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Brick Knowledge — Participatory Knowledge Production as a Strategy of Transformative Research in the Vogtland Region, Germany

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Abstract: The Vogtland region of Eastern Germany was shaped by industrialization, and its heritage defines the face of the region to this day. Brick was the dominant building material, and knowledge of the material is embodied in its buildings and landscape. The region's most significant landmark, the Göltzschtal Viaduct, is the world's largest bridge made of brick. Since the 1990s, however, following the abrupt changes after the reunification of Germany, brick has fallen out of favor and is now more synonymous with landfills, brownfield sites, and abandoned firewalls. The region's industrial heritage has become fragmented. "V-Act Netzwerkstatt Vogtland" is an interdisciplinary research project at the Bauhaus-Universität Weimar (funded by the German Federal Ministry of Education and Research, BMFTR 2023-2025) that brings together the fields of landscape architecture, heritage conservation, and sociology. Focusing on the Vogtland region and the transformative capacity of its material and immaterial industrial heritage, it seeks to establish new formats for activating and linking networks within the industrial-cultural landscape as a means of strategic, sustainable regional development. Hands-on brickmaking is one such format.

Key words: Sustainable regional development, transformative research, design build, industrial heritage, brick making.

1. Introduction: "Brick Knowledge" as a Means of Linking Landscape, Culture, and Transformation

Landscapes can be seen as a common resource for social action: they provide a material, ecological, and cultural foundation for development opportunities. At the same time, they are themselves shaped by and bear witness to ongoing changes of uses, traces, and meanings. Landscapes are thus visible manifestations of social change, reflecting both long-term developments and current transformation processes.

Bricks are among the oldest building materials in human history, and during industrialization advanced to became one of the most widely used building materials in the world. Their durability, regional manufacturing methods, and broad application mean that they have contributed significantly to shaping landscapes and the built environment. At the same time, they serve as material repositories of knowledge, conveying information about available resources, craft techniques, production methods, cultural meanings, and social values. These strands of material knowledge, landscape references, craftsmanship, building culture, and social meaning can be summarized under the term *brick knowledge* and offer potential for developing new approaches to sustainable and regionally specific development processes.

The Vogtland region is a striking example of how these aspects are manifest in the landscape. In the 19th century, the region experienced an enormous surge in industrialization and economic growth, coupled with urban expansion and the widespread

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brick construction. Visible evidence of this era shapes the landscape today — from industrial buildings to infrastructure projects, the most spectacular example of which is the Göltzschtal Viaduct, the largest brick bridge in the world. Alongside such built manifestations, local plot names, clay pits, and spoil heaps bear testimony to historical practices of extracting resources and the importance of the material for the region's urban and industrial development.

However, following the profound structural changes and the resulting sharp decline in population in the 1990s after the reunification of Germany, this architectural heritage has come under increasing pressure. With the loss of function or occupancy, buildings were abandoned and fell into dereliction, causing brick to become a symbol of decline in many areas. The presence of red brick beneath the once-stuccoed walls of decaying ruins, laid-bare firewalls, and rubble-tips tells of the contradictions of post-socialist transformation processes.

Against this background, the "V-Act" research project employs transdisciplinary approaches from the fields of landscape architecture, heritage conservation, and social sciences to develop strategies for activating the industrial, cultural, and landscape heritage of the Vogtland region. Using various formats, ranging from networking events to strengthen local stakeholder cooperation to hands-on formats with schoolchildren in the region, students from the Bauhaus-Universität Weimar explored and tested ways of making the region's industrial heritage tangible as a potential resource for future new strategies and uses.

By refocusing attention on the cultural value of bricks and brick buildings as repositories of cultural knowledge and as historical artifacts, brick has the potential to be a medium revealing the relationships between landscape, industry, society, and change. This is where its special potential lies: the *brick knowledge* inscribed in it — from material knowledge and landscape references to craft traditions and building culture practices — can provide an important impetus for sustainable and future-oriented regional development in the Vogtland region.

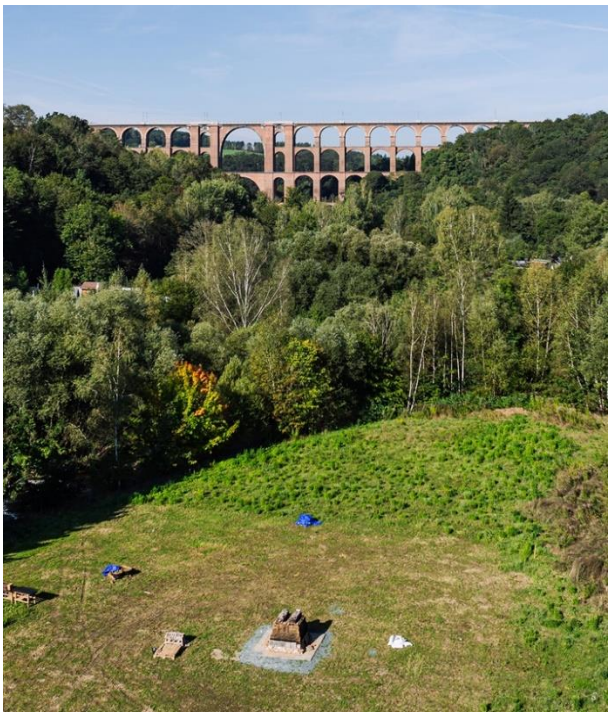

Fig. 1 Field kiln and Göltzschtal Viaduct, Alexander Burzik (2024).

2. Research Approach

The "V-Act" research project employs transformative research as its primary methodological framework. This research method examines specific social challenges and aims not just to analyze existing developments but also to actively intervene in ongoing processes of change [1]. According to this conception, academic work can itself serve as a trigger and catalyst for social transformation [2].

To help adequately understand complex social problems, transformative research distinguishes between three forms of knowledge [3]: "system knowledge," which describes the current state of a problem situation, as well as the interrelationships and structures that characterize it; secondly, "target knowledge," which serves to define desired future developments, for example through scenarios or

models; and thirdly, "transformation knowledge" pertaining to ways and strategies for actually achieving these desired changes.

Existing social and regional structures are perpetuated on an ongoing basis through everyday activities and actions. To bring about change, it is necessary to create conditions that make it possible to critically — or experimentally [4] — examine and question these structures [5]. An approach commonly used in the context of transformative research is to create specific "niches" in which alternative sustainable models can be developed and appraised [6].

Real-world laboratories are an example of such "niches" that offer a methodological approach for experimentally testing, evaluating, and applying strategies for sustainable development. They provide an opportunity to research problem situations relating to the ecological, economic, and socially sustainable design of transformation processes at specific locations within a region, and with the respective actors and experts [7]. As part of the toolset of applied urban and spatial planning, they apply the fundamental principles of sustainability-focused transdisciplinary research and experimental methodologies to a real-world social and spatial situation, empowering local stakeholders to take transformative, sustainable action in their region [8].

The use of real-world laboratories to develop and test new formats makes it possible to build on existing structures, potential, and talent in a region and to promote new value chains. In addition, they can contribute as an educational format to communicating the architectural heritage of the Vogtland region.

The design of our research for the "V-Act" project builds on the objectives and characteristics of real-world laboratories outlined by Schäpke et al. [9] — their transformative intention, transdisciplinarity, focus on real-world experiments, long-term horizon, emphasis on transferability, and ongoing accompanying evaluation. In terms of process, we applied the iterative approach of Participatory Action Research (PAR) that involves reflecting on and developing the applied formats on an ongoing basis together with the respective actors [10]. PAR offers an appropriate methodological framework not only for investigating industrial-cultural transformation processes but also for actively shaping them with local stakeholders. Here, research is a social process that brings together scientific expertise and local experiential knowledge. Unger [11] highlights the role of PAR as a particularly effective tool for visualizing and activating local knowledge, especially in regions undergoing change. By interleaving research and action, directly experienced, shared knowledge emerges that strengthens social participation and opens up new perspectives for regional development processes.

Given the strong industrial heritage of the region and its relevance for the cultural landscape and for a broad range of actors across municipal boundaries, we chose local brick production as the starting point for the "V-Act" project. The intention was to both draw on and communicate the diverse knowledge of the material and its use among various local and supra-regional actors. The project employs the design-build format used in architecture and design as a means of practice-oriented teaching and research that combines planning, design, and construction to create learning spaces in which students develop conceptual ideas and translate them independently into built interventions [12]. This creates a direct interplay between social engagement and theoretical and practical learning.

In contrast to traditional design-build approaches, our project focuses not on the construction of a new building or conversion of an existing building [13], but on the production of bricks as a building material. This shift in perspective is notable in that the extraction of clay as a raw material, the production of bricks, and their processing into buildings are closely linked to the landscape, cultural history, and industrialization of the Vogtland region.

Fig. 2 Wasteland and industrial ruins, Ivan Djambov (2025).

In this context, "V-Act" draws on the region's diverse cultural landscape and industrial heritage, documenting it as well as making it tangible using practice-oriented research processes. By actively engaging with the raw material, from its extraction to its transformation into bricks and their use in construction, as well as through identifying its historical traces, a common theme emerges that links technological knowledge with the landscape and with cultural meaning — what we call "brick knowledge". Working with bricks thus serves as a medium for rendering visible historical and contemporary transformation processes in the Vogtland region, as well as for involving different actors and stakeholders in a joint learning and design process. By drawing on local resources, craft practices, and integrating industrial cultural sites of remembrance into the research process, a deeper understanding of the region's architectural heritage emerges – which, in turn, can serve as a starting point for the development of new perspectives on sustainable regional development.

3. Local Brick Production as a Means of Knowledge Transfer

3.1 Industrialization, Brickmaking, and Regional Development in the Vogtland Region

Brick became a defining material in the Vogtland region during the industrial boom of the 19th century, shaped by rapid growth in textile production [14] and a sharp rise in population. The expansion of factories led to the building of prestigious residences for the owners and the construction of new working-class quarters. Parallel to this, large investments in water management and especially rail infrastructure supported the accelerating industrialization. Throughout Europe, brick was the dominant building material of this period [15], often hidden behind stuccoed or stone facades or used in subterranean structures such as sewer systems.

Bricks were produced locally in the Vogtland region and relied on simple, low-cost methods, as long transport routes or expensive machinery would have made mass production inefficient. Although documentation on local brickmaking is scarce, the construction records of the Göltzschtal and Elstertal viaducts provide detailed insights. These projects triggered an unprecedented boom: more than 26 million bricks were required for the Göltzschtal Viaduct alone, most shaped by hand, as only one local brickworks owned an early extruding machine.

After 1990, the Vogtland — like many regions of the former GDR — experienced rapid structural decline. Factory closures and outsourcing led to severe job losses and significant population shrinkage. For example, Greiz shrank from over 30,000 residents in 1994 to under 20,000 today [16].

Many industrial buildings subsequently decayed or were demolished, yet their presence continues to shape the region's urban and rural landscape. Traces of industrialization also persist in clay pits, altered river systems, and railway earthworks, revealing how deeply brick production and industrial development have been inscribed into the landscape.

It is evident that these socioeconomic processes also

manifested themselves in spatial changes. The factory buildings were closed and have since fallen into disrepair or been demolished. Repurposing these structures is often extremely challenging due to their size and number, as well as their poor condition. Nevertheless, whether reused, standing empty, or slowly decaying, the former industrial buildings of the Wilhelminian era continue to shape the spatial structure of the Vogtland region.

Nevertheless, the edifices represent merely a fraction of the extant evidence of the region's industrial past. The topography of the region has been shaped by the impact of industrialization, as evidenced by the transformation of watercourses, the modification of the landscape for the construction of railways, and the clay pits that were used for extracting the material for brick production. The latter, in particular, played a significant role in buildings of the Wilhelminian era, where brick served as a primary building material (its role in the industrialization of the Vogtland region is discussed in Fröhlich-Kulik, Langner and Utermann (2025) [17]).

3.2 Brick-Knowledge as a Catalyst for Cultural Heritage Preservation

Brick-knowledge encompasses the practical, material and cultural understanding of brick as a building material — ranging from the geological origins of clay, to historical production methods, architectural applications, and the social practices embedded in brickmaking. In the Vogtland region, this knowledge is deeply intertwined with the landscape and the built environment: clay pits, historical kilns, Wilhelminian-era brick buildings, and spectacular engineering structures such as the Göltzschtal Viaduct all embody a long-standing relationship between material, craft, and regional identity.

Understanding brick not merely as a unit of construction but as a carrier of knowledge allows for new perspectives on preserving the region's architectural heritage. Brick structures, many of which date from the industrial boom of the 19th century, are remarkably durable. Yet their preservation is often hindered by a lack of awareness of the material's qualities, repair techniques, and cultural significance. Rediscovering brick-knowledge helps communities recognize the ecological value of maintaining existing buildings, the embodied energy and craftsmanship they contain, and the sustainable potential inherent in repair rather than demolition.

In this sense, *brick-knowledge* becomes a tool for transformation: it empowers local actors, strengthens regional identity, and supports a shift towards sustainable construction practices. By reconnecting people with the material foundations of their industrial past, it contributes to a more informed and culturally rooted approach to conserving the Vogtland's architectural heritage.

3.3 The Hands-on Teaching of Brick-knowledge

From the early civilizations of Ancient Mesopotamia to European industrialization and modern-day production in tunnel kilns, brickmaking has always been closely related to knowledge of available clay resources, climatic conditions, and forming techniques. Such material knowledge encompasses the selection and blending of suitable types of clay from specific mining regions and strata, the respective shaping processes such as hand molding or extrusion, climate-dependent drying processes, and the various firing techniques — from historical field firing to the diverse types of ring and tunnel kilns.

Bricks are also repositories of knowledge: they document standardized dimensions, inscriptions, construction practices, and technical innovations. From their shapes, formats, and fabrication methods, we can draw conclusions about architectural, cultural, social, economic, and organizational structures.

Consequently, local brick production was the starting point for a series of summer building workshops held in 2024 and 2025, in which students from the Bauhaus-Universität Weimar working together with children from the region, produced bricks using a historical firing process known as field firing. The aim was not to produce building materials for future structures but rather to draw attention to the industrial, cultural, and landscape heritage of the Vogtland region by producing bricks and, in the process, fostering a new awareness of the region's

industrial past and its interconnection with the landscape.

The workshops focused on learning through shared, hands-on engagement. By participating directly in the brickmaking process, attendees gained practical skills and a deeper appreciation of the material's properties and cultural relevance. Working with clay and bricks made the region's industrial and landscape heritage tangible and strengthened awareness of its historical and contemporary significance.

The workshops took place outdoors and used pre-industrial production methods, employing only simple tools to emphasize material experience and keep costs low. The process followed traditional steps – from clay extraction to forming, drying, and firing. Participants included preschool children, school students, young adults, people with disabilities from the region, alongside Bauhaus-Universität students.

The clay used was extracted manually from the former Limbach brickworks and then transported to the workshop site near the base of the Göltzschtal Viaduct. There, the material was mixed with sand and water into a homogenous mass using a paddle mixer, ready for forming. The bricks were then formed using a hand-molding process, placing the mass into sand-sprinkled molds, smoothing it, and then, after removal of the mold frame, imprinting it with a stamp. The resulting formed bricks were then left to dry slowly in the shade for six weeks to reduce susceptibility to cracking.

After drying, the bricks were fired in a traditional charcoal kiln. The dried bricks were stacked layer by layer on a grid of fired bricks, while the spaces between them were filled with wood and charcoal. The entire structure was then sealed with clay and set alight, with strategically placed vents acting as chimneys to regulate the six-hour firing process. After cooling, the structure was taken apart and the finished bricks removed.

A brick-firing festival was held at the end of the process to allow visitors to witness and celebrate the craft of brick firing.

4. Conclusion

This article has shown how the industrial heritage of the Vogtland region — both tangible and intangible — can offer significant potential for future sustainable regional development processes. In particular, the term brick knowledge reveals how closely landscape, resource use, craftsmanship, building culture, and industrial production have been intertwined historically and spatially. The brick thus functions not only as a characteristic building material of the region but also as a carrier of multilayered knowledge embedded in buildings, landscapes, and craft practices. The joint production of bricks using pre-industrial techniques with students and schoolchildren also demonstrates that co-creative, active participation formats offer a suitable vehicle for conveying a more profound understanding of material cycles and how the landscape serves as a foundation for construction activity. Such approaches provide an easy, accessible way of engaging with and raising awareness of local industrial cultural heritage.

The chosen focus on local brick production also addresses the three forms of knowledge that are central to transformative processes. System knowledge is created when participants directly experience the connections between raw material extraction, geological conditions, technical manufacturing processes, and the structural use of bricks, and are able to relate them to the industrial-cultural landscape. Collaboration fosters discussions on the roles of regional resources, the longevity of building materials, and architectural continuity for a sustainable future in the Vogtland region. The process of joint exploration also gives rise to shared ideas (target knowledge) about what desirable development in the region could look like. Finally, transformational knowledge emerges from the hands-on experience of making bricks. It shows that traditional knowledge, local resources, and collaborative approaches can drive new, sustainable regional development strategies. This applies not only to tangible skills but also to a deeper understanding of how knowledge, individuals, and landscapes can interconnect to catalyze change.

Focusing on the manufacturing process made it possible to reveal hidden knowledge and make ecological and cultural connections while strengthening local and regional identities. The format of local brick production serves not only as a means of conveying knowledge but also to create an experimental space in which the industrial-cultural landscape heritage can be used as a starting point for activating new directions for future development in the region.

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