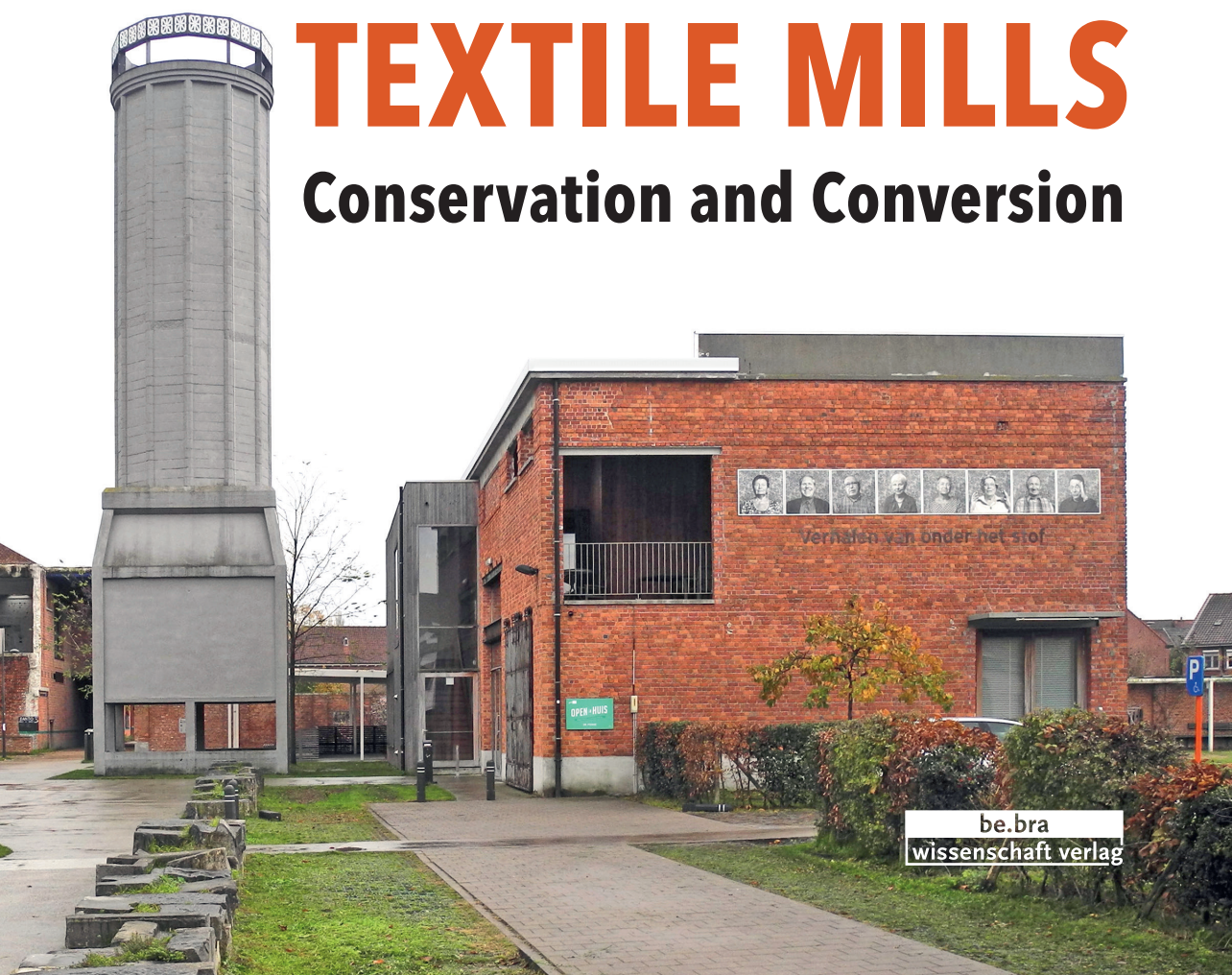Heike Oevermann

URBAN TEXTILE MILLS

Conservation and Conversion

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Contents

Acknowledgments

1   Urban Textile Mills: Conservation and Conversion

The conservation of urban textile mills is not only about the technological and architectural contributions of the textile industry and the securing of these material remains. Based on and moving beyond that existing knowledge and practices, we also understand historic urban mills as resources for present and future needs. The decline of the textile sector in much of the world has meant that converting and repurposing these historic industrial complexes has become a new opportunity and important task in many European cities. Ongoing practice in architecture, planning, and conservation shows that historic textile complexes can be conserved *and* enhanced by conversion to new uses. Conservation allows the preservation of known built features of a cityscape that provide orientation as landmarks and passes on memories of places of work. Converted mills contribute to the variety of urban spaces, both indoor and outdoor, and offer structures for different forms of mixed uses. Most interesting is the debate on whether industrial production sites can be recognized as part of the historic city and how they fit into the urban morphology and design. The present work supports this argument in pointing out the impact of urban textile mills on historic cityscapes and the interrelation of mills and cities in form and design. The books does not reject the notion that mills often include something that is seen as atypical or different to the urban setting—their chimneys and sheds, their scale and spatial compositions—but these elements offer the opportunity to let emerge and create unique urban spaces. Nevertheless, the book contributes to the case-specific knowledge of 20 textile mills in Europe by analysing their development as industrial complexes, beginning with the first steam-driven mills in Manchester from the end of the 18th century, towards their conservation and conversion in the 21st century, including the manifold layers of time.

The core messages of the book are:
1. Textile mills have been and remain part of the city; the complexes include familiar elements of urban design and architectural representations, but also enrich the variety of spatial structures.
2. Former sheds and shelters, as well as newer layers, are more likely to be torn down

during current conversion projects than are floor factories and 19th-century brick buildings; however, the conservation of these often-overlooked elements can trigger particularly inspiring approaches to conversion.

3. The conversion and reuse of textile mills allow for long-term conservation. Models of good practice are needed that consider machinery, architectural objects, and the historic urban structures.

The publication discusses historic textile mill complexes in towns and cities rather than those in rural settings. While the built history of textiles started with handicrafts and water-powered mills, this volume focuses on the emergence of larger-scale mills powered first by steam and later electricity. The book presents an urban industrial typology to facilitate the description and valuing of these complexes; and examples of good practice to provide orientation in conservation and conversion processes. In this context, a typology is understood as an instrument of analysis, for example as used in thematic studies by TICCIH (The International Committee for the Conservation of the Industrial Heritage) and other classification systems, in inventories, listings, and further documents serving heritage conservation. Herein, the urban typology focuses on larger-scale mill complexes, their spatial compositions and arrangements, the configuration of different buildings and building types, and how they are connected and adapted to urban settings, such as infrastructures, plot schemes, and urban layouts. The novel contribution of this book is that it examines not only the emergence of various historic mill types during the period of industrialization but also focuses on recent processes of conversion and correlations between both periods and processes.

Historic urban mills are recognized as monuments, listed buildings, or heritage sites—not to speak of those which are not acknowledged at all. The specific terminology depends not only on the complex itself, but also on the different planning cultures and the translation of different languages. Furthermore, the United Kingdom and other countries employ different terminology and categories for what in German is termed Denkmal (which is also further differentiated as Einzeldenkmal, Ensemble, Sachgesamtheit, Denkmalbereich, and many more), listed buildings of differing grades, and conservation areas or those with presumption of protection (Schutzvermutung), and listed cityscapes (geschützte Ortsbilder) in Switzerland, and many more. Therefore, some discrepancies are unavoidable. Nevertheless, the two concepts—monument and heritage—are not congruent, even if overlaps can be discerned. A monument thematizes more the artefact through its documenting and memory-activating function, whereas the heritage field focuses more on the burden and opportunity of adaption, appropriation, and use, and takes greater account of actor-related approaches.[1] In this

book, urban textile mills are historical industrial complexes that can be understood and recognized as both an artefact that presents evidence of the past as well as a resource for adaptation. The discussion and reflection herein promotes the—often conflictive—task of achieving appropriate balance between conserving a building as a document of the past and adapting it to present and future needs.[2]

Cities, industrialization, and urban textile mills

Before introducing in detail the structure of the book, it is helpful to recall the fundamental influences of the Industrial Revolution and industrialization in Europe, which have shaped cities and their urban development over the past 200 years. The term Industrial Revolution is recognized in the history of urban planning as denoting the far-reaching restructuring processes of the late 18th and 19th centuries in the United Kingdom.[3] The present book employs the somewhat more general term industrialization, which is more frequently used for continental Europe.

The period from the end of the 18th century to the beginning of the 20th century featured constantly increasing urban industrial production, with associated technical innovations, political–social, and economic changes, and increasing population numbers that also led to massive changes and the loss of familiar cityscapes. In 1836, the architect and theorist Augustus Welby Pugin introduced this subject by contrasting two images of cityscapes from 1440 and 1840, pointing out the radical architectural and urban changes that had taken place. He titled these changes as the "present decay of taste".[4] A decade earlier, in 1826, Karl Friedrich Schinkel documented the new cityscape ofin a diary of his journey through England.[5] Schinkel's sketches of the massive urban blocks and plain facades of the urban textile mills are still used in numerous publications and lectures to illustrate the urban changes brought about by industrialization. Manchester was the first city with steam-powered factories and has become an icon for this radical process of urban transformation.

In England—the motherland of industrialization— the use of machinery in combination with steam power triggered an enormous push for rationalization during the 1770s to 1790s, which was subsequently repeated on the continent somewhat later (usually beginning in the 1790s). The textile industry has often promoted the settlement of other industries: Mechanical engineering companies that that emerged to provide machinery for textile manufacturing, such as in Winterthur, Switzerland; and the chemical industry, which has close links to the textile industry through printing works, dye works, and synthetic textiles, such as in Wuppertal and Krefeld. But also training and research spaces were established. The local exchange of knowledge

and innovations as well as close entrepreneurial ties within a city brought economic advantages.[6]

Although mining and engineering were two very important sectors, the textile industry is regarded as having led industrialization in Europe. Textile and clothing production was one of humankind's first skills and was also practiced in multiple and dispersed locations. The handicraft procedures of spinning and weaving were dependent on resources that were widespread: wool or flax. The mechanization of the production processes, the division of labour across a production facility, and the quantitative increase of employees and products are the central characteristics of industrial production and were established first for textiles. The development from manufacturing yarn and cloth mostly at workers' homes to extensive mechanization, was a clearly recognizable step that indicated the beginning of industrialization and the emergence of industrial complexes. The textile industry spread throughout Europe. Arkwright's water frame, the first water-driven spinning machine, initiated industrial development at riversides. Arkwright's Cromford Mill on the River Derwent was established in 1771, and only 12 years later another mill based on the experience and knowledge of Cromford was built in Ratingen, Germany, the so-called Cromford mill on the continent.

In the course of the mechanization of textile production, the various procedures—the preparation of wool, spinning and weaving, dyeing procedures, and finishing—were increasingly brought together in one place to benefit mostly from powerful, steam-drive systems. As a consequence, extensions or additional buildings were differentiated according to various functions; initially, with the advent of the steam engine, the drive technology was usually housed separately. Increasingly, the entire production process (or stages of it), workers' housing, and the company's domicile were also separated functionally; some mills were even designed as a factory village.

The invention of steam power and later electric drives made water-power superfluous as a drive technology. This allowed the expanding industries to relocate from their initial riverside locations and to settle in cities with connections to railways and navigable waterways, and where workers were also available in large numbers. Textile cities arose, such as Manchester (UK) and Łódź (Poland), in which the textile industry explicitly determined the structural shape of the city, whereas in others such as Ghent (Belgium) and Leipzig (Germany) mills shaped specific districts.[7]

Considering not only technological but also architectural and constructional developments, we see that the introduction of cast and wrought iron in building construction around 1800 had a decisive influence on textile industry complexes. Around 1800 the first iron-framed buildings were developed for textile mills. Until 1820 this form of construction was established in England, because it allowed larger

spans with vast column-free spaces and was also certified to be more fireproof than timber construction. Nevertheless, timber construction existed in England until 1860 and persisted even longer on the continent.[8]

Since about 1835, further development had utilized brick cap vaults in-between the cast-iron joists. Although this construction method was promoted as fireproof[9], the problem of iron constructions collapsing during a fire, which was increasingly proven in practice, led to sprinkler systems and to increased demand for the plastering of structural iron elements.[10] Around 1895, reinforced concrete construction was introduced for textile mills. This was often combined with outer walls of red brickwork and yellow brick masonry details, and can be observed in England between 1880 and 1920.[11] The glass palace constructed in Augsburg (from 1902) is the first example in the Swabian textile industry of a reinforced concrete structure; at the same time it is one of the early daylight factories[12], a construction typology that became famous with the Fagus factory in Alfeld, Germany, designed by the architect Walter Gropius in 1911.

In the second half of the 19th and early 20th century standardization of construction, technologies, and proceedings was established through industrial architects, engineers, and engineering companies and their guidebooks suggesting solutions for both machinery and building. One of them, William Fairbairn, highlighted early that the mechanical looms worked better on the ground floor, where there was generally greater stability, and that the processing required a certain humidity level that was also not easy to achieve on the upper floors. Thus, with the introduction of the mechanical loom, single-storey structures (mostly with shed roofs) became important. Most interesting is that although the urban mill had been established, urban design or planning aspects were hardly discussed.[13]

General typology

To sum up, we have the early water-powered mills, often located in rural areas but with exceptions such as in Winterthur, Switzerland, or Oslo, Norway, where streams in the city drove waterwheels. The later steam- and electric-driven mills can generally be differentiated in two basic types of urban mills from the late 18th to the early 20th century:

- Basic type 1: Chronologically, these are considered early urban textile mills, as found in Manchester in the 1790s. They consist of rectangular, multi-storey building volumes determined by machine sizes, transmission systems, and urban plots. They were increasingly built as iron skeleton structures with brick facades and

were often described as the English style. The complexes usually featured steam rather than water as the driving technology, which, depending on the location, had become established from about 1800–1840 in England and later on the continent.

- Basic type 2: Textile industry complexes, which often grew at one location, via extensions, to form a very large complex with a large surface area, known as integrated mills. They were mostly built between about 1850 (England), 1870 (continental Europe) and the 1930s. This group was significantly influenced by two innovations: a new building form—the shed (established after 1850[14])—and the implementation of power loom weaving machines (established around the 1820s in England[15] and after the 1840s on the continent). Consequently, multiple buildings were differentiated: Warehouses, preparation, spinning mill, weaving mill, finishing, and steam engine house with chimney (from the 20th century also electric generator houses), office, and often residential functions. Workers' housing was mostly realized as independent groups of buildings but often spatially connected. The entrepreneur's residence differed significantly from the production and storage buildings. Here, multi-storey buildings as well as single-storey sheds form the mill. Frequently, additive arrangements and sheds in the inner part of the complex were structurally formative. In addition, the compositions of some complexes show axial arrangements, for example at the Verseidag works in Krefeld, or certain entrance gestures and facades or chimneys as representations in the urban context. Finally, there are complexes designed as factory towns, such as Saltaire in England.[16]

Next to the drive system, building types, and functional differentiation—defined as the structural characteristics—we recognize different formal elements, displays, and decors, which we call design characteristics. The architectural historian Julius Posener highlighted various urban design types from an architectural perspective. Firstly Posener analysed types of volume, such as industrial solitaire or urban block. Furthermore, he acknowledged industrial complexes in which typically traditional architectural and urban planning elements of representation, such as axes, create a monumental or sublime effect. Additionally, Posener suggested another typology characterized by additive and serially applied construction elements.[17] Other typologies, such as that referring to industrial architecture in Saxony[18], attempt to combine architectural elements, spatial composition and settings, and certain periods. Generally, we can differentiate these through their design characteristics:

- Early mills were mostly located on watercourses. They are characterized by their strong correspondence to representational architecture of landscapes settings, such as manor houses. The materials used were local stone, often also plastered

facades, and wood; and the decorative styles used included tradition architectural representations. These early mills were often adaptations of Georgian domestic vernaculars.

- The so-called English-style mills are dominated by a neat design with plain facades and functional appearance. The volumes of the mill wings were of narrow and long form. Mostly brick and cast iron were used for construction. This design originated in the early steam-powered mills of England such as those in Manchester, and refers in general to mills with access to bulk transport facilities.

- In the mid- and late 19th century the Victorian style—on the continent the so-called historicism—became more dominant in mill design and led to representative facades, especially where the mill displayed itself towards its urban setting. On the continent, these mills are often called palace type, whereas in England it is often referred to the Lancashire cotton mill style[19] around this time. Both can generally be specified as huge, multi-storey mills of deep building depths with vertical main transmission reaching each floor, staircases offset from the building structure, representative dust towers, and a single standing chimney, as well as minor smaller buildings. The early Lancashire mills designed by the Stott dynasty are simpler in decor, whereas the later examples use a more ample style.

- At the beginning of the 20th century, factories and mills were addressed by the modern architecture movement, for example the so-called Neues Bauen, with new materials: reinforced concrete, glass, and steel, as well as curtain wall construction. Nevertheless, certain architectural elements were used to achieve a sublime or monumental appearance. Here, electricity often became the primary power system.

- Functional aspects dominated the construction and complex organization of mills built mainly after the Second World War. In the textile branch, the huge single-storey production hall without sheds or windows became common, with technical installations providing light and ventilation. These mills were predominantly located in industrial parks.

The Second World War formed a common, but locally different, caesura in the history of industrialization and urbanization for the whole of Europe. Not only the new division of East and West, but also the EEC (and later EU), or changes in transportation and logistics through motor traffic: all of these factors challenged established textile companies and textile cities. Consequently, just some of them survived through mergers and concentration, such as UCO in Ghent or the Verseidag (Vereinigte Seidenweberei Aktiengesellschaft – United Silk Weaving Corporation) in Krefeld. The textile industry was shrinking in Europe, relocating eastward to low-cost countries, although

specialist products such as chemical fibres and technical textiles are still manufactured at historical production sites.[20]

Some decades later, mills complexes and other industrial remains were neglected as industrial and urban heritage. Sir Neil Cossons, who was responsible for the first industrial museum in England, refers back to a debate of the 19th century, to explain the neglect of industrial heritage in England during the late 20th century. It was such famous individuals as John Ruskin, William Morris, Thomas Hardy, Norman Shaw, Richard Jefferies, and Charles F. A. Voysey who defined the English culture and tradition—the Englishness—in their time in such a way that industry had no place.[21] This attitude, called anti-industrialism by Cossons, was then taken up again during the industrial decline of the 1980s to legitimize the demolition of mills and industrial infrastructure.

In particular, the research work of Uta Hassler and Niklaus Kohler[22] provided important findings on the total stock of production buildings in Germany: Firstly, there is a trend towards shortening the life span of production buildings; secondly, listed buildings account for only about 0.5% of the building stock, with about 300,000 buildings having been lost in the last 150 years. Thirdly, due to changing requirements for efficient logistics, production flows, flexible expandability, and room size and climate, hardly any old buildings are being used for new production purposes.

Around the millennium, approaches other than solely demolition received recognition. The successful International Building Exhibition (1989–99, based in the Ruhr area, is credited with establishing the European Route of Industrial Heritage (ERIH), which includes a network of former textile production sites. Combined with cultural reuses, their associated organizations, and the work of local activists (such as Trans Europe Halles, a European-based network of cultural centres initiated by citizens and artists), new life was brought to industrial urban heritage. At the same time, the complex interrelations between industrial decline, derelict remains, shrinking prosperity, and urban quality of life became increasingly obvious in cities. These factors formed the context for the "Vernieuwingsstrategieën"[23](renewal strategies) comparative study of textile cities in Europe. The study compared, reflected, and highlighted strategies of urban renewal with a focus on economic, social, and geographical reprogramming. The book states: "[The textile mills] have had an impact on the design of urban morphology. Their concentration of technology, build-up volumes and infrastructures have made them the source points of an urban morphology: a new, often impressive urban character, which sometimes introduced a new language of form like an extension of the traditional built and existent morphology, but sometimes at right angles to it. Not only on the scale of the buildings and industrial complexes, but above all on the scale of the city and region."[24] Conversions—understood as the change of use of larger areas,

which includes the preservation and alteration of the historical substance, especially the urban structures[25]—became an integrative part of many conservation concepts. In the late 20th and early 21st century conversions of urban industrial sites have moved into the focus of architectural and urban planning practice.[26]

In this context, this book uses the example of textile production in Europe's cities to investigate the development of urban mills in the context of their cities (Chapter 2), the built history of each complex, including multi-phase plans and architectural representations (Chapter 3), and good practice for conservation and conversion (Chapter 4). Specifically, this research contributes to a profound understanding of the urban dimension of textile mills: urban in regard to surroundings, layout, and design. The urban industrial typology extends the understanding of the historic structural elements (function, building, and technology) and design features of textile mills.

It is debatable to what extent urban textile mills can be read as differing from traditional urban planning types (such as block, row, or square) and known architectural representations, or whether they are instead an interpretation of these traditions. However, it seems important to me that they are first of all perceived as urban structures of the historic city. The book utilizes and adds to findings about the analysis of historical mills and present day developments. These findings show different methodological approaches, mostly ranging from national or local inventory works to industrial archaeology. The industrial archaeology on Manchester mills by Ian Miller and others, or the work of Georg Nagler on the textile mills of Augsburg, Germany, are two examples that have proven the value of this approach for understanding urban textile mills.[27] Furthermore, knowledge about the cases was gained through the documented work of art and urban historians, historians of economics and history of enterprises, journalistic articles or similar, and my own archive work; as well as personal site visits and communication with local experts.[28] Furthermore, overview literature was consulted, such the study on textile complexes and workers' settlements by TICCIH colleague Bartosz Walczak.[29]

Inventory, conservation, and the typological approach

TICCIH (The International Committee for the Conservation of Industrial Heritage) conducts thematic studies and industry-specific lists to support ICOMOS (The International Committee of Monuments and Sites). The aim of both institutions is to provide "guidance to the World Heritage Committee as to sites that could be considered of international significance."[30] The TICCIH list has a far-reaching spectrum with criteria: (i) individual mills that stand alone; (ii): large textile complexes and adjoining

workers' settlements and facilities; and (iii): integrated textile landscapes with mills from several enterprises and connected processing activities and infrastructures. In particular, mill complexes in category (ii) are analysed as constituents of their urban setting. Furthermore, consideration is given to sites that could be termed: (a) pioneer, such as an initial mill of a developmental series; (b) flagship, for example historically unique, (c) giant, considered for the size of the complex and scale of production, and (d) time capsule, representing an unique example of a past tradition or civilization.[31] The list's typology follows the introduced scheme of domestic workshops, multi-storey mills, and sheds, but also adds: roofs, power systems and transmission, sprinkler systems, and gardens. These latter aspects are mostly less distinctive for the comparison of urban mills thematized here, but are highlighted if so. Consequently, this book contributes to part of the TICCIH textile site list, namely in better understanding the urban structures of textile complexes.

Early works by the architectural historian Nikolaus Pevsner[32] analysed building types and summarized different branches of industry under the building typology of factories. In contrast, the historian of urbanism Vittorio Magnago Lampugnani and his team, as well as other scholars, introduced a historiography of typology, and display varying understandings of the concept and method of typology in identifying, analysing, and designing urban architecture.[33] Next to some remarks on the origin on the concept and its use in the design of architecture, I wish to highlight the following argument, namely that "a warehouse can be turned into apartments and a Georgian terrace into a school. What this means is that a functional reduction prevents other knowledge that can be obtained from type by considering it as belonging to a group of formal, historical, and sociocultural aspects."[34] That means that types and typologies support the activation of collective memory due to their function as a sign for purposes, events, and processes even if these no longer exist and changes have been undertaken.[35]

Going back to A. C. Quatremère de Quincy (1755–1849)[36], who first introduced notions of building type to the architectural discourse: He did not reduce type to works of copying and imitation—which was the main criticism later in architecture—instead, he pointed out the correspondence of type, characteristics, and purpose in architecture and strengthened the signifying function of types. It is exactly this function that allows us today to read an adaptively reused building as a former mill and with this to keep at least reminiscences of an industrial past.

Unlike the notion of the model, the type has a creative potential that was taken up again in the 1950s, among others by architects such as Saverio Muratori and Aldo Rossi. Despite their differences, architects of this typological approach share the assumption that architecture and urban design are meaningful through historical

epistemological procedures based on the investigation of permanent spatial forms and arrangements. The architect Giorgio Grassi understands typologies as design principles for establishing continuity between the historical city and present times. In both approaches, certain principles and rules were followed (methodological agreement), but enable quite different interpretations in the design statements (difference in content), which generate variety and alteration within types and typologies. A slightly different argument was put forward by the Team 10 group of architects, especially Herman Hertzberger. Architectural types are basic elements that shape the city over long periods of time, specify places, and allow for identification. Robert Venturi also ascribes semiotic relevance to the type. For him, types embody societal dimensions and—as an element of the urban—carry collective memory. Here, the idea of the city as image and text emerges, and the type as visual and readable element comes to the fore. Venturi supports the ambiguous use of spatial forms in order to gain a complexity, even contradictions, which enfold and display the heterogeneity of history, space, and society.[37]

Oswald Mathias Ungers, together with Rem Koolhaas, Peter Riemann, Hans Kollhoff, and Arthur Ovaska, conceptualized the city of Berlin as a non-uniform, fragmented city: different spatial islands that are recognizable through differing in character.[38] From here, the way is not far to misunderstand the conservation of historic cities. Rem Koolhaas provocatively stated: "There is always a quarter called Lipservice, where a minimum of the past is preserved: usually it has an old tram/tramway or double-decker bus driving through. (…) some random hovels (…) are saved, restored to a splendour they never had."[39] The idea of spatial islands with certain characters becomes problematic where architecture and urban design lose their complexity and merge into consumable theme parks. The understanding of the city as a homogeneous organism has to be critically reflected, furthermore, when it comes to the historic city. The historical analysis of generally valid types—especially of the traditional urban space: street, square, courtyard—is too simplistic. This approach fails by applying "copy and paste" procedures to architecture and the reconstruction of an imagined past; it lacks the productive confrontation with different layers of time, conflictive needs, and different agents.

This discourse on architecture and conservation becomes even more complex when heritage and identity are discussed. The conservation theorist Hans-Rudolf Meier problematizes one lasting trend that aims at retro design and reconstruction projects in cities and is often connected with the claim for the identity of place. Here, the problem is the reduction of difference, contradictions, and diversity of existent historic structures, in other words the elimination of the unwanted or complex in order to only produce the main specifics of a place. In this process, the selection of

the existent and the production of imagined objects corresponds to the selection and homogenization not only of history but also of the addressees.[40]

In consequence, the challenge is not only to conserve the testimonial value of textile mills but also to identify the urban, structural, and design characteristics that are usefully preserved in terms of continuity and recognizability, while at the same time revealing scope for change and transformation. The strength of typologies lies in their potential to create complex interpretation if at the same time the mill's identity is considered as specific and variability is understood as possible variation up to the point of reaching alterity and alienation. When applied to planning practice, it is clear that the conservation and conversion of mill buildings contributes to a diversity of urban spaces, especially with this multi-layered reading and treatment of historic textile mills.

Analysing textile mills from a broader perspective than simply their historic functional aspects opens wider possibilities for conservation and conversion on the one hand. We know that mills and factories serve as urban landmarks, as resources, as places for experimental uses, etc. On the other hand, this understanding includes some conflictive arguments in heritage conservation that are further discussed in Chapter 4.

Industrial heritage: diverse and global

The conservation and conversion of urban textile mills is challenging: not only must proposed adaptive (re)uses be appropriate, but these historic buildings provide evidence of the past and activate memories at both local and global levels. Such proposals become complex when diverse individuals or social groups attach different memories to the same place. Furthermore, the historical significance assigned to a site derives from various intertwined processes of understanding and interpreting material remains.[41] Historical mills are polyphonic in this sense. The discussion on industrial heritage versus labour heritage is one example of this polyphony. Put simply, the concept of industrial heritage can be assigned to the recognition of technological and constructional innovations and (master) achievements, including their global dimensions, whereas notions of labour heritage focus on the working and daily lives, the knowledge, and traditions of workers.[42] To date, there has been only limited study of the respective possibilities and limits of knowledge, and the fruitful links and overlap between the different approaches. In particular, works that examine the connections between material heritage (such as buildings and machineries) and immaterial heritage (such as knowledge and traditions) appear promising for future studies.[43] We have to ask which kind of—and whose—heritage we conserve, and for whom we use

this documenting and memory activating function. Furthermore, reflection is needed on questions of who benefits from adaptive reuses and conversion. In this context, the local and global dimensions of industrial heritage and its historic and future impacts on people around the world are relevant.

Although the focus of the book is urban textile mills in Europe, developments within this field cannot be understood without taking the global context of the textile sector into consideration. The cotton industry—although not unique in this sense—remains an exemplar of a global enterprise, with worldwide production chains and trade networks, utilizing and supporting colonization, exploitation, and the ruthless dominance of European elites in geopolitics and economics. This system (in both its overseas and domestic forms of colonialization) was reliant on and normalized exploitation, violence, poverty, high mortality rates, and slavery. It was Sven Beckert whose work closely examined these miseries and injustices and the strong interrelations of the global and the local for the cotton industry.[44] Acknowledging these facts allows us to understand that local mills also talk about the global and difficult dimensions of heritage. The decline of textile production in Europe during the 20th century is a consequence of production relocating to other countries, mainly within Asia. However, in the 21st century both the global North and South see demands to negotiate interpretations, appropriate reuses, and conversion of urban textile mills.[45]

All of the case studies presented in this book show aspects of worldwide trade, knowledge exchange, and human mobility, although the focus is not on colonial and postcolonial aspects, the cruel history and impact of slavery and present forms of human exploitation, or issues such as global environmental harm. The book is limited insofar as it does not take into further consideration what we can learn from the historical experiences of this global and difficult heritage for today's challenges of ongoing exploitation, migration, and climate change; neither does the argumentation presented herein show how we can communicate and discuss these immaterial aspects through material remains.[46] Reflecting the difficult and dark sides of industrial and labour history, and understanding mills as artefacts that give evidence of strongly corresponding global–local dimensions, requires international and interdisciplinary research projects and networks. Furthermore, the examples illustrate that, to date, these complexities are not yet communicated with and through the former production sites and structures by means of their conservation and memorialization. I consider both reflection and new forms of practice to be the main challenges for future heritage conservation in this field.

Although this book does not contain examples beyond Europe, nor address the global connections between companies, politics, and trade networks, it nevertheless contributes to another important aspect in this field. Heritage conservation—in its

known policies and practices—searches for outstanding and exceptional values: the first mill, the best technology, the largest complex, and so on.[47] However, the present volume leaves behind this competitiveness and instead includes mills that might not be listed (yet) and considers a variety of conservation and reuse engagements and practices. This approach might open a path to better rethink textile heritage as common heritage in future works. From this perspective, in the words of Meier and Steiner, "a critically considered Global Heritage [is] understood as heritage of humanity which is to be shared, as a Patrimoine de l'Humanité that binds all of us together as people with diverse experiences"[48]. Consequently, the issues surrounding the conservation of industrial heritage are broadened to encompass a wide range of issues, and cases such as the struggles of former workers and local initiatives to benefit from mill conversion in Mumbai, for example, provide much that is worth sharing and learning from.

Reuse, conversion, and good practice

Probably the biggest challenge of our time is climate change. Industry was and is deeply involved in triggering climate change, while also contributing to avoiding and mitigating climate change through technical innovations and solutions. Understanding abandoned mills as built infrastructure and resources through which to face global challenges offers new opportunities for local communities, cities, and industry. Hence, reuse, conversion, and good practice are urgently required in helping to combat climate change. We need to take into consideration not just the exceptional examples, as emphasized in the tradition of monument protection, but also the ordinary ones.

In addition to the long-established practice of reusing buildings, a more recent debate in architecture, urban development planning, and conservation can be observed in which conversions of historic industrial complexes are important. Conversions are part of urban revitalization strategies[49], re-shaping urban space[50], and last but not least they play an important role in the resource debate[51] as already mentioned. Moreover, in practice, conversions can be connected with participatory and appropriating processes involving groups from civil society, be they artists, citizens' initiatives, or grassroots movements.[52]

However, research and practice still show that the fates of industrial complexes remain largely unchanged: a great deal of uncontrolled demolition and new construction, in some cases even similar types of buildings, such as DIY stores, are newly erected on historic sites. Furthermore, even if some historic buildings are maintained, the visual integrity of the complex and its urban surroundings often fail. Lively community ties are missing, when investors and capital arrive to transform a former place

of ordinary work into a new creative and well-being hotspot. There is barely any planning culture of discussing alternatives to projects or different scenarios, nor any comprehensive planning activities that correspond to the urban heritage of textile mills.

In the context of planning, conversion is understood as a change of use of larger areas whereby areas formerly used for military or industrial purposes are usually thematized. Thus, conversions are always transformations embedded in the long-lasting practice of architecture in existing fabric[53], but are not heritage conservation per se[54]. In short, we see approaches of understanding the industrial relicts as hybrid spaces or flexible usable infrastructures, or as as-found-objects[55] to interpret and contextualize in a new manner, as aesthetical values or landmarks, as specific constructions and particular atmospheres; but we can also discover testimonial values. In this latter context, Meier argues that, especially in the conversion of barracks and industrial plants, the prudent and knowledgeable handling of the urban structures of these facilities is important, since they bear witness to organizational processes and social conditions and conflicts. Several examples within this book document those; for example, the provision of social and hygienic facilities at production plants may reflect a culture of paternalistic care, whereas puzzlingly small entrance doors at other sites may reflect the historically widespread use of child labour. It can be added that the architectural representations indicate the close relationship between city and industry. The overarching question in each case is: What do we—as a society and conservationists—want to pass on?[56] What is of importance and which substance documents it?

Basically, examples of good practice have in common that the characteristic structures of heritage sites are more or less preserved, while at the same time careful changes and adaptations have been made with regard to new uses and functions. Good practice also includes design quality with regard to the coherent insertion and integration of the new use into the existing building fabric. A broad spectrum of motivations, concepts, and measures of conversion are possible and compatible with international positions on heritage conservation, such as the Venice Charter. From the perspective of heritage conservation, good practice in conversions can be discussed with the help of the following evaluation criteria:[57]

- Preserving the urban, the structural, and the design characteristics of the industrial complex
- Retaining the legibility of the document, the time layers, and historical changes
- Reflecting diversity, global aspects, and difficult heritage
- Creating accessibility for the general public
- Designing quality through interventions or new architectures
- Avoiding radical demolition
- Ensuring long-term use

In particular, criteria one and two refer to listed buildings and their specific entries. These entries might list the full intrinsic, or testimonial value of the site. Criteria three allows us to better understand the whole complexity of the heritage and to learn from difficult, dark, and global aspects of its history. Criteria four to seven explicitly focus on conversions that are compatible with listed building and are appropriate to heritage conservation principles. From the perspective of heritage conservation, comprehensive documentation, suitable restoration of the machinery, and careful restoration of buildings are central indicators for a positive evaluation. In comparing the different forms of conversion, this contribution oscillates between individual case analyses (which are typically used in the field) and the typological approach. The latter helps to document and compare the structural and design characteristics and practices related to criteria one and two: their conservation in conversion as well as the legibility of historical temporal layers and changes.

Notes

1 Meier and Steiner 2018.

2 Oevermann and Mieg 2015.

3 Cossons 1993; Hassler and Kohler 2004.

4 Pudgin 1898.

5 Schinkel 1986.

6 Föhl and Hamm 1988; Cossons 1993; Rose et al. 2011; TICCIH 2013.

7 Cossons 1993; van Boom and Mommaas, 2009; TICCIH 2013.

8 Cossons 1993, pp. 192–193; Schädlich 2015, p. 124.

9 Fairbairn 1865b, pp. 115, 133.

10 Nasmith 1894, pp. 58–75; Buschmann 1992, p. 11.

11 Cossons 1993, pp. 195–197.

12 Nagler 2011, pp. 225–227.

13 Fairbairn 1865b; Klasen 1896; Renz 2005; Lassotta 2005.

14 An early shed construction was promoted by the engineer William Fairbairn in his guidebook On the Application of Cast and Iron, using Saltaire Mill (1851–1853) as an example (see Fairbairn 1865a, pp. 154–170); Séquin and Knobel (1859) build an early European example in Switzerland (see Bärtschi 2008).

15 Pevsner mentioned the following numbers of power mills in England: 1813 = 2,000; 1829 = 45,000; 1835 = 96,679; and 1850 = about 250,000 (see p. 276).

16 This overview recaps many sources, which are all introduced when aspects and examples are discussed in detail.

17 Posener 1987.

18 Sikora et al. 2010.

19 Holden 1998; Oehlke 2005.

20 Rhefus 2016.

21 Cossons 2007, p. 9.

22 Hassler and Kohler 2004.

23 van Boom and Mommaas 2009.

24 van Boom and Mommaas 2009, p. 42 (author's translation).

25 Meier 2014.

26 Kierdorf and Hassler 2000; Douet 2012; Oevermann and Mieg 2015a; Meier and Steiner 2018.

27 Miller et al. 2007; Nagler 2011.

28 The acknowledgment lists all the experts and dialogue partners.

29 Walczak 2010.

30 TICCIH 2013, paragraph 1.

31 TICCIH 2013, paragraph 3.

32 Pevsner 1976.

33 Magnago Lampugnani et al. 2005, pp. 251–337; Magnago Lampugnani 2010, pp. 812–847.

34 Lee and Jacoby 2011, p. 16.

35 Lathouri 2011.

36 Quatremère de Quincy, Encyclopédie Méthodique Architecture, Vol 3, Paris 1825.

37 Venturi 1978; Rowe 1997.

38 Ungers et al. 2013.

39 Koolhaas 1995, p. 1256; Oevermann 2017.

40 Meier 2010.

41 Himmelmann 2000.

42 Shackel et al. 2011; Smith et al. 2011.

43 Reeves et al. 2011.

44 Beckert 2015.

45 Jain 2015; Adakar 2020.

46 Bogner et al. 2018.

47 Meier and Steiner 2018.

48 Meier and Steiner 2018, p. 31.

49 Jessen et al. 2008; Legnér and Ponzini 2009; Douet 2012.

50 Baum and Christiaanse 2012; Blasi and Sala Giralt 2019.

51 Hassler and Kohler 2004; Watson 2012; Oevermann and Mieg 2016.

52 Dörrenbächer 2013; Polyák 2015; Oevermann et al. 2016.

53 Breitling and Cramer 2012.

54 Kierdorf and Hassler 2000, p. 221.

55 Lichtenstein and Schregenberger 2001.

56 Thanks to Konstanze Domhardt, Winterthur.

57 Criteria are always debatable, but help to make a clear point. This argumentation was elaborated, discussed, and further reflected with local and international experts in (industrial) heritage conservation within the three-year research project (see Oevermann 2020).

2   Textile Cities and their Mills

Industrialization is a dominant theme in the history of urban development in the 19th and 20th centuries: the effects of industrial production on the city, the new urban and transport technologies, and the many counter movements that were reflected in architecture, urban development, and town planning. However, despite the importance of industrialization and urbanization in the 19th and 20th century, discussion often concentrates on transportation and housing and the difficulties associated this new urban density, such as underdeveloped social and sanitation infrastructures. Other works include the perspective of a *longue durée*. One such example is the renowned work on the history of cities by the historian of architecture and urban structures, Leonardo Benevolo. He highlighted both the persistence of cityscapes and built structures and also how this enduring nature preserves and highlights changes through spatial innovations over time. Factories feature little in this assessment, except the two social utopias Phalanstère and Familistère. Both projects rethink production and housing as a social and spatial unity located in a rural landscape. Spatial elements known from manor house and castle complexes, such as symmetry and court of entry, are used to express order and paternalistic care by the factory owner.[1] Considering the "Enzyklopädie zum gestalteten Raum"[2] (The encyclopaedia of the designed space) various elements of the designed environment in general constitute textile mills and their urban surroundings. Beyond industrial landscapes, canals, and harbours, these are urban streets or boulevards, blocks and grids, suburban settlements as well as enclosures and gateways, but also rivers and hills and sometimes gardens or parks as specific features of the industrial ensembles. Here, designed spaces (gestaltete Räume[3]) are spaces that have been transformed through human action and interaction, be that through design in the narrow understanding of the German word Entwurf, or else through use, care, or even neglect.

In general, the development of textile cities and their mills has mainly corresponded to five lines of discourse and fields of planning practices[4]: First, the upcoming examination of the appalling housing conditions and urban environments during the mid-19th century, which led to pollution, illness, and high mortality rates. Sec-

ond, the reform movements and utopias as answers to these problems, ranging from Phalanstère, Familistère—and the flagship project Saltaire—via the Cité Industrielle by Tony Garnier to the garden city of Ebenezer Howard and all his followers. Third, the emerging discipline of urban planning around 1900 that succeeded not only in introducing broad improvements to sanitation infrastructure but also pushed forward a vast discussion on how to design and plan cities and city extensions in which most of the mills are located. Fourth, the modernist architecture of the 20th century with its references to industrial production, functionality of architecture and urban design, and the spatial separation of functions in the city—the industrial landscape of several huge mills, waterways and infrastructure in Ghent is an excellent example—; this also launched new utopias of an experimental modernity, including great visions of the vastness of textile production such as in Leinefelde, as well as social housing. Finally, the fractures and discontinuities of two world wars and the eventual breakdown of Europe's post-war separation in 1989 influenced the rethinking of cities and finally the power of converting places of textile production.

To sum up: For half a century it has been commonly acknowledged that the textile industry transformed cities.[5] However, cities have also shaped mills: geography and topography, available knowledge and technical development, but also the economic–political situation and planning culture formed the mills as designed spaces.

Due to the extensive history of urban textile production, this book takes into consideration just some of the manifold textile cities in Europe. Projects of paternalistic care, such as Saltaire, are introduced in detail, and other textile cities and mills display some similarities to the introduced discourses. The focus of the book lies on bigger cities in countries ranging from England to Poland. The case studies introduce Manchester and Bradford, both from the United Kingdom; Lille, France; Ghent, Belgium; Winterthur, Switzerland; Krefeld and Leipzig from Germany, and finally Łódź in Poland. The detailed description of the mills' built history, the urban structures, and architecture is given in Chapter 3; additionally, single complexes are considered from a broader geographical area comprising Prato, Italy; Terrassa, Spain; Lisbon, Portugal; and Leinefelde, Germany.[6]

Pioneers and flagship projects in England

The term *superlatives* might appear more relevant to marketing than science. However, there is a reason why the industrial developments that occurred in England are conceived as an Industrial Revolution, whereas on the continent we speak instead simply of industrialization. The examples from Manchester are pioneers, as the TIC-CIH study[7] puts it; Salts Mill and the industrial town Saltaire, a flagship project in

answering social questions of industrial production, and finally Lister's Mill, the first facility for silk production on such a huge scale.

Manchester

Manchester is one of the best-known cities historically associated with textile production, although the financial and trade sectors had also been very influential in its historic urban development. The area's regional market function originates in the Roman and subsequent (from the 7th century) Anglo-Saxon periods, and Walloon immigrants later established woollen and coarse linen manufacturing and trading in the 15th to 17th centuries.[8] Manchester's rise as so-called Cottonopolis started around 1800 with the introduction of steam power; more precisely, in 1783, what is thought to be the first steam-powered textile mill (since lost) was constructed in Manchester.[9] At this time, many factories were not of building types specifically intended for production but often workshops and warehouses, reused buildings, or room-and-power mills where comparatively small producers rented space and power from the mill owner. Scholars argue that it was the cotton branch that invented the factory as a purpose-built construction type, namely of multiple storeys and large, open indoor spaces structured by regular columns, beams, and windows.[10] Already by 1793, 30 spinning mills—mostly producing cotton—were operating in Manchester[11], together with a huge number of warehouses to store and sell the bulk textiles: in 1807 there were 1182 warehouses located in the city[12].

Ancoats, northeast of central Manchester, is an urban extension developed in the mid-18th century and was the world's first industrialized suburb.[13] One driver for its development as an industrial district was the Rochdale Canal, commissioned in 1794 and opened in 1804. The canal belonged to an extensive network of waterways that had been constructed throughout Britain during the 18th century to transport coal and iron ore products.[14] The Rochdale Canal connected Manchester (via Hull) with the North Sea, as well as (via Manchester-Castlefield) with the important seaport of Liverpool.[15] Ancoats became home to the cotton-spinning mill complexes owned by A & G Murray and also McConnel & Kennedy, both located on the Rochdale Canal as Fig. 2.1 shows. Thomas Slack's 1815 engraving of Ancoats' cityscape illustrates the new urban structures and mill buildings: seven to eight storeys high, more than 20 bays long, formed as simple, rectangular volumes almost entirely without decor, and packed densely alongside each other.[16] The centuries-old tradition of urban block perimeter structures[17] received a factory-style providing a new variation in scale, function, and design.

Ancoats emerged as a multi-functional district with industrial production, warehouses, infrastructure, churches, office buildings, and housing including slums as well