boloria dia*,



Fig. 11 Design examples of cultural landscape trail image plates placed at the Kathert vineyard

Polyommatus coridon, and *P. bellargus* were frequent on the vineyard and dry grasslands—besides the most common small white (*Pieris rapae*). The following recorded butterflies are also relevant for nature conservation: *Coenonympha arcania* and *C. pamphilus*, *Colias alfacariensis*, *Erynnis tages*, *Lasiommata megera*, *Maniola jurtina*, *Melanargia*

galathea and *Pyrgus malvae*. The rarely observed hermit (*Chazara briseis*) was also detected in the study area, but on dry grassland only.

All these insects on the Kathert vineyard represent a large subset of vulnerable or endangered species found in the area (see, e.g., Vischer 2002), thus calling for conservation

measures to maintain the status quo. Non-intensive land-use on the vineyard allows species from the neighboring dry grassland to spread and take advantage of the fine-scaled habitat diversity (which is uncommon even for traditionally managed vineyards because of intensive tillage). Generally, management of the surrounding dry grasslands (removal of upcoming shrubs) would preserve the area's plant and animal diversity.

Conclusion

As a result of profound changes in human land-use throughout the Holocene, most landscapes have become complex mosaics of natural, agricultural and architectural elements. Just few of the most outstanding cultural landscapes have been, so far, included in the World Heritage list (nearly 90 worldwide, about one-third of them in Europe). In Central and Western Europe, just three river valleys have been acknowledged as cultural landscapes so far (Loire Valley, Upper Middle Rhine Valley, Wachau—Danube Valley). The delisting of the Dresden-Elbe Valley in 2009 highlights the severe conflicts between preservation of cultural landscapes and the demands of actual landscape use. In the Upper Middle Rhine Valley, high urbanization and multiple traffic lines continuously challenge the priority demands of landscape preservation.

Of course, many landscapes in Europe and worldwide suffer from losing their characteristics due to extended overprinting by impervious surface coverage, river regulation and industrialized agriculture. The rather low industrialized Burgenlandkreis (with the lower Unstrut in its western part), in contrast, suffered from a loss in population by 25% during the last twenty years. The consequences, like shrinking towns, impoverishment of communities and abandonment of marginal arable land also threaten existing structures in cultural landscapes. On the other hand, targeted landscape re-structuring and supporting projects for preservation of the cultural landscape may become feasible. Many items of the early industrial and earlier cultural heritage (mills, medieval architecture, terrace-walled vineyards with cabins) are preserved, but necessary change of use of these objects has to be planned carefully. With respect to the concept of a cultural landscape corridor, developed to increase the touristic valorization of landscape elements and historic architecture, the Saale-Unstrut area no doubt has a high potential but still has half way to go. While the historic centers of the main towns (Freyburg and Naumburg) and many other locations (Neuenburg, Goseck, Arche Nebra) appear to be well developed in this respect, other outstanding elements are less developed or neglected, such as Wendelstein castle and the "Stone Album." In order to shape the cultural landscape corridor, excessive restoration of many objects is unnecessary

and would overburden individuals as well as communities. A "sustainable" concept of restoration (Wedekind 2014), however, without over-ambitious financial efforts but with sense of proportion and with sound judgment of experts and practitioners alike, may be feasible to link and visualize for both residents and visitors many objects in a coherent corridor that are interrelated but only at second glance.

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