VITAL ARCHITECTURE
VITALE ARCHITECTUUR
GEREEDSCHAP VOOR LEVENSDUUR / TOOLS FOR DURABILITY
RJURD ROORDA, BAS KEkke

nat010
Embracing the World

Zonnestraal, Sunbeam. The word alone says it all. A building with this name has got to be an example of vital architecture. My mother once worked as a cook in the kitchen of this former sanatorium architect Duiker designed for diamond cutters who had contracted tuberculosis. When I was a child, she told me how she fell in love with my father here a long time ago.

Unlike their marriage, the building was not meant to last forever. When Duiker designed the sanatorium in the 1920s, there was no or at least insufficient budget to build for posterity. With the help of architect Bijvoet, he almost tentatively drew one building after another, small and large, which eventually resulted in an unprecedented ensemble. Slimline constructions of reinforced concrete, making it possible to erect façades almost entirely out of steel profiles and glass, buildings made of little else than sun and light.

As new medical discoveries would cure the feared disease, Duiker had made his ‘disposable building’ for the few decades there would still be a need for sanatoriums. Duiker died in 1935, not yet 45 years old, but his expectation was right: new, effective treatments for TB were found and Zonnestraal, with its transparent main building flanked by the two patient pavilions and with the workshops for the patients around it, was no longer needed as a sanatorium. It was first used as a ‘normal’ hospital, but later it fell into ruin, between the thousands of Scots pines that had been planted for the sake of fresh air for the patients. With a great deal of effort, the ruin was fortunately salvaged and after a major restoration Zonnestraal is now fully functioning again: from eye hospital to rehabilitation centre, from blood bank to obesity clinic. The radiant white ship of yesteryear with the forest behind it and with the heathland for a view has become an ode to humanity.

Because of its vulnerability, Zonnestraal is not even the most clear-cut example of Vitality. There is a wide range of very diverse vital projects in this book. From the Pantheon in Rome to the School of Architecture in Nantes. From the house of artist Donald Judd to a wooden chalet in the mountains that has been disassembled several times and reassembled at different locations. Buildings that look completely different but have more in common than you might think at first. Whether they were built on a spectacular cliff or along the canals of Amsterdam, in New York or in Chandigarh, by an architect who remained unknown or by Le Corbusier.

The buildings in this book do not let themselves be restricted to a single use; like chameleons they change their colour and skin over time, without losing the features and character that set them apart. Each and every one of them is a stout and sturdy building, their robustness part of their design. These buildings are loved; they are part of our collective memory. They are ready for changing demands in certain and uncertain times. Just look at the floor plans and sections of all these buildings. Clear, razor-sharp. They are testimony to durable and vital architecture, to timelessness and generosity. Shouldn’t all of us make buildings like these again? Light and space that goes beyond today’s design brief and use; that is more than just a number of square meters from an Excel file.

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Edwin Oostmeijer is trained as a journalist and currently works as an independent project developer.
De wereld omarmen

Zonnestraal. Alleen het woord al. Een gebouw dat Zonnestraal heet moet wel een voorbeeld zijn van vitale architectuur. Mijn moeder stond ooit als kokkin in de keuken van het vroegere sanatorium dat architect Duiker had ontworpen voor diamantslijpers die tuberculose hadden opgelopen. Zij vertelde mij als kind hoe zij hier ooit mijn vader had ontmoet en verliefd op hem was geworden in een gebouw dat niet voor 'de eeuwigheid was bedoeld.

Toen Duiker in de jaren twintig van de vorige eeuw het kruoord ontwierp was er geen budget of in ieder geval onvoldoende budget om voor de eeuwigheid te bouwen. Met hulp van architect Bijvoet tekende hij het ene gebouw na het andere, bijna zoekend van klein tot groot, tot uiteindelijk een ensemble onstond dat zijn weerga niet kent. Slanke constructies van gewapend beton, waardoor de gevels vrijwel geheel uit stalen profielen en glas konden worden opgetrokken, gebouwen van bijna enkel zon en licht. Zoals de gevreesde ziekte zou verdwijnen dankzij nieuwe medische ontdekkingen, had Duiker zijn 'wegwerpgebouw' gemaakt voor de enkele decennia dat sanatoria nog nodig waren.

Duiker stierf in 1935, bijna 45 jaar, maar zijn verwachting kwam uit: er kwamen nieuwe, effectieve behandelmethoden van tbv en Zonnestraal met zijn 11e hoofdgebouw, de twee patiëntenpaviljoens aan weerszijden en de barakken eromheen werd eerst nog als 'gewoon' ziekenhuis gebruikt voordat het een ruine werd, tussen de duizenden vliegdennen die omwille van de frisse lucht voor de patiënten waren aangeplant. De ruine werd gelukkig na veel inspanning gered en na een ingrijpende restauratie is Zonnestraal weer volop in functie: van oogziekenhuis tot revalidatiecentrum, van bloedbank tot obesitas kliniek. Het stralende witte schip van weleer met het bos in de rug en de heide als uitzicht is een ode geworden aan de mensheid.

Vanwege zijn kwetsbaarheid is Zonnestraal nog niet eens het meest uitgesproken voorbeeld van Vitaliteit. De reikwijdte en diversiteit van vitale projecten in dit boek is groot. Van het Pantheon in Rome tot The School of Architecture in Nantes. Van het woonhuis van kunstenaar Donald Judd tot een houten chalet in de bergen die meerdere malen uit elkaar is gehaald en op verschillende plekken weer in elkaar is gezet. Gebouwen die in niets op elkaar lijken maar toch meer met elkaar gemeen hebben dan je op het eerste gezicht zou vermoeden. Of ze nu op een spectaculaire kif zijn gebouwd of aan de Amsterdamse grachten, in New York of Chandigarh, door een onbekend gebleven architect of door Le Corbusier.


Licht en ruimte die het Programma van Eisen en het gebruik van vandaag overtijgt, die meer is dan een aantal vierkante meters uit een excelbestand. Als opdrachtgever van woongebouwen ben ik ervan overtuigd dat je meer moet willen maken dan het vereiste minimum aan ruimte. Je moet willen uitpakken, in de goede zin van het woord. Met mooie ruime plattegronden, de beste materialen en detailering, horizontale en verticale overmaat, Plekken maken waar mensen elkaar kunnen ontmoeten. Het geheel is altijd meer dan de som der delen en dat laat dit boek op unieke wijze zien. Vitale architectuur gaat niet over geld of regelgeving, het gaat vooral over de ene generatie die iets van waarde achterlaat voor de volgende generatie. Vitale architectuur gaat over de liefde en aandacht waarmee onze omgeving is vormgegeven, over wat mensen bindt in plaats van scheidt, over dag- en zonlicht dat een ruimte binnenvult. Het gaat over de wereld omarmen, open staan voor verandering, in plaats van de wereld buiten de deur te houden. Let The Sun Shine In!

Edwin Oostmeijer is opgeleid als journalist en werkt nu als zelfstandig projectontwikkelaar.
Embracing the World

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VITALITY

ONLY A LIVING INSIDE
HAS A LIVING OUTSIDE
LUDWIG MIES VAN DER ROHE
Vitality

This book is about friction. And how this friction can be prevented. Friction between architecture and time, between architecture and the fickleness of life; the friction that occurs in and around that architecture over time. Architecture, broadly defined in this book as the design and construction of buildings, can in principle be understood as a contramal of its design requirements: a snapshot of guidelines, thoughts and dreams for human lives and how to accommodate these. These design requirements are constantly evolving in the wake of changes in the views of people and society. These changes start the moment architects begin to design a building; and this programmatic change never stops, not even after completion. This happens because life is ever changing. Unfortunately, a building usually only complies with the original design requirements. Much architecture comes with an element of friction.

Incidentally, architecture itself is not alive, and neither are the buildings that come from it. The general idea, nonetheless, is that architecture behaves like a living organism. Although architecture is by definition inorganic, lifeless and generally immovable, we still speak of the ‘life’ of architecture, and we use all kinds of architectural terms that relate to life: the ‘skin’, the ‘skeleton’, windows as the ‘eyes’ of a building, ‘intelligent’ facades, buildings that ‘learn’ et cetera. In this architectural ‘life’, the design stage is the conception of a building, the construction its birth, the successful and ongoing accommodation of human activity then constitutes the rest of its life, and the building’s demolition marks its death.

As Stephen Cairns and Jane M. Jacobs show, architects, architecture theory and -history are completely focused on the stages of design and construction (architecture’s ‘natality’), and usually overlook the wear and tear associated with aging as well as the subsequent ‘death’.

The authors of the book at hand are not so much fascinated by the death of architecture, but rather by the length of its ‘life’ – and more specifically by how architectural design can affect its lifespan, and delay its end. In our perception, this lifespan is important for two reasons: first, because of the fact that buildings with a long life may be more sustainable; and second, because one can pass culture on to future generations through physical architectural objects and the perception of these, beyond the issues of the day at the buildings’ completion.

The lifespan of a building is limited, by the way. The oldest building that is still in use is about 1,800 years old. This corresponds to approximately 120 generations of people. Note that the oldest living tree is nearly 4,800 years old. It is quite a task to retain a building’s vitality.

Since architecture itself is not alive, vitality in architecture cannot be understood in the literal sense of life force. Architectural vitality does, however, refer to real (human) life, and responds to it in the most exquisite way: with minimal friction.

In our definition, architectural vitality is the degree to which a building is equipped to support people’s lives in the long run. Vitality leads to durability, to buildings that age without losing their usability.

Value

Building is expensive. What does it mean when a building ‘outlasts’ the term for which it was designed? Does it mean the initial investment was too high? Or does it mean that because of this over-investment the building still has value and use, and that it does not have to be demolished?

On average, today’s buildings are constructed with a 50-year lifespan in mind. Among other things, that design lifespan is determined by the expected period of use and related depreciations. People assume that the activities the building is supposed to protect from the elements will have changed to such an extent after those fifty years, that an investment greater than what is needed to keep up the building for that period of time is unwarranted.

Most buildings, however, are still in use after those fifty years. Rem Koolhaas and Hans Ulrich Obrist observe an average lifespan of 75–100 years for buildings with a steel or concrete skeleton, 100 years for buildings with a wooden skeleton, 125 years for stone buildings and 175 years for buildings made of monolith concrete.

When a building is older than average, it has usually faced a few critical moments in which people weighed up the pros and cons of its demolition or preservation. Buildings survive those critical moments if they represent a higher value if they remain untouched than they would if they were taken down: vital buildings, buildings with future value.

What value are we talking about here? The use of the word ‘investment’ seems to imply the economic value, but that notion needs immediate qualification. In addition to their market value (expressed in monetary value, and depending on factors such as their age, location, maintenance and usability), especially their cultural-historical value (valued not according to financial criteria, but to more abstract ones) plays a role in the vitality of buildings, as we will see below. Public value and political conditions also play a role as intangible outside factors influencing the vitality of a building. The architectural value finds itself in the midst of these values. The way in which a building responds to the variability of human and architectural culture, and to changes in the economic and political climate, is a measure of its vitality.

So not only does vitality depend on various incomparable values, but those values also change with time, among other things due to changing perceptions of use and beauty, new technical requirements, and because of political-ideological and other social developments. This means that the factors that determine vitality are difficult to bring together, and also that found vitality is always a snapshot.

Method

This book is the product of research. This research focused on the question of which factors determine the vitality of buildings. BNA Onderzoek (the Research Department of Royal Institute of Dutch Architects) supported the research. It was initiated in 2012 when architects affiliated to the BNA conducted a number of studies. In these studies, analyses were made of the design and history of use of 47 buildings over the centuries.
The purpose of the research was to gain insight into which factors play a role in a long service life, and how these factors interact. These factors were divided into architectural and external factors. In the first part of the BNA study, we asked the architects which factor was decisive in the fact that the building had not been demolished yet. The growing realization that vitality is connected with time-dependent factors then led us to reconsider the interpretation of the (timebound) outcomes. We decided to both fine-tune the factors and ask multiple questions about each building. The answers, in the second part of the study, provided us with more insight into the vitality of the 47 buildings. This book features twenty of them. The aim of this selection of buildings is to link proven longevity of old buildings to the as yet unproven one of newer buildings. By doing so, we intend to gain insights that new designs can benefit from.

This method is based on a number of assumptions. It is not easy to make predictions about the lifespan of young buildings, because external factors, such as economic and political ones, can cripple their vitality. Some of the featured buildings have partly lost their vitality under the influence of such external factors. Three of them have even been demolished now, despite their clearly vital characteristics. In our view, this makes them no less important for understanding vital architecture. The twenty buildings featured in this book form a selection composed to illustrate all factors with example buildings – sometimes with clear differences in vitality. So the selection is not a Top 20 of durability.

The research is based on a literature study, which entails a focus on published architecture. This is where the aforementioned ‘natality’ in architecture and its theory and history fall short; the preoccupation with design and construction. Because of this, it is not easy to find descriptions of the entire lifespan of buildings in the literature on the history of architecture. As a result, some buildings were taken out of the selection if too little information was available about their history of use and transformation processes. Furthermore, this method entails an emphasis on architecture that has been written about before. This means conventional buildings are a minority in this book. Within the framework of our research, we cannot entirely eliminate those restrictions. More extensive research is likely to be needed to support our findings.

For now, we assume that the found vitality factors to some extent apply to all buildings.

The research resulted in 15 of such factors that play a significant role in the life of the 47 studied buildings, as an indication of their vitality. These factors form an essential design tool for clients and architects to create vital architecture.

Qualitative Analysis

This book presents the 47 buildings and 15 factors in a matrix, classified on the basis of the Qualitative Comparative Analysis (QCA) method [see pages 32–35 Matrix]. This method comes from the social sciences; Charles Ragin developed it in the late 1980s. QCA allows researchers to compare quantities that seem incomparable at first sight and draw conclusions from it. Instead of quantities, qualities are assigned and compared in QCA. QCA does justice to diversity and complexity, and it can be used to compare systematic differences.

QCA provided a solution for the problem of how to analyse the occasionally time-dependent factors and the incomparable values associated with vitality. The QCA-matrix is set up as a so-called ‘truth table’, which was made for each building based on whether a hypothesis was considered to be true or false for that particular building. These hypotheses refer to economic, cultural and architectural values.

A building scores a point if an hypothesis is true for this building. In the table, this shows from the amount of black. The more black, the greater the chance that a building will have a long lifespan.

However, results from the matrix cannot be numerically compared. QCA describes qualities, not quantities. If a building scores a 'yes' eight times, that surely is a high outcome, but in some cases this might mean a different nuance than in others. Then again, we can see from the outcomes that almost all buildings have several factors that simultaneously influence them. A strategy aiming for high vitality will thus have to consist of several ingredients.

Layers

For our interpretation of vitality factors, especially concerning what components of a building are responsible for its adaptability, we used the concept of 'shearing layers': building layers that each have a different replacement cycle, under the influence of wear, maintenance, fashion and the availability of money. It was Francis Duffy7 who introduced this concept, and Stewart Brand and Bernard Leupen8 elaborated on it. Brand points to the fundamental instability of the entirety of those layers, which 'always tear a building apart due to the different rates of change'.9

Among other things because of differences in their field of research, these authors do not use the exact same number of layers and they also use different names for them. Brand subdivided Duffy’s four layers and elaborated these into six layers: Site, Structure, Skin, Services, Space Plan and Stuff.

For our study of vital architecture, we consider Stuff (individual furniture and inventory) and Services (installations) to be of less importance than the other layers. In our study, we distinguish the following layers:

1. Site:
The geographical setting, the urban location and the lot, the boundaries and context of which will outlast generations of buildings. The lifespan of the site itself is eternal.10

The site is the subsurface in which the foundations of the building are supported. Though formally not part of the building, its location can still have a great impact on its vitality.

2. Structure:
The foundation and load-bearing elements of the building (floors, walls, columns, beams) are perilous and expensive to change, so people do not do so, or only sparingly. The lifespan of a support structure varies between 30 and 300 years (according to Brand, who uses a wider margin than Koolhaas and Obrist do), but many buildings do not last this long.
3. Skin:
The exterior surfaces of façades, the roof and other places where the interior of the building is separated from the outdoor climate, such as exterior ceilings. In addition to this separating role, the skin also presents the building to the public. The lifespan of the skin is determined by how resistant it is to the weather and wear and tear, and by its maintenance. On average, the skin is replaced every twenty years, and possible technical or cosmetic improvements can be made then.

4. Interior:
For reasons of readability we will use the term interior rather than the sixth S of Brand. This shearing layer comprises the layout of the interior, with walls, ceilings, floors, doors and all these parts' finishes and openings. Here is where the structure and boundaries of the interior are created, equipping it for human activities. The lifespan of the interior is shorter than that of the other layers: about seven years.

Reading Guide
In the chapter Change of this book, the architectural factors are discussed first. We describe the ways in which buildings can allow changes to be made, with what adaptability they are equipped to be able to accommodate people's lives for a long time. Ideally, this adaptability leads to an ongoing utility for time-dependent programming. This often requires architectural transformations, such as extensions or reconstructions of building layers. In this chapter we also describe how the site of a building can support or harm its vitality. We furthermore pay attention to robustness – a prerequisite for achieving high vitality.

The chapter Solidification is devoted to the way people look at architecture, and how this influences the vitality of buildings through culture. In this culture, some buildings become important and are likely to be preserved, while others do not. This chapter is also about beauty, and about the question of how to achieve sustainable attractiveness. We do not only describe how culture influences people's notions of beauty and permanence, but also the means with which architecture can meet these notions. Paradox with the previous chapter: architecture that is now considered vital arises precisely from a desire to transform as little as possible, from a desire to perpetuate the original architecture.

In the chapter Economy, we describe the other external factors, which can still 'override' the architectural and cultural vitality of buildings: politics, economics and pure chance. In this chapter, we also focus on demolished vitality.

The chapter Challenges come last, with 'operating instructions'; considerations about the new design tools, and recommendations for new developments and building transformations.
1. Economy
Land price: land price forms no threat to the building
Depreciation: building has a low depreciation
Maintenance: building does not require much maintenance
   (mainly assessed for the exterior)

2. Architectural
Polyvalence: function can be changed ‘without’ demolition
   – programme variable, structure stable
   Interior: the interior (staging) can be replaced
Expandability: can be (easily) extended (l/w/h)
   – programme stable, structure variable
Skin replaceable: building has a replaceable façade
   – internal load-bearing construction, façade non-bearing
Robustness: building is unchanged ‘for some reason’
Site: building is part of a stable (scenical or urban) environment
Great Space: building has an irreplaceable interior due to its cultural value
   (‘great space’ or finish)
Refinement: building has a refined appearance due to the expression of detail

3. Culture
Monument: is listed for preservation
Museum: in use as a museum (potentially after a different use)
Society: is designed for a long-term social entity (public or religious building)
Public value: highly appreciated by the public

Abbreviations:
LAN  Land Price
DEP  Depreciation
MAI  Maintenance
POL  Polyvalence
INT  Interior
EXP  Expandability
SKI  Skin Replaceable
ROB  Robustness
SIT  Site
GRE  Great Space
REF  Refinement
MON  Monument
MUS  Museum
SOC  Society
PUB  Public Value

CHANGE
ARCHITECTURAL
SOLIDIFICATION
CULTURE

Verona, Arena
Arles, Amphitheatre
Rome, Pantheon
Split, Diocletian’s Palace
Rome, Santa Costanza
Ies, Grand Shrine
San'a, Highrise-Dwelling
Sevilla, Mosque
Schwyz, Haus Nideröst
Massachu, Dominican Church
Siena, Palazzo Publicco
Florence, Palazzo Vecchio
Venice, Ca d'Oro
Florence, Palazzo Medici
Utrecht, Centraal Museum
Veere, Grote Kerk
Amsterdam, Het IJssel
Florence, Galleria Uffizi
Amsterdam, Barliotti House
Amsterdam, Town Hall/Royal Palace
New York, 101 Spring Street
Amsterdam, Magna Plaza
Paris, Oare/Musée d'Orsay
Buffalo, Larkin Administration Building(1)
Winterwijk, Tricot Textile Factory
Leiden, Branch Office Van Nelle(1)
Turen, Lingte
Stockholm, Public Library
Moscow, Narcomin Building
Hilversum, Zonnestraal Sanatorium
Rotterdam, Bijkhorst Departement Store(1)
Berlin, Electricity Station/Metahaus
Rotterdam, Van Nelle Factory
Lübeck, House Schminkne
Capri, Casa Malaparte
Rotterdam, Industrial Building
Mexico-City, Casa Lopez
Firmeny, Unité d'Habitation
Chandigarh, Palace of Assembly
Hernemanschenden, Siedlung Halen
Amsterdam, Burgerweeshuis
Berlin, Neue Staatsbibliothek
Floraac, House Latapis
Porto, Casa da Musica
Seattle, Central Library
Essen, Zollverein School
Nantes, School of Architecture

70% 34% 57% 79% 82% 34% 28% 40% 45% 53% 36% 70% 26% 53% 64%
CHANGE

THE SPEED OF CHANGE MAKES YOU WONDER WHAT WILL BECOME OF ARCHITECTURE

TADAO ANDO
When studying buildings through time, the dissimilarity between the buildings and their programmes is striking. Programmes and uses change constantly. Buildings – basically collections of lifeless material themselves – can allow these changes in various ways, despite this lifelessness. When mapping the vitality of buildings, it is crucial to study these ways.

We have therefore studied first how the buildings in our selection were used throughout their history, and then we listed the transformations that came with these different uses. The friction between the stillness of the building and the fickleness of life will in many cases lead to a wish for transformation, and if this is not an option, to disuse and demolition. In order to be vital, a building must be kept available for use at all times.

A building has the right adaptability if it is able to keep meeting usability standards, which change rather often over time. If little or no transformations are needed, we can speak of polyvalence. The building then has maximum adaptability. The more layers in need of transformation, the lower a building’s adaptability and vitality. The lowest level is called demolition or disassembly.

1. Polyvalence

Polyvalence is defined as the ability to change a building’s use or its full programme, without having to make structural modifications. The word polyvalence is known from the *salle polyvalente*, a type of building that can be found in every French village or town, which can just as easily be used as a venue for parties as it can be used as a theatre, concert hall or cinema.1 Herman Hertzberger introduced the concept in the architectural debate.2 Polyvalent architecture allows various programmes without the need for structural modifications and additional investments. This is undoubtedly the most natural and elegant form of vitality, since it is entirely without friction.

This may disappoint some of you, but we did not find any entirely frictionless architecture in our study. This might not so much be an indication of the way these buildings are composed as of the time span we focused on in our study. Without structural modifications, the *salle polyvalente* has a different function almost every week, but our research is focused on a usage history of years – in half of the cases even centuries. Over such lengths of time, new uses usually do involve some transformations. This does not mean that polyvalence, as a real quality of an existing building or as a design approach for a new building, is not valuable for our research.

We have therefore chosen a broader definition. In our study, we qualify a building as being polyvalent when it allows programme changes. In principle, the main shape and composition of the building remain unchanged. The layers site, structure and skin stay the same, but incidental additions to the interior, for example, can indeed be made.

With these qualifications, many of the studied buildings are polyvalent. The phenomenon is not linked to a particular building or plan type, but can be found in large, column-free spaces; in regular column structures; in buildings with both large and small spaces; and in buildings with neutral and similar spaces – as long as the resulting spaces are not too small to accommodate a variety of activities.

For the transition from one use to another in a polyvalent building, certain uses are more important for the dimensions than others. In the example of the *salle polyvalente*, the theatre performance dominates the party in this sense. When an unused hangar served as a theatre, the hangar is the determining factor. After all, the hangar was not designed as a theatre and, on balance, integrating the theatre programme works because the hangar is too big for it. Here too, we can speak of polyvalence. A polyvalent building will obviously not be tailored for all possible uses. For the programme that does not determine the dimensions, it will rather have a ‘loose fit’, meaning that for some uses the building will definitely not be a tailor-made fit, and because of this, the building offers multiple options. So overfit – for at least one of the uses – can play an important role when it comes to polyvalence.

In addition, a polyvalent building also offers abundance in another sense: a generous infrastructure – preferably without dead-ends –, sufficient daylight and sufficient carrying capacity for different purposes. Because of the usual pressure to reduce construction costs, a deliberate aim for quality through oversize will rarely be the case immediately upon delivery, unless the design brief has already become smaller over the course of the design and construction process, without changes having been made to the design.

Only a very economical design can support a strategy of deliberately constructing oversized buildings with the unknowable future in mind. We make a distinction between horizontal and vertical oversize. The horizontal version refers to the floor plan and the limitations of the programme, the vertical to the cross-section of a building and the presence of surplus net heights. For most of the studied buildings, it is difficult to indicate horizontal oversize, since the original design briefs are unavailable. The example of the Architectural School in Nantes is one of the exceptions [see pages 50–55 Nantes, France].

Many of the studied buildings are also vertically oversized (spaces > 2.6 metres). Historically, realizing storeys with greater net heights had to do with daylight, representativeness and the discharge of waste air. It is easier to house activities for larger groups of people in a high space. This is the result of an architectural-spatial law: the height generates space for an acceptable physical and psychological climate. And if the design brief does not include such large groups, one can always make the space smaller. Sometimes it is also possible to add extra floors. The reverse – raising a low space – requires interventions in the main support structure, a drastic and costly intervention. For this simple reason, a high space offers more options for changes than a low space does, and thus it has a higher chance of vitality. Unfortunately, vertical oversize is no longer a natural part of buildings, since the twentieth century brought the building world standardization, the development of air conditioning systems and the stress on efficiency. Unlike horizontal oversize, we could easily trace vertical oversize in the buildings we studied [see pages 56–61 Veere, the Netherlands].

Sometimes it is necessary to radically transform a building to enable changes in its use. Here we distinguish between the adaptability of buildings and extensions.
We then subdivide adaptability into modifications or replacement of the building’s skin or of the interior. Occasionally, this means some adjustments have to be made in the support structure as well.

2. Replaceable Skin

The need to replace the skin can result from overdue maintenance and practical concerns about its performance, but it may just as well stem from an out-dated appearance. A new skin can make the building more representative or improve its architectural message. Often, it is replaced because of both reasons. Replacing a building’s skin is costly, and nowadays arguments regarding technical improvements are more common than those regarding representativeness. Due to the longer maintenance cycle, the skins of buildings will usually be replaced every twenty years or so.

The unlinking of support structures and the skin in frame structures, and the eventual complete separation that came with the use of the façade libre (the non-bearing façade), one of the ‘five points for a new architecture’ of Le Corbusier, make it easier to either completely replace or modify the skin layer, without jeopardizing the stability of the support structure.

In our study, we found replaceable skins from the nineteenth century onwards. A specific type of building with a replaceable skin is the twentieth-century industrial building [see pages 62–67 Turin, Italy]. In terms of technique, the industrial revolution plays a role in the development of this type of building, with the use of first cast iron and later steel and concrete. In this development, line-shaped supports are increasingly replaced by point-shaped skeletons: grids of columns, aimed for inexpensive spans and support, as well as a high degree of flexibility of the industrial process. We think of these grids of columns as generic structures, which, depending on the building depth, floor height and column spacing, can accommodate different programmes. It is these buildings that are currently being redeveloped in great numbers into offices, exhibition areas, shops, hotels and apartment blocks. These new uses are possible because of both the strength of the supporting structures and the adjustability of the skin.

3. Interior

Replacing an interior is much more general and happens much more frequently than replacing a skin. Replacement of an interior, in this book referring only to the elements that are part of the building and not the furniture (Stuff), almost always comes with changes in use. As a layer, the interior is closer to the human skin. It is usually less expensive per square metre than other building layers, and it is therefore more directly influenced by personal desires and fashions.

Brand describes a replacement cycle of three years (for a commercial space) to thirty years (for a house with an exceptionally stable occupation). He illustrates this with a picture of an American building, showing the wallpaper was renewed every seven years on average in the nineteenth century. He further reports: ‘Interiors are flighty, fickle and inconsistent – whether from caprice, or wear and tear, or the irregular shifts of necessity’. The seven-year period says something about wear, but also about the human desire for renewal.

For this renewal other changes in the interior are usually considered as well. Not just the wallpaper, but also indoor paintwork is usually done once every seven years. Nowadays, kitchens and bathrooms are also commonly renewed on a regular basis.

For many uses, changes in the interior function as an indicator of the vitality of the corresponding buildings. Especially in offices and schools, in the last decades we can see a development leading to increasingly open and nuanced indoor spaces, in order to facilitate new work processes and a growing need for communication. Today, this development results, among other things, in countless interior renovations in existing buildings. In older buildings, in which support structure, interior and the building’s skin have sometimes fused into a monolith, these types of renovations also often lead to interventions in the support structure.

Both adjustments and complete replacements of the interior contribute to an increased vitality [see pages 68–73 Amsterdam, the Netherlands].

4. Expandability

When there is an ever-increasing demand for space, a building is not always able to meet this demand through adjustments within its own boundaries. At a certain moment it has become too small to be able to realize the functional changes deemed necessary by itself. For the continuation of its vitality, the choice then has to be made to either look for new housing, demolish the building and replace it with a new one, or to extend the building. Each of these options would thus end the arisen friction between the building and the demand for space. An extension does of course have to be possible. This depends on the site, the financial and legal possibilities of the client, but also on the structure of the original architecture. In most cases, expandability means the ‘purity’ of the original architecture becomes subordinate to the usability for new programming.

Not every kind of architecture can be expanded without damage to the integrity of the original. An example: dual symmetrical typologies seem to fall outside of this category. Everyday buildings, and certainly informally composed, seemingly ‘accidental’ structures more easily fall into it. With every extension, the key question is whether it does not depreciate the original architecture or – the opposite – exaggerate it. It is almost always a challenge to find a balance in the new composition. Furthermore, solutions will have to be found to make a natural connection between the extension and the existing circulation areas.

Some of the studied buildings show that expanding a building can be an art form in itself. Central to this art form is that the new interventions are self-confident, that they are not inferior to the original architecture, but an improvement of it, by adding something significant, without overshadowing it.

In our opinion, to have too much reverence for the original building will ultimately diminish its chances of survival. The Palazzo Vecchio in Florence [see pages 74–79 Florence, Italy] demonstrates that during three hundred years after the first building phase, each era made a significant contribution to an increasingly rich whole. Here, confidence in the contemporary architecture seems to be a prerequisite for vitality.
5. Site

The position of a building in its context is a factor in its vitality. For realtors, location is the measure for real estate value. It is a measure for vitality as well, but as opposed to real estate value, the future value of buildings benefits from long-term stability.

If we look at the dynamics of a site, a position in a stable environment clearly offers a greater chance of durability than a spot in an environment that is undergoing rapid development. There, the replacement of buildings under the influence of explosive land and real estate price developments will generally have a negative effect on durability. Think of the turnover rate of buildings in downtown New York in the twentieth century. It may seem paradoxical: "vital" cities do not lead to vital buildings, but to rapid demolition. A stable environment, such as in the city centre of Arles in France or the ring of canals in Amsterdam, on the other hand, does lead to future value.

Another issue is the dependence on traffic. A location that attracts an ongoing stream of people, for instance, leads to an effortless occupation of a building by a commercial party depending on this stream. So, site influences the usability of architecture, which in turn influences the chance of durability. A site can, however, also hinder necessary programmatic changes in a building. An example of this is the designation of the location as a protected town or cityscape. This designation aims to freeze the appearance of the buildings, with consequences for possibly necessary adjustments.

In general, one can say that if the building is still useful as an object, but can no longer function at the first location, a solution could be to relocate the building, in exceptional cases. Relocating complete buildings is an expensive affair and does not happen very often, unless a building can be easily disassembled. In specific cases, this can significantly increase a building's durability, as the case of Haus Nideröst in Schwyz demonstrates (see pages 80-85 Schwyz, Switzerland).

6. Robustness

In this book, we combine strength, stability and resistance to weathering and rot into one term: robustness. In this term, we can also recognize Vitruvius' basic condition for architecture, namely Firmitas. Vitruvius refers to the construction of foundations into the stable ground, and to a free and sensible choice of materials. To explain robustness, the division of architectural layers is essential.

The skin of the building, generally consisting of façades and roofs, deserves special attention since this is the surface that is exposed to the weathering processes of the outside air. The skin makes the building wind- and waterproof; a condition for preservation. Correctly performed maintenance of the roof and façade can keep an unused building vital for years, as the example of the Grote Kerk of Veere shows. When the roof is leaking or missing, or when the façade is open to weather and wind, the building will shortly become ruinous.

No matter how wise the choice of material for the skin might be, even a modern, "maintenance-free" skin will eventually weather under the influence of the sun, temperature, moisture, dirt and water. The material will slowly dissolve, oxidize or decompose, and slowly but surely be ruined.
2009 students move into the school

LONGITUDINAL SECTION
LANGSDOORSNEDEN

programmed space
geprogrammeerde ruimte

ARCHITECT: LACATON & VASSAL (2009)
De Architectuurschool van Nantes is bewust groter gebouwd dan noodzakelijk. De architecten (Lacaton & Vassal) hebben in het ontwerpproces de onzekerheid over de programming onderdeel gemaakt van hun ontwerstrategie. Jean-Philippe Vassal zegt hierover: "In twenty years, who can say that the architectural school will still be there, or that it won't have been completely changed?"

Het gerealiseerde gebouw bevindt zich op een herontwikkeld industrieterrein op een eiland in de Loire, tegenover het centrum van de stad, en is gerealiseerd vanuit een architectuurstip-vraag. Het is ruwweg dubbel zo groot als waar het programma van eisen om vroeg aan het oorspronkelijk gevraagde nuttig oppervlak van 12.500 m² werd door de architecten niet alleen 2.500 m² extra toegevoegd, maar daarbovenop ook nog 5.000 m² dubbelhoge espace libre approprié (vrij toe-eigenbare ruimte) en 6.000 m² terrassen.

Pam een overzicht: zich een afzonderlijke kantoortoren, die met een passerelle verbonden is met het onderwijsgebouw. In dit onderwijsgebouw, met afmetingen van 90x63.5x23 meter, is sprake van twee onderscheidingen draagconstructies: een 'permanent' betonconstructie die niet zwaar belast kan worden, met een kolommenraster van 10.80 meter in het vierkant, betonbalken en kanaalplaatvloeren op een hoogte van 9.40, 16,00 en 22.60 meter, en een tweede, lichtgewicht constructie, met stalen kolommen op een raster van 5,40 meter in het vierkant en stalen vloeren, gericht op veranderbaarheid en alleen aangebracht in de met onderwijsruimten, collegezalen en parkeerruimte geprogrammeerde zones.

Een in de fundering opgelegde begane grondvloer ontbreekt. Ter plaatse is verharding direct op de ondergrond aangebracht. Alleen de geprogrammeerde zones, informeel verspreid in het gebouw, worden volledig verwarmd en hebben een volwaardige gevel, voorzien van aluminium kozijnen, buitenzonering en aangehangen stalen glazenwabalkons.

De ongeprogrammeerde, vrij toe-eigenbare zones zijn slechts half geïmproviseerd en dienen als daglicht- en energiebuffer. Ze kunnen 's zomers ook bij de onderwijsactiviteiten worden betrokken. Een omhulling van grotendeels te openen, lichtdoorlatende golftaal toont de nooddak van een lage bouwprijs en benadrukt tegelijkertijd het open karakter van het halfbuitens. Behalve enkele trappenhuizen en lijken kan het verticaal transport plaatsvinden via tien meter brede externe heiligehuizen, die naar grote terrassen leiden en de gebouwdepie op de bovenste verdiepingen reduceren tot 34,90 meter.

Het mag duidelijk zijn dat een tweemaal zo groot gebouw als gevraagd de architecten tot economische keuzes dwongen. Naast de toepassing van goedkope gevelplaten dragen ook de minimale installatiegraad (55% natuurlijke ventilatie) en de grote gebouwdepie, met relatief weinig buitengebouwplavand, aan die keuze bij.

De architecten brengen met hun uiterst sober gebouw, wellicht ongewild, de kwaliteiten van het vroeg-twintigste-eeuwse fabrieksgebouw opnieuw tot leven.

Veranderbaarheid, door programmatische variabiliteit te vangen door middel van een aanpasbare staalconstructie, is hier het doel. Ondersteunend aan deze veranderbaarheid werkt de polyvalentie en de stevigheid van de betonnen draagconstructie, en de aanpasbaarheid van het interieur, mede dankzij de scheiding van deze lagen. De huid van kunststof golftaal is tezelfdertijd onderhoudsgevoelig en draagt als enige niet direct bij aan een streven van de lange termijn. Die huid kan op termijn worden vervangen.

The Nantes School of Architecture School was deliberately built with larger dimensions than necessary. The architects Lacaton and Vassal included uncertainty about the programming in their design strategy. Jean-Philippe Vassal explains: 'In 20 years, who can say that the architectural school will still be there, or that it won't have been completely changed? The completed building is located on a redeveloped industrial site on an island in the Loire River, opposite the centre of the city, and was developed from an architectural competition. It is roughly twice the size of the brief asked for: to the originally requested useful surface area of 12,500 m² the architects not only added an extra 2,500 m², but also 5,000 m² of double height space libre approprié (free space) and 6,000 m² of terraces.

Right next to the river there is a separate office wing, which is connected to the educational building by a footbridge. In the educational building, with dimensions of 90x63.5x23 metres, there are two distinct support structures: a 'permanent' concrete structure that can support extremely heavy weights, with a column grid of 10.8 metres square, concrete beams and hollow core slabs, at a height of 9.4, 16 and 22.6 metres; and a second, light-weight construction, with steel columns on a grid of 5.4 metres square and steel floors. This second support structure was designed with adaptability in mind, and is only used in zones programmed with classrooms, lecture halls and parking.

At the ground-floor level, floor paving is installed directly on top of the ground. Only the programmed zones, informally distributed over the building, have central heating and façades with aluminium frames, exterior blinds and cantilevered steel balconies for window cleaning. The un-programmed zones are only partly heated, and serve as buffers for daylight and energy. In the summer, these zones can also be used for educational activities. A shell of translucent corrugated polycarbonate, most of which can be opened, reveals the need for low construction costs, while simultaneously emphasizing the open nature of the semi-outdoor zones. Except for some stairwells and elevators, vertical transport can take place via 10-metre wide external ramps that lead onto large terraces, reducing building depth on the upper floors to 34.0 metres. Obviously, a building twice the size of the design brief forced the architects to make economic choices. Besides the use of a low-cost façade, the minimal level of installation (95% natural ventilation) and the large building depth, with relatively little outside wall surface, add to that choice.

With their supremely sober building, the architects, perhaps unintentionally, revive the qualities of the early-twentieth-century factory building. Versatility, through programmatic variability by means of an adjustable steel structure, is the objective here. This is supported by the polyvalence and the strength of the concrete frame; plus the adaptability of the interior, also because of the separation of these layers. The skin of corrugated polycarbonate is relatively maintenance-prone and is the only part of this building that does not directly contribute to the strategy of durability. This skin can be replaced over time.

SOLIDIFICATION

WE MUST MEASURE BEAUTY ACCORDING TO THE PRINCIPLES OF TIME
ADOLF LOOS
Solidification

Under the heading of change, we have explored the factors that contribute to a continual optimization of use. These factors of change – polyvalence, adjustability of the skin and the interior, expandability, site and robustness – are architectural factors: they ensue from the staying power of the building itself. One might think this is the key to designing for vitality: to build in possibilities for change.

However, change is only part of the truth about vitality. For there are also buildings that do not change. Some buildings do not allow changes in use or only with difficulty, yet they are not demolished. External factors can be the cause of this, but so can architectural ones, or a combination of both. This usually means a form of beauty or – to use a broader and more apt term – character plays a role.

The expression of a building that has ‘character’ creates a human desire for preserving that expression, for perpetuating the original state. This desire to preserve buildings as they are leads to vitality too. This may sound paradoxical. Change and solidification are, however, two sides of the same coin, namely the demands and desires of mankind, through time. The two even seem to balance each other out. The more change, the more nostalgia, the more solidification. Change leads to ongoing usability of buildings. Solidification occurs as a result of lasting consensus on beauty, and occasionally leads to a search for new usability, as some of the twenty buildings in this book show. In both cases architectural vitality arises, despite apparent friction.

As mentioned above, beauty – for now we will stay close to Vitruvius’ formulation Venustas – is a criterion with a definition that fluctuates over time. For culture (an external factor in our research) influences views on beauty. The notion of beauty at the time of Vitruvius – based on orders and proportions – has been adjusted several times over the course of time. The Enlightenment gave rise to the idea that architecture was a science. Jean-Nicolas-Louis Durand replaced Vitruvius’ principle of beauty with ‘economy’. Romanticism then permanently made the notion of beauty an individual matter. Today, on balance, there is no longer an objective criterion for beauty. So it is not easy to study beauty aspects of buildings, for these are subjective criteria now. Although the results of such a study can be measured, they do not result in useful conclusions for the long term. This is not, however, all there is to be said about beauty.

For an evaluation of a building’s beauty, it is useful to make a distinction between the appreciation of the public and the opinion of experts. Although not always equally influential in decisions regarding demolition and preservation, both sometimes play a decisive role these days. Both are vitality factors.

7. Public Appreciation

A positive public appreciation does not have to coincide with a positive opinion of experts in the field of architecture, as the project Robin Hood Gardens (1972, Alison and Peter Smithson) shows [see also pages 114–119 Seattle, USA].

The appreciation for buildings also changes over time, and not just because of cultural developments. For there is also a kind of timeless regularity associated with the change in aesthetic opinions about buildings. It essentially boils down to this: after any initial scepticism (the building is ugly or ‘different’), the public embraces the usually still fresh-looking building. Over time however, the building and the message it stands for start to seem dated; the building becomes neglected and the positive opinion turns sour. The building becomes an eyesore.

This is a dangerous moment for a building, as this is often the point where buildings begin to face demolition or mutilation. Only thereafter, the buildings that by chance remain untouched over time get noted as being special or charming. This entire process can take place over a period of about fifty years. In 1946, Van Embden said about such shifts in appreciation: ‘Whether the experts will value it, is hard to say now, but that the public will spit it out in 25 years’ time, is clear to me. We may hope that within 50 years’ time, the people will recognize the quality that we will most certainly have put into it with a lot of effort.’

8. Monument

A professional standard for beauty – or character – of a building lies in its cultural value, as reflected in the opinion of experts, such as architectural historians. Some buildings are realized as monuments from the start, for instance to underline the power of the founder. A modern approach to historic preservation, however, has brought about a much broader definition of the monument concept: historical, and loaded with specific values.

Recognition of a building as a monument leads to consensus about its cultural value and uniqueness, and secondarily also about its beauty. You do not find a monument beautiful, it is ‘beautiful’ – just like Rembrandt’s Night Watch is ‘beautiful’ and moves the public. This means that the subjective aesthetic value dissolves or is suspended. This consensus can be determined objectively.

We assume that both a positive aesthetic evaluation from the public and a more objective recognition of its cultural value through a heritage status can extend the life of a building. Both public appreciation and a heritage status thus support a building’s vitality and create a desire for solidification of the (monumental) aesthetic aspects.

This desire is by definition at odds with change. When a building is listed as a monument, it is more difficult to make an extension to it, and it is only possible to renew the skin and the interior under strict, often costly conditions. Furthermore, the factor site is stripped from its financial incentives. Investments in monuments follow a cultural agenda. Only polyvalence remains a vital factor, since programmatic adjustments do not require building transformations. Because of the observed tension between solidification and change, the preservation of monuments can sometimes prove to be problematic in practice: it is often not easy to find a suitable use that fits with an exact preservation of the architectural original [see pages 120–125 Amsterdam, the Netherlands and 126–131 Capri, Italy].

9. Society

Some buildings do not change at all over the course of their lives. From the outset, they are meant and designed for a social entity that has a more or less permanent use and significance. These are usually public or religious buildings. Social stability then perpetuates the durability of the building. Therefore, we consider a social use as a tool for vitality too.
We would like to make a point in this regard. It shows determination to think society will need to use a building for a long time, prior to its construction. But reality is often different from what we expect. After all, even 'stable' social units, such as governments and religious communities, are influenced by life's changes. That does not necessarily mean that a building aimed for permanence is obsolete the moment circumstances change [see pages 132–137 Amsterdam, the Netherlands].

Hereafter, we find the case of the Pantheon, which switched from poly- to monotheism. This did not require fundamental changes to the building – although it was supplied with neoclassical towers for a while. It is just an example in an endless array of places of worship that in the course of history have 'lost their faith', through the addition or removal of steeples, minarets and other more or less architectural components and symbols. Availability of a monumental, reasonably maintained and therefore usable space is sometimes sufficient basis for reuse.

The vitality that comes with a social function can thus be strengthened with possibilities for change, such as polyvalence or renewal or replacement of the skin. The same can be said about public (government) buildings. Even in a stable democracy, it is not clear from the outset how long it will be before, for example, digitization, decentralization or administrative redivisions will render a public building redundant or require the building to be extended.

10. Museum

A museum function also perpetuates the lifespan of a building, and thus is a factor for vitality. Traditionally, the museum serves as a sanctuary, isolated from society, to conduct studies. Museums usually collect objects of rare value for conservation, objects that would lose their value without this protection. These depots for rarities are focal points for the desire for solidification. Where this desire for preservation is strongest, people will do everything in their power to protect the collection, so the programme of the museum building is projected into eternity [see pages 138–143 New York, USA]. Whatever the scenario, we can hardly imagine the twenty-second century without the Louvre or the Prado.

This does not mean museum buildings never change, for instance to stay attractive for a changing audience. And these changes strengthen their vitality as well.

This is less true for another museum category: those for which the use as a museum is the final and only use, following a decision to designate the building itself as rare art. Naturally, this only happens to first order architecture. 'The work of art as an idea tries to rule out change,' argues Fred Scott and he describes how the life of the 'artwork' the Schröder House (1924, Gerrit Rietveld) coincides with the way its owner maintains it and lives in it in accordance with the design – for example without curtains. 10 Conservation of this building in its entirety as an artwork means that beyond the life of Mrs. Schröder, it can only go on without habitation. And that is what happened. Many private residences have become museums in this way. To name a few: Villas Savoye in Poissy, E.1027 in Roquebrune-Cap-Martin and the Sonneveld House in Rotterdam.

The prolongation of the lifespan of these houses is evident, but we have to add that although their vitality works, it no longer does so by itself. Their life is prolonged, but the architecture is no longer the contramal of present-day life, but of a solidified, imaginary life that must have taken place around the time of the design stage. The friction between architecture and life did indeed dissolve, and the price paid for this is that its usefulness is narrowed to being a mere setting [see pages 144–149 Essen, Germany].

Still, this is certainly a form of vitality as well, substantive vitality, when it concerns the transfer of tangible architectural culture to new generations.

11. Great Space

In our research, the concept of 'greatness' functions as a surpassing variation on the concept of beauty, as a bearer of vitality. Just like beauty – or character – greatness refers to the expression of buildings, both on the inside and the outside: an expression of space. Greatness has to do with the experience of space, with edification and with scale.11 We define a Great Space as a grand, valuable space of overwhelming beauty, a sublime experience for those who see it. The dimensions of such a grand space are disproportionate and its use is usually not exactly defined.

Ideally, a Great Space bridges ideologies and the corresponding programmes, for instance by emphasizing the universal in its shape and detailing. Such a space can thus represent multiple values. Polyvalent use is then linked to a polyvalent meaning. And as we have seen before, polyvalence by definition leads to vitality.

Like beauty, greatness additionally leads to fascination, to identification, to an experience of value. That experience results in a desire to preserve that value, to perpetuate it.

Frank Bijlendijk puts a strong emphasis on the relation between an experience of architectural beauty and the desire to preserve that beauty.12 In this respect, Bijlendijk does not speak of beauty, but of 'preciousness': a subjective form of attachment, which in his view can be especially induced by the experience of a 'beautifully aging facade'. In our view, however, human attachment is not reserved for one single architectural layer; all parts of buildings that can be experienced can lead to attachment, certainly also the interior.

Because of the extreme nature of the experience, we believe greatness can be interpreted more objectively than beauty. Despite the absence of absolute scale characteristics, it proves to be quite easy to assess the presence and the impact of a Great Space, also in buildings that are not yet listed as monuments. This makes it a useful criterion for research [see pages 150–155 Rome, Italy].

Many of the buildings we studied – both new and old – contain a Great Space. Note-worthy are the differences in size [see page 113 Great Spaces]. For the disproportionate dimensions of a Great Space are not absolute but relative, i.e. they are disproportionate only in relation to a building's other rooms connected to the Great Space. So great does not always mean large.

Through their (relative) oversize, Great Spaces also offer room for change as we can see from the examples of the Grote Kerk in Veere and the Gare/Musée d'Orsay. With great spaces, vitality may arise in two ways: through change or solidification.

Some of the buildings studied show a coupling of one or more Great Spaces with a multitude of smaller, supporting spaces (Non-Great). These buildings generally exhibit
a high level of vitality. In this regard, we have to mention a parallel with the notion of ‘served spaces’ and ‘servant spaces’, as formulated by Louis Kahn. In Kahn’s Salk Institute in La Jolla, California, the laboratories as ‘served spaces’ embody research, which is supported by the thinking in the ‘servant spaces’ of the offices. As with Kahn, buildings can have both horizontal and vertical coordination of Great and Non-Great Spaces. Unlike Kahn’s theory, which is mainly spatial, the distinction Great/Non-Great shows us possibilities over time [see pages 156–161 Paris, France].

The example of Seattle Public Library shows a vertical coordination. The Great Spaces on the platforms provide room for variable programming, while the Non-Great blocks provide stable support. Ca d’Oro in Venice displays a horizontal coordination. A building with a sufficient number of small spaces, supportive of one or more large ones, apparently facilitates the exchange of generic design briefs. We think that any organization, be it large or small, complex or simple, horizontally or vertically structured, can easily use the Great/Non-Great coordination to its advantage, with minimal architectural modifications. This is actually a form of polyvalence. It means that also in this case the forces of programmatic change and architectural solidification operate simultaneously.

12. Refinement

Finally, we describe the presence of architectural refinement as a factor for vitality. What we mean here is the difference in the experience of a building from afar and from up close; whereby upon approaching it, it is not so much the main mass, but the material and the details that speak to us.

Refinement leads to the desire for perpetuation, for conservation of the building. Conversely, the absence of architectural refinement will evoke the idea that the building is less valuable and is ready for demolition sooner. In this category we find buildings that express rarity and authenticity through a remarkably refined use of materials. Refinement may extend to all parts of the building, but in the chosen examples it is mostly the refined aspects of the façade that catch the eye.

Refinement is about conveying an understanding of what it means to build, as an architectural equivalent of the complexity and preciousness of life. Ideally, material use is an expression of precision in relation to form and technique. That relationship – between expression and the putting together of materials – is called tectonics. The perception of that relationship largely determines what we find pleasant or beautiful.13 Via a detour of architectural theory, this brings us back to beauty – and thus solidification.

Refinement will often result from the application of ornamentation, although in principle, unornamented architecture as defined by Quatremère de Quincy can also reach this stage.14 However, most of the unornamented architecture of modernism, which saw a rational construction and prefabrication as reality and strived for ‘purity’, unfortunately is at a disadvantage when it comes to achieving vitality, as we can see clearly from the matrix.

Especially today, in a time when craftsmanship is under pressure and buildings are often unique but their elements often come from catalogues for economic reasons, tectonic details – man-made or not – are unaffordable, and refined buildings gain value. Not only the craftsmanship of construction, but also the industrial or computer-
In the face of the economic plight, it is our task to become pioneers of simplicity, that is, to find a simple form for all of life's necessities, which is at the same time respectable and genuine.

Oskar Schlemmer
In the first chapters of this book, we have presented change and solidification as characteristics with which to explain architectural and cultural vitality. When a building is equipped for change, this supports its continuous usability; and when a building is equipped for solidification, this contributes to its lasting beauty. In both cases, the chance of a long lifespan will increase.

However, culture and the architectural composition are not the only factors influencing the durability of buildings. Economic and political forces and coincidences (such as war and natural disasters) do so as well.

Coincidence and politics are not part of our research, though. The reasons for this are simple. It is generally impossible to take measures against natural disasters and war, other than those the architects find in their design brief. When the circumstances against which these measures protect the building actually occur, this is no coincidence. It is only coincidence if something happens that was not taken into account. And that is not something you can arm yourself against. Coincidence can mean that vital buildings still get damaged and then are demolished.

In our study, this happened to the pre-war Bijenkorf department store in Rotterdam, W. M. Dudok’s masterpiece from 1929, a building that despite a direct hit during the May 1940 bombing was still largely intact. Afterwards, the building, upon completion hailed as the ‘most modern department store in Europe’, was reduced to half its size. In this form, it was to serve as a department store until 1957. But the Basic Plan of Van Traa (1946) for the post-war reconstruction of the Dutch city, which included an ‘open window on the river’ from the Coolingsel garden, left no room for a building at this location. And so Dudok’s Bijenkorf was demolished.

This example shows that policies can be stacked on the coincidence of war. This stacking brought a vital building that could have been restored to an ignoble end. From this we may conclude that few measures can be taken against the power of politics. Politics is an unreliable factor for vitality. This is partly due to its capriciousness, resulting from a fundamental short-term perspective.

At the site of Dudok’s Bijenkorf, the longer term (thirty years) shows the disappearance of the ‘window on the river’, amongst other things with the construction of a new building at the site of the department store: the Maritime Museum. Political power certainly affects the building production, and also the decision whether or not to demolish a building. But it is tricky to predict which building will come down before another one does.

Financial/economic considerations play a crucial role in the decision to either demolish or preserve buildings. This has always been the case, because construction is expensive, and a building that is too expensive due to high construction and/or operating costs can pose a great problem for its owner. When the costs no longer outweigh the income generated by the building, a different accommodation may be the solution. This is how economic factors influence the vitality of buildings.

In our research, we distinguish between three economic vitality factors. Firstly, the development of land and property prices. If these increase exponentially, it becomes attractive to sell a vital building. Secondly, the operating costs of a building, which are a derivative of, among other things, the maintenance of the façade. Thirdly, the construction costs, which determine depreciation costs and the term for possible new investments.

13. Land Price

Rising land and property values can increase the pressure to renew or expand the building, with negative consequences for its vitality. For the Burgerweeshuis in Amsterdam, for instance, this mechanism nearly meant the end of the building. A financial crisis of 2008 eventually led to a stagnant market, which provided the time and opportunity needed to list the building as a national monument.

Declining land and property prices, by contrast, lead to devaluation of the building and to a decreasing number of new developments. House Bartolotti, also in Amsterdam, can be linked to the so-called Herengracht index, which shows the house price trend over a period of 350 years, corrected for inflation. 1 From this index it can be seen that for most of the eighteenth and nineteenth centuries, the Herengracht suffered from falling prices. Between 1752 and 1855, the house drops at least 77 per cent in value. 2 As a result, there are fewer constructions and renovations in this period: the last great renovation of the house thus also dates from 1755. This way, a period of low real estate value leads to an increase in vitality. The same happens to Het Aepgen, as we will now describe [see pages 178–183 Amsterdam, the Netherlands].

14. Maintenance

A building with low operating costs leads to increased vitality. The relation to the vitality factor robustness is clear. Particularly the maintenance of the skin, which has to withstand the effects of dust, moisture, precipitation, sun and cold, plays a role in the reduction of maintenance costs. The material chosen for the skin influences the intensity of the maintenance required and thus the vitality. Historically, stone buildings last longer than wood ones, for example.

In our research, a few maintenance-prone buildings have remained vital, as they could count on large budgets of wealthy owners, churches and governments. When budgets are smaller, modifications are sometimes made to the skin in places where the building wears out fastest and maintenance or repair has become too expensive. Other buildings, such as the wooden Niderost Haus, eventually almost fall into ruin due to postponed maintenance. When the textile factory Tricot was realized the Dye House was built in phases, to keep gearing the construction and operating costs to the planned business processes [see pages 184–189 Winterswijk, the Netherlands].

15. Depreciation

When a building is depreciated, the question arises whether it is a good idea to make new investments. The same way that building, modifying or maintaining architecture can be seen as an investment, housing a programme in that building can represent proceeds. For each investment there is a depreciation period, the period in which the investment in principle should be recouped. This depreciation period varies with
each architectural layer. Load-bearing construction, skin and interior essentially have a declining depreciation period, from over two hundred to seven years.

So there are several simultaneous investment cycles for one and the same building. When one of these cycles ends, the owner considers whether it makes sense to make new investments in that layer of the building. The appreciation of the building as an architectural object always plays a role in these considerations. If buildings are fully depreciated and their residual value is still high, and good proceeds are to be expected through an appropriate programme, the choice for preservation or reuse will be simple.

If we were to assume an equal depreciation period for all examined buildings, a building with low construction costs would have a higher level of vitality. After all, the corresponding depreciation would be low, and owners would be quicker to decide to continue its use through further investments. For this reason, notoriously cheap buildings such as the Nantes School of Architecture are more vital than expensive ones.

Thus, we see that a vital building such as the Larkin Building can completely lose its vitality in a short time, for a combination of reasons. The first reason was the decline of the company. The second reason was that, at that time, Wright’s work was not sufficiently appreciated. And the third reason – cited most at the time of the demolition – was the emphasis on profit. The history of the Larkin Building shows that a building designed for vitality does lay the foundation for a long lifespan, but unfortunately cannot guarantee it [see pages 190–195 Buffalo, USA].

The demolition of the Van Nelle branch office in the Dutch city of Leiden (J. A. Brinkman and L. C. van der Vlugt, 1926) also reads as an accumulation of motives. Here too, the time was not yet right for conservation, and both the owner Vroom & Dreesmann and the Leiden city council, which would give permission for the demolition in 1976, proved to be completely uninterested. Striking similarities with the Larkin Building: here too a company ceased its commercial activities; here too the initial reactions to the building were not positive; here too the building did not last fifty years; and here too those advocating preservation had too little influence. And the comparison continues: both buildings had strong steel structures, and finally both sites were merely used as a car park for decades after their demolition. Just as the Larkin Building, the building in Leiden, originally intended for storage and for selling coffee, could very easily have been used for different purposes due to its design and layout.
ARCHITECTURE IS LIFE, OR AT LEAST IT IS LIFE ITSELF TAKING FORM AND THEREFORE IT IS THE TRUEST RECORD OF LIFE AS IT WAS LIVED IN THE WORLD YESTERDAY, AS IT IS LIVED TODAY OR EVER WILL BE LIVED
FRANK LLOYD WRIGHT
Challenges

We started this research with the idea that we would focus on architectural quality, as an indicator for the expected durability of buildings. We were curious about the vitality of a building itself, before culture embraces it as valuable, before it is declared a monument or included in a canon.

In the course of the study, it soon became apparent that these cultural aspects could not be separated from the architecture itself, because the most elementary factors of architecture, such as usability and beauty, are entwined with culture, and can therefore vary depending on time and place.

Architecture is a cultural act carrying with it an awareness of the impact of today’s acts on tomorrow’s world. Confidence in contemporary architecture is an important condition for this awareness. We are aware of the inconsistency of the current Western architectural culture, with on the one hand a resignation regarding the frugality and limited durability of the contemporary production and, on the other hand, a high appreciation of historical buildings – ensuing amongst other things from the thinking about heritage and conservation. Both sides seem to balance each other out. On balance, this results in a culture of preservation of what is historically valuable.

That culture of conservation is not new, but for a long time also in Western culture it was not a given. Think, for example, of what happened to the interior of Roman Catholic churches during the Iconoclastic Fury, or, more recently, of the aggressive neophilia of futurism. I With every change in religion, ideology or politics, the reflex is still to destroy the old, oppressive culture or at least render it powerless.

The current Western culture of conservation and protection of all things old and rare thrives on social stability. However, it is unlikely that this stability will last forever.

We note that this process already seems to have begun, in the Netherlands at least. The Rijksdienst voor het Cultureel Erfgoed (RCE, Cultural Heritage Agency of the Netherlands), for one, clearly states that its policy for the period 2014-2018 will be less one-sidedly focused on preservation and more on the ‘meaningful and prudent guidance of change’. The instruments for this guidance are thereby limited, while financing and management of national monuments is largely delegated.

This development does not suddenly make the durability of buildings irrelevant. Even without extensive preservation programmes, there is a potentially powerful vitality in the architecture itself, providing for change, after the right design choices have been made. See the pre-nineteenth-century usage history of the studied buildings, such as the Amphitheatre of Arles, Haus Nideröst, House Bartolotti and the Grote Kerk of Veere. This means that it is still worth making vital buildings in the near or distant future. Vitality is a timeless task.

Who?

The fifteen factors we described in the previous chapters can be used to influence the durability of buildings. They form design tools. But who is best suited to use these tools, and how? And why?

The question of why was discussed in the introduction. Besides the given arguments of durability and the passing down of culture, there is also a financial argument.

That financial argument presents itself especially in the – limited – residual value of modern buildings. In the past century’s pursuit of efficiency, the minimum has become the standard and common spaces such as attics and other less intensively programmed spaces (including representative circulation spaces) disappeared from the architectural stage. The goals aimed for these days are generally focused on the short term. This would not be so problematic if the buildings and their load-bearing structures would not exist for much longer than the short term they were designed for. On balance, we have a large stock of predominantly twentieth-century buildings that are difficult to reuse, as they were designed for exactly one life, and with a minimum of architectural wealth.

If these buildings were at least suitable and attractive for multiple purposes, they would generate financial profit for their owners, beside durability, since demolishing or reconstructing these buildings could be avoided.

This points in the direction of the main party that could benefit from vitality, namely the client. Here we mean the client who will ultimately own and manage the building, or who at least claims long-term responsibility for it. It is these clients we address here, to point to that long-term responsibility, which, in order to realize a vital building, we think they should never relinquish or delegate. The question of who is most suited to use the vitality tools thus starts with the role of the client. Six of the fifteen factors are clearly in the clients’ domain, when they define the starting points for the buildings they plan to build, with or without the advice of an architect. The factors Society (function), Monument, Museum, Site, Depreciation (construction budget/expected lifespan) and Maintenance are typical factors for clients, who can thereby have a direct impact on the longevity of buildings.

These clients then need architects who they will urge to realize vital buildings. The architects help the clients set out a course to determine how they may use the remaining nine vitality factors in their projects. Architects do not only have the necessary technical, spatial and coordinating knowledge, they also have a long-term connection to the building through copyright. A collective approach from clients, architects and other advisors is needed to achieve a high level of vitality. The ideal of realizing good buildings for the future encourages this collectiveness. In that sense, vitality is a challenge that asks for a completely different frame of mind than the approach from a short-term perspective does.

When they developed the Nantes School of Architecture, the architects gave a positive response to a short suggestive note from the clients, which included the option to add mezzanines after completion. This early communication between architect and client had a permanent impact on the design of this exceptional building.

Vital architecture thrives when the team of clients and architects combines vision, knowledge and intellect, as the history of Ca d’Oro demonstrates. Here, client Marin Contarini decided to outsource the different parts of the facade to two different stone-masons, putting it all together at the buildings site three years later, when the load-
bearing structure of the rest of the building had long been finished. Those decisions had to do with time pressure, and apparently also with a lack of constructional knowledge. The upside was that supplies could be brought to the construction site without the façade being in the way. The result of this working method is the unparalleled beauty of this architectural collection of stonemasonry.

How?

The strategy of client and architect to realize a vital building means the circumstances surrounding the conception of the building have to be put into perspective. For all circumstances can change, as recent developments show. For example: for years, office buildings were built that were in line with market conditions, based on the speculative assumption that that market would keep growing. The market has crashed since 2008. The question now is not so much whether that market recovers, but rather that if it does, what demands the new market will make regarding the existing stock. The current surplus of redundant real estate at uninteresting locations that has yet to be depreciated and is difficult to reuse forms a burden for the owners - and for society.

Important in the strategy of client and architect is first of all a reflection on the long-term effects of the use, of the choice of location, and of economic and financial conditions. Determining the choice of tools for vitality requires common sense.

The vitality factors we distinguished form two categories. The first category - Change - contributes to the building's tolerance of changes in the programme. The second category - Solidification - supports the human desire to preserve the physical building. From the results of our study we can conclude that change and solidification factors are simultaneously at work in nearly all examined buildings. The same is true for all vital buildings. In the following paragraphs we will present the accuracy of this assumption.

Architecture resisting change

Making use of vitality factors that evoke a desire for solidification (preservation) - without simultaneously putting in factors that allow for programmatic or ideological change - is not a wise choice in terms of vitality. For a vital building we should always avoid a kind of architecture that resists all changes, unless the ultimate goal is to erect a monument to that architecture, or to its content. For monuments have a long lifespan at least as long as those monuments are of social value. But it is far from certain if the appreciation for every acknowledged form of architecture will last over time, especially when it is difficult to use this architecture for new programmes.

The Zollverein School of Management and Design is a good example. This building has certain fixations that stand in the way of real changes. The façade design with its large windowless areas hampers the relocation of activities. The coincidence of the layers interior, skin and support structure in the construction of monolithic concrete determines the limited possibilities to adapt those layers after their respective average replacement period often, twenty and three hundred years, without violating the architecture. The fact that the technical installations are incorporated in the façade and the bubble-deck floors makes it hard to make even simple structural modifications. The architecture of this building undoubtedly has character - a factor that could lead to public appreciation or a monumental status. The building therefore does look vital, but unfortunately this cannot be said about its reusability. So solidification without change does not easily lead to vitality.

Vernacular

Vitality seems easier to achieve without purposefully aiming for character, by only applying factors that allow changes in use. This too, however, is not without its problems.

The two vernacular buildings Het Aepgen and Haus Nideröst are examples hereof. Both buildings are equipped with adaptability to changes in use. Both buildings therefore show little friction with the life that takes place in those buildings. In Het Aepgen, this is due to the adaptability of the interior and to occasional modifications to the skin. Haus Nideröst reveals itself as an example of expandability and adaptability of interior and skin, its origin gradually overlapped with a plethora of new interventions. Both buildings derive their vitality from their adaptability, and have done so for centuries without the care that comes with being listed as a historic building. In the end, both buildings did find protection, by virtue of their age and consequent rarity. So solidification is finally part of their story as well, and without it Nideröst Haus would have been destroyed and Het Aepgen may have been demolished or modernized once again.

Change without solidification - without the desire for preservation - apparently has its downside, and this downside is called dilapidation. Centuries of adaptation to the needs of time, without seeking accordance with the character of the building, tends to result in aberrations, in architectural imbalance, and ultimately in loss of value.

The reconstruction of Haus Nideröst in 2015, this time in Sattel in Switzerland, raises yet another question. In the reconstruction, which focuses exclusively on the time it was first built, the history of the adaptability of this house has been completely removed. All later modifications, such as windows, doors and all extensions have disappeared in the reconstruction. The building has been transformed into a fictional original state, as a museum of an ancient building technique, without a trace of its rich, 800-year lifespan. The interior of this museum is inaccessible but visible through a new, stylistically contrasting display window. We have defined vitality as the degree to which a building is equipped to support people's lives in the long run. Stripped of human life, the reconstruction of this house is the end of the historic essence of its vitality. Change without solidification thus turns into solidification without change. As may be apparent from the examples, both strategies offer a limited view of vitality.

Endless beauty and usability

The best strategy for a vital building consists of the simultaneous application of change and solidification factors. As it turns out, it is possible to make buildings that evoke a desire for preservation and also have options to adapt themselves to the demands of time.

Gare/Musée d'Orsay is the right example here. With its polyvalence through its coordination of larger spaces accompanied by many smaller spaces and its refined
detailing of materials, the station was well-positioned for its transformation into a museum. The Great Space under the station canopy appeared to have suffered little from the covering of the railway tracks, the separation of the side nave and the addition of a new concrete floor. Thus this building does not only demonstrate the importance of architecture, but in particular that of the tools Polyvalence and Great Space, which fulfill a dual function together. These vitality tools together serve a principle of endless beauty and usability.

**Poly-functionalism**

Vital architecture minimizes the friction with the life inside and around it. So the tolerance for change is the most important basis for vital architecture.

For that reason, an emphasis on change means the end of an era of mono-programmatic architecture. In any case, the functionalist design method appears to be ill-suited to the long-term perspective of vitality. If in our view, this certainly does not have to lead to ‘function follows form’. For the requirements for the first use of a building will always predetermine the conditions of the design brief.

We argue that it is better to ensure that a construction project can be used for at least two programmes, the first being a specific programme that matches current demands, and the second having a more timeless usability – see the example of Gare/Musée d’Orsay.

Function therefore remains important for the long term. Follow-up research into particularly the factor Polyvalence – the avoidance of modifications while allowing for programmatic changes – is important and advisable in this regard.

It’s an interesting thought experiment to think of how Aldo van Eyck would have possibly designed his Burgerweeshuis orphanage with not one but two design briefs. The hyper-functionalism that we see particularly in the realized interior would then have to be practical for multiple types of use. The question is whether the sunken floors, the play and cooking houses would disappear from the scene altogether, but also, and this seems even more important, if the one-size-fits-all method Van Eyck despised so much would come into play. We think one of the reasons for the low vitality of this building is this lack of (mostly vertical) oversize. Alternatively, and equally problematic, the functional layout of this building – determined by a marvellous but fixed interior design – cannot be changed without compromising the integrity of the architecture. This building too seems to oppose change, as the work of art that it is – as a caring, artistically thought-out contramal of the life of the orphan.

**Machine of Change**

Old and new buildings generally exhibit different vitality tools. The matrix [see pages 33-35 Matrix] clearly shows different densifications for these periods. Much modern architecture has the advantage that the architectural layers are made up from separate elements, so the different maintenance and replacement cycles of the interior, the skin and the load-bearing construction can be run independent of the other layers. On balance, these buildings seem better equipped for change. Old buildings generally have other benefits, such as vertical spatial oversize and architectural refinement. Vital newer buildings in our view should combine the vitality tools of both.

This is what the next example is about. The oldest and the newest building in our research display a striking similarity regarding their vertical dimensions. The free spaces in the Nantes School of Architecture (2009) are projected onto ‘permanent’ concrete floors sections of 6.6 and 9.4 metres high. It is possible to add two or three ‘temporary’ mezzanines here. The layers of this building are separated, as described above. The Roman building structure of the Amphitheatre of Arles (85 AD) consists of storeys of similar height: 7.65 and 10.4 metres. In Arles too, these can be divided into two or three programmed floor fields, as the pen drawings of the medieval situation show.

In the case of Arles, this concerned a residential programme with a proven extension of vitality. In Nantes, the building still houses the educational programme it was built for, and the intended vitality through the internal and external adaptation options is still to be proven. With their permanent support structure, both projects display a useful vertical oversize for these programmes. The project in Nantes – in its appearance and setup much less an absolute work of art than a machine of change – thus is based on an exemplary combination of modern and old vitality principles.

**Guidelines**

In conclusion, we may say that the vitality diverges considerably in our selection of buildings. Zollverein School and the Burgerweeshuis appear to have limited vitality, Haus Nideröst and Het Aepgen display average vitality, while the Amphitheatre in Arles, Ca d’Oro, Musée d’Orsay and Nantes School of Architecture have a high level of vitality. These last four buildings represent different ways to achieve vitality.

Those ways to achieve vitality are in principal timeless. For example, the recipe for a contemporary version of Gare d’Orsay would undoubtedly result in a stylistically very different building, but the vital ingredients could nevertheless be completely the same. The recipe for the Nantes School of Architecture is fascinating and might be easier to copy, but it is certainly not the only way to realize a vital building today.

There are multiple ways to create vital buildings. Each task for vitality calls for a consideration of various questions, and the answers will vary depending on conviction and circumstances.

We conclude with guidelines for creating vital buildings. These guidelines have the character of a checklist prior to construction, rather than of a ready-made recipe. Use these guidelines will result in buildings that have minimized their natural friction and capriciousness of life.

1. Determine the use. If it concerns a long-lasting social entity (a public or religious building), a greater permanence of the first design brief seems justified. In all other cases, we propose to make the design suitable for a second, more general programme as well. Always keep in mind that buildings may get a new life.

2. Choose a location in an area that is expected to both remain attractive in the long run and to have a slow real estate price development. Avoid locations that are too dynamic, such as the city centres of rapidly growing metropolises and infrastructural junctions.
3. Determine if it makes sense to erect the building as a monument, depending on its use, location and message. Only consider creating a building as an absolute, unchangeable work of art if it really does make sense to do so.

4. Aim for a building with low maintenance and operating costs.

5. Aim for low depreciation costs, but do consider the following:

6. Avoid architectural vulnerability.

7. Aim to let the load-bearing construction, the skin and the interior coincide as little as possible, so the building itself will not stand in the way of the various replacement cycles of these layers.

8. Strive for polyvalence in the design of the load-bearing construction, the skin and the interior. In order to do so, consider vertical or horizontal oversize for at least one of the programmes; ensure sufficient daylight and a generous circulation structure, preferably without dead ends; and design especially the load-bearing construction for changing activities. Never just design the required minimum of space.

9. Consider including a Great Space in the design. This space should support all other points on this list and should bring people together, assist them in bonding with each other and with the building. Aim for buildings that people love.

10. Design a robust load-bearing construction that can support the uses and the space required for the first and the second programme.

11. Design a skin with a characteristic appearance, which at least matches the desired expression of the first programme, but not without taking the duration of this characteristic into account. For this reason, extravagance should be avoided. Aim for a refined appearance, supportive of human excellence, and which has an intelligible (tectonic) relationship to the act of building. If desired or necessary: aim for universal rather than specific symbolism and/or ornamentation. Create a skin that ensures a good indoor climate, so unnecessary technical installations can be avoided.

12. Design an interior with character, in which the programmatic surface is divided in preferably universally usable spaces. Consider whether it is possible to refine the space plan (in retrospect), to open it up or to share it.

13. Consider taking into account expandability within, outside and on top of the building. For the first, additional margin is necessary. For the second, money and space. For the third, additional constructive facilities.

14. Have faith in today’s time and cultural opportunities. In case of reuse, don’t let the new interventions be subservient to the original architecture, and also don’t let them belittle it; do bring a new balance to the building. Aim to make the new building even more characteristic than the old one.