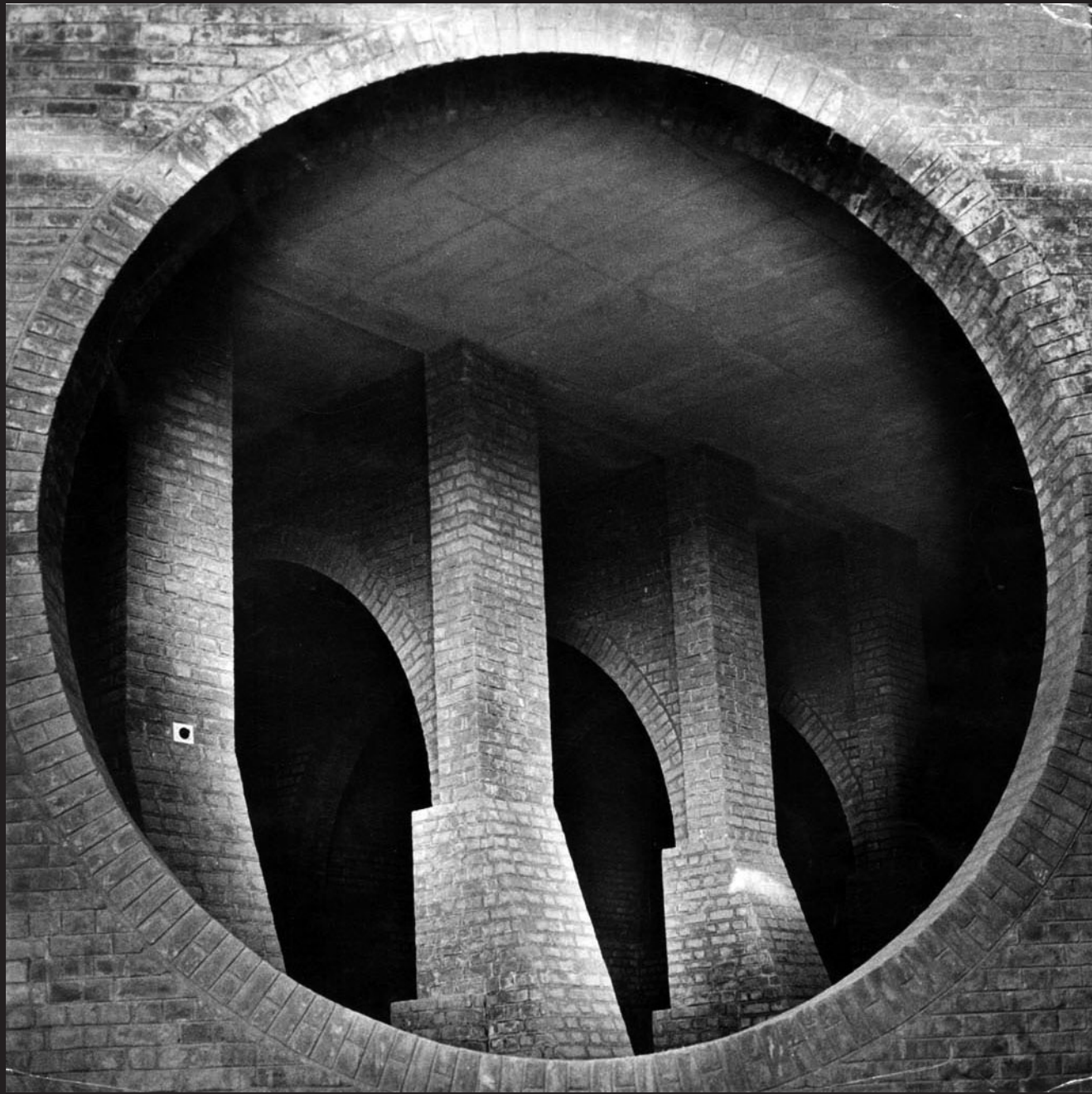




Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962–1974. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

ANA TOSTÕES

Chair of **docomomo** International

Transcendence and permanence

You can never learn anything that is not a part of yourself.
Louis Kahn, "Silence and Light", 1969

The Mediterranean is full of wonder and beauty. The parts I saw around Italy I shall never forget.
Louis Kahn letter to Anne Tyng, 1953

Louis I. Kahn fascinate us all with his passion for Mediterranean culture. Precisely at the moment when the centre of the dominant culture moved from Europe to North America, he was able to immerse himself in the Roman brick structures of the great classical buildings, interpreting the timeless forms of antiquity. When the glass curtain of the bureaucratic International Style became trivialized, he turned to the archaic sources of architecture to discover light, matter and desire, in the pyramids of Gisé or in the ruins of the Caracalla Baths. Kahn is a unique case in the history of 20th-century architecture: he introduced the question of monumentality, a matter heretical to the Modern Movement, and emphasized the value of permanence, and the tectonic character and materiality of constructive elements. He was able to read History creatively, interpreting the permanent value of the monuments for the community and rescuing their public sense of place. Posing questions such as "what do you want, brick?" or "does the inside of a column contain a promise?", he produced an impressive body of work and a doctrine with originality, often appearing philosophical, poetic or even mystical. Moving away from dogmas, but never losing the functional and constructive sense of modulation, he broke the systematic use of fluid space and reintroduced a sense of ritual and the value of solemnity, while achieving the most suggestive syntheses between modernity and tradition, as Otávio Paz recognized, between the use of technique and memory.

Louis Isadore Kahn was born on 1901 on the Baltic island of Osel which, at that time, was part of Russia (now Saaremaa, Estonia). He grew up in the bosom of a Jewish family who emigrated in 1905 to the USA, settling in Philadelphia. When he was 3, an accident disfigured his face and hands. At 5, scarlet fever changed his voice, delaying his starting school, and determining a special destiny in a precarious family context. Kahn chose to be a painter, but his fascination for architectural history led him to enrol in architecture. In 1928, 4 years after graduating, he travelled for a year in Europe, drawing the temples of Antiquity. In 1950 he returned to Italy, beginning what would become a new cycle in his life: the period of growing glory that nurtured him until 1974, the year of his death. In fact, he had lived

for 50 years and worked for about 25 when he finally found fame, with the Yale Center for British Art.

This DJ reveals the cross-section of subjects that restoration raises in Kahn works. From houses to facilities, from public authorities to private owners, from America to Israel or India, written contributions demonstrate how his buildings have proven their resilience and character.

I wish to thank David Fixler for being such a dedicated and committed guest editor, the authors for having shared their remarkable experiences in the restoration work, and William Whitaker and David Brownlee for the interviews that complete this Journal with their unique insights. Very special thanks must be given to the Architectural Archives of the University of Pennsylvania, for having graciously shared precious iconography and, in that context, once again to William Whitaker who daily "watches over" the Louis I. Kahn Collection, with more than 200 projects, 6,363 drawings, 29,813 working drawings, 100 models, 12,140 photographs, correspondence, a personal library and awards. In fact, the essential revision of Kahn's work and theories was made two decades ago, when the investigation carried out from this monumental archive resulted in the exhibition that travelled between 1991 and 1994 to 7 museums in America, Europe and Asia, and the magnificent *In the Realm of Architecture* that constitutes the work of reference to understand the work and the man, that has been completed since then (see exhibitions and book reviews section). Finally, a special thanks to GCI, for their support to this journal, to Yale Center for British Art directors' Amy Meyers and Cecie Clement, and to **docomomo** US/Philadelphia and friends who conducted visits on Kahn buildings: Bianca Sforzi, Bryn Mawr, Charles Firmin-Didot, Dan Macey, Larry Korman, Maureen Ward and Paul Savidge.

After more than a half-century of use, it is deeply gratifying that society is still able to testify to Kahn's knowledge and built heritage, renovated by some of the most skilled architectural offices, and can still rediscover the intensity of its poetics, where the transcendence of architecture is perpetuated with power, beauty and plenitude.

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Kahn's Modernism and its Renewal

BY DAVID N. FIXLER

The late architect and historian Stanford Anderson once remarked that authenticity is the third rail of architectural debate — a place to venture at one's peril. Notwithstanding, any architectural intervention demands that we engage and understand what is essential — authentic — in the original to its creator, those for whom it was created and all those all who experience it — to ensure fidelity to the character and integrity of the original work. Louis I. Kahn was one of a handful of truly significant architects of the last 75 years, and arguably the one who (with Le Corbusier) will have the most lasting effect upon architecture over time. As we now assess his legacy and develop interventions for renewal, it is instructive to contemplate how our understanding of Kahn's aesthetic of authenticity — buildings as “instrument[s] that exaggerate, and so heighten one's awareness of nature's infinite variations”¹ — should affect our approach to their conservation, adaptation and renewal.

Kahn had an inordinate interest in creating works whose material authenticity and spatial definition would be evident both autonomously and as component parts of a larger ensemble, thereby clarifying both the tectonic logic of the work and the relationship of these materials to their cultural context. This was both a reaction to the material and spatial ambiguity of the International Style and a nod toward Wright and the post-war Le Corbusier, but at a more fundamental level it was about a desire to reify its expression; to connect the material reality of the work to its site and function, enabling the user to become complicit in the act of its becoming.

Kahn brought mass to Modernism. This tendency, which begins with his childhood exposure to the primal geometric forms of the ruins of Arensburg Castle in Estonia — and is reinforced through his education in the Beaux Arts system under Paul Cret at Penn — took decades to root itself and finally blossom at the core of his architectural sensibility. Upon moving into practice and encountering the shock of the onset of the Great Depression, Kahn embraced Modernism — being particularly drawn to its commitment to the creation of buildings and places embodying social and economic justice. While his early works, both at the domestic and the urban scale are more conventionally related to the International Style and contemporary trends in social housing, through his engagement in the debates on monumentality that emerged in the 1940s and his re-acquaintance with the primal poetics of light, space and form of the ruins of antiquity during his stint at the American Academy in Rome in 1950, Kahn found himself increasingly trying to express what he viewed as essential, ineffable architectural truths.

Kahn further focused on the singularity of the room as an element of composition and the generator of the plan —

a “society of rooms” — and to the primacy of human sensory experience as an individual situated within a community in a manner arguably also achieved only by Alvar Aalto among his contemporaries. His use of concrete for instance stressed the refinements of its making, the almost decorative possibilities of the dressing of the joint and its masterful juxtaposition with other materials such as brick and wood, rather than the more raw, sculptural concrete architecture that would come to be known as Brutalism. Kahn's evocation of history in fact reflects a modernist's search to more deeply integrate the principles he saw as the essence of the power of archaic, particularly antique architecture in its ruined state — into an ethos of human-centered placemaking in service of uplifting the human condition. He achieves this through a methodology that combines an essential understanding of the evocative power of architectural form as it has been used throughout history with an understanding of contingent present circumstance — which includes a rigorous commitment to formal abstraction.

Renewal without disrupting the aura that Kahn generated in his best work is both art and an exacting science. As the essays within this volume affirm, the successful conservation and in some cases transformation of Kahn's work demands rigorous scholarship, design and technical precision and a strong dose of both creative restraint and emotional detachment. More perhaps than any architect of the 20th century, Kahn is viewed as a sage whose aphorisms contributed to his reputation as a quasi-mystical figure. While these sayings have meaning and have undoubtedly contributed to Kahn's exalted stature they can also be mis-read when taken out of context and contribute to a hagiographic interpretation of his work that can inhibit the intellectual autonomy necessary to formulate optimal rehabilitation scenarios.

Which brings us to the work at hand. Most of the essays in this volume directly address the rehabilitation of a representative cross-section of Kahn's mature works through strategies of conservation, restoration and adaptive reuse. The earliest of these — the Yale Art Gallery, was also the first of Kahn's buildings to undergo a comprehensive rehabilitation. Lloyd DesBrisay's essay focuses not merely on the renovation, but instead poses the question, through comparison of the rigorous approach undertaken to the Yale project to the neglect of a now demolished structure by Kahn, the Coward Shoe store in Central Philadelphia, as to the validity of the relative heritage values of different building types (commercial vs. institutional) within the panoply of modern resources.

Anne Weber and Michael Mills discuss the meticulous process undertaken to stabilize and restore Kahn's seminal Trenton

Bath House, raising questions familiar to those who work with ancient structures and ruins as to how much of the evidence of wear and decay should be left as a testament to the building's change over time — particularly as in this case it was at least to some degree the architects original intent create a work that would wear its age in this fashion — and what kinds of measures are appropriate to design into the intervention to arrest further deterioration.

My own essay on the Richards Lab renovations describes the implementation of adaptive reuse and energy enhancement strategies necessary to enable Richards to continue to serve a useful function. Richards is a classic example of an iconic but chronically dysfunctional work that required robust technical and programmatic intervention to ensure its survival. Here is where addressing the notion as to what makes these works genuine — what defines the underlying authenticity of the resource — becomes important as part of the art of meshing conservation with creative interpretation of character definition to achieve optimal technical and aesthetic results.

As work that is now part of a larger conservation management planning process, Kyle Normandin and Sara Lardinois present a glimpse into the exhaustive project to restore the teak wood paneling system at the Salk Institute — highlighting an effort that seeks to maximize retention of original fabric, while at the same time optimally balancing the client's desire for a consistent appearance with Kahn's original intent to allow the teak to weather to a natural gray finish, which could not occur due to the presence of fungal spores from the Eucalyptus trees present on the site.

The topic of wood conservation is pursued further by Andrew Fearon in an essay describing the history and ongoing conservation efforts at several of Kahn's houses, all of which utilize various species of wood cladding and fenestration. Once again, the efforts are geared to executing durable solutions that still enable the acquisition of patina, and the considerable effort — both in the rehabilitation and in ongoing and future maintenance — that is necessary to strike that optimum balance. In both this and the Salk essays, it is important to note that the authors are careful to place their efforts in the larger context of these buildings as representative works of Kahn, and how their efforts in renewing these character-defining materials must continue to mesh with and represent the full range of values inherent in each resource.

In the early 2000s, The Yale Center for British Art was the first of Kahn's buildings to undertake a comprehensive conservation management plan, and this work in turn set the tone for an exemplary rehabilitation project that was completed in 2016. Renovation architect George Knight describes the process by which interventions were undertaken to upgrade systems, restore or replace worn finishes, and in several areas, to undertake changes that enable the realization of more of Kahn's original design intent — particularly the opening of the long gallery. While these kinds of interventions inevitably invite questions as to the legitimacy — and authenticity — of implementing unexecuted ideas after the fact, in this case the change can be justified through strong programmatic or practical technical reasons.

Brinda Somaya tackles serious material conservation issues as well as programmatic updates in her work on renovations to

portions of the Indian Institute of Management in Ahmedabad. The problems relating to the conservation of deteriorating brick masonry and reinforcement in the typical exterior wall systems are ongoing (and to some degree intractable) issues that particularly highlight the importance of adhering to strict conservation protocols for cleaning and maintenance in order to prolong rather than shorten the material service life. She also touches on how technology and changes in pedagogy have altered the function of the library and how these alterations were managed in a way that respects the original idea and fabric to the greatest degree possible.

The final contribution is a documentary essay by Jeremie Hoffman and Hadas Nevo-Goldberst on Kahn's only executed work in Israel, the Wolfson School of Mechanical Engineering at Tel Aviv University, which was not completed until 1980, six years after his death. This is a large, complex but relatively little-known work outside of Israel, and while this paper presents foundational knowledge about the building and its genesis, as a lesser known and largely posthumous project of Kahn's, this is a work that will benefit from further future research.

The renewal of Kahn's legacy simultaneously reinforces traditional conservation methodologies, while demanding that we confront — at Kahn's behest — the authenticity of the well-used and weathered artifact with Ruskinian skepticism as to the ultimate wisdom of what one is to undertake in managing its long-term stewardship. Kahn clearly believed his buildings should last and display the marks of their age, regarding this as positive affirmation that his work expresses essential truths about the relationship of humankind to the built environment, and through it to nature.

Thus, to renew is not to make new; rather it is to stabilize and regenerate, acknowledging the effects of both the passage of time and the evolution of function on the structure; carefully interweaving repairs and new elements in ways that balance their newness against the rich, patinated qualities of the original material. The precision and quality of Kahn's architecture demands that these issues be confronted and addressed head on — though they will be met with often withering scrutiny. The project case studies herein illustrate the struggle to achieve this "authentic" balance, and it is our hope that they will contribute to the rich dialogue that has emerged within **docomomo** and the broader design and conservation communities on how to sustain, renew, enhance — and thereby assure the survival of — both the legacy of Kahn and by extension the rich and diverse heritage of Modernism.

David Fixler

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Notes

- 1 Sarah Goldhagen: *Louis Kahn's Situated Modernism*, Yale University Press, New Haven, 2001, 158.



Louis Kahn, Yale University Art Gallery, New Haven, Connecticut, USA, 1953. Post-renovation. © Elizabeth Felicella, 2006.

What Decides “Heritage”?

Lessons from a Comparison of Louis Kahn's Commercial and Institutional Projects

BY LLOYD L. DESBRISAY

In the quest to save recent-past, mid-century modern buildings, it is important to recognize how symbolic and commercial considerations influence the likelihood that some buildings are preserved while other buildings are demolished. Simply put, why does one building survive and another not? This article compares two of Louis I. Kahn's projects — one a commercial building and the other institutional. The comparison examines how various dynamics facilitate or hinder the preservation of modern buildings. Further analysis considers steps that preservation-minded individuals and organizations might consider to retain and restore more modern buildings.

No architect can rebuild a cathedral of another epoch embodying the desires, the aspirations, the love and hate of the people whose heritage it became... but we dare not discard the lessons these buildings teach for they have the common characteristics of greatness upon which the buildings of our future must, in one sense or another, rely¹.

Introduction

This article reflects on the issue of the longevity of recent-past mid-century modern² buildings and the dynamics — symbolic, economic, and political — behind why some buildings are preserved while others are demolished. It will compare two of Louis I. Kahn's earliest buildings — the 1949 Coward Shoe Store (Coward) in Philadelphia, Pennsylvania (figure 01) and the 1953 Yale University Art Gallery (YUAG) in New Haven, Connecticut (figure 02) — to examine how the dynamics cited above resulted in the very different outcomes for these contemporaneous buildings. While the Coward building was demolished in 2014 — the last of Kahn's commercial buildings to be demolished — the YUAG, an institutional building that is regarded as one of his first great works, was painstakingly and expertly rehabilitated between 2001 and 2006³.

This comparison might strike the reader as unexpected given the lack of public recognition for the shoe store and the global renown of the museum. However, it is an instructive comparison given the similarity in Kahn's experimental use of materials, in both cases, and given the differences in use and ownership of the buildings. The comparison thereby allows us to ask questions about how the dynamics cited above facilitate or hinder the preservation of modern buildings. How does the way cultural institutions are given more symbolic value than commercial buildings affect preservation efforts? How do economic pressures unique to the commercial sector influence preservation consideration? How do local political dynamics, including difficulties of building constituencies for historic

preservation, shape preservation outcomes? I was drawn to this comparison as I reviewed recent writings on Kahn's work because both buildings were built within four years of each other and because Coward appears to me, based on my observations from my three-year experience renovating YUAG as project architect for the construction phase, to be a testing ground for ideas later used at YUAG (in proportions, detailing approaches and the use of large expanses of glass which were not thereafter a Kahn staple).

Through the comparison, this article argues that there are symbolic and economic considerations — which are, of course, grounded in political realities — that explain why some buildings are saved and some buildings are not saved. Therefore, we need to reconsider how we as preservationists make calculations about what constitutes our built “heritage” and develop more effective strategies to save buildings. This is crucial if we are to preserve not just what is left of Kahn's legacy but also endangered mid-century modern buildings in general. While the last decades have seen an increase in the push to preserve modern buildings that are well-recognized masterpieces, many lesser-known buildings, including commercial buildings, are also worthy of our preservation efforts⁴. Our calculations must identify ways to better protect and restore buildings of less renown as well as those considered part of the modernist “canon”⁵.

Problem

Preservationists have pointed out that modern buildings are seen, by many, as not as worthy of preservation efforts as other more typical restoration subjects that date further back into the past, and that are made of more popularly symbolic “historic” materials such as brick masonry or stone. This tends to be either because of the mid-century buildings' relatively recent history⁶ and/or because the materials used by their architects



01 Louis Kahn, Coward Shoe Store, Philadelphia, Pennsylvania, USA, 1949. Shortly after construction. © Free Library of Philadelphia.



02 Louis Kahn, Yale University Art Gallery, New Haven, Connecticut, USA, 1953. © Yale University Art Gallery, 1953.

are not seen as being built to last, do not actually have longevity⁷, or are assembled in a less permanent way. Mid-century modern buildings, however, are important to preserve because they give us insight into the social and political moment of their construction or, to cite Kahn's words above, into "the desires, the aspirations, the love and hate of the people whose heritage it became"⁸.

Observers and practitioners of historic preservation have argued that while much work remains to be done, in recent years the preservation community has made significant strides in settings standards and practices for the restoration or rehabilitation of modern materials⁹. However, we still need to build and nurture constituencies — professional, public and political — not only to advocate for but also to support the preservation of modern buildings¹⁰. Others have pointed out that while there might be a constituency for those modern buildings that are well recognized as masterpieces, many lesser-known buildings that are worthy of preservation efforts lack such constituencies¹¹. These "everyday" buildings not only allow us to understand the complex relationship between the built form and the context of its construction but, quite often, provide indispensable links that allow us to trace the evolution of an architect's career. In short, as Michael McClelland, Graeme Stewart and Asrai Ord argue, in their study of post-WWII apartment towers in Toronto, "greater efforts are necessary to bring modern preservation topics into planning and political circles and to start to recognize the contributions such projects can make towards effective economic and planning goals"¹².

Case Studies

Coward Shoe Store

The Coward Shoe Store was designed in 1947 by Oscar Stonorov and Kahn. It opened in 1949 on Chestnut Street in the then high-end specialty store retail center of Philadelphia. Despite the efforts of the city's Preservation Alliance to save the building, it was demolished in 2014. At that time, it was the only surviving commercial building of which Kahn participated in the design.

William Whitaker, the curator and collections manager of the Architectural Archives of the University of Pennsylvania School of Design, has observed that the Coward Shoe Store was typical of post-WWII efforts to "modernize main street". City planners and retailers spearheaded such efforts to revive downtown districts. They sought to use new, futuristic, sleek designs to attract crowds. In this context, William Whitaker notes, manufacturers sought to increase the demand for innovative construction materials such as glass and aluminum by holding public design competitions. One such competition was entitled *There is a New Trend in Store Design* which was sponsored by the Pittsburgh Plate Glass Company (PPG) during the summer of 1944. The competition encouraged new "ideas of what post-war store design might look like". Stonorov and Kahn's submission, according to Whitaker, included large sheets of Herculite glass — a product marketed by PPG — juxtaposed with free-floating display cases. The emphasis was on the products for sale in the store, shoes, and not on architectural glamor or tricks. The clean lines, careful proportions and fine detailing conveyed the message that the products being sold within were of high quality. Three years later, their submission to this competition garnered Oscar Stonorov and Kahn the Coward commission, as the store sought to build a "modern" space that would attract consumers to its product¹³.

Oscar Stonorov and Kahn's design sought to carve a space among the older buildings on Chestnut Street by using a simple, if technologically experimental, flat façade composed of a glass and aluminum curtain-wall. The clear glass panes revealed (figures 03–04): "...the organization of the two sales floors within... Specially-designed showcases, first seen behind the glass of the façade, lined the way in, and screened the men's fitting area from initial view. The emphasis placed by the architects on the quality and craft of the merchandise, via case display, was further accentuated by the design of the staircase; its structural glass parapet drew into view the up and down parade of the female clientele — seen to best advantage from (as if it was out of an episode of *Mad Men*) the men's fitting area"¹⁴. In these ways the built form of Coward is indicative of elements that in the coming decades would come to symbolize modern architecture — including not just



03 Louis Kahn, Coward Shoe Store, Philadelphia, Pennsylvania, USA, 1949. Interior ground floor. © C. V. D. Hubbard.



04 Louis Kahn, Coward Shoe Store, Philadelphia, Pennsylvania, USA, 1949. Interior second floor. © C. V. D. Hubbard.

retail spaces but also commercial buildings. As Pamela Jerome and Angel Ayon point out in a study of high-rise office buildings of the 1960s, it was the curtain-wall cladding that came to symbolize their “Modernism”¹⁵.

As high-end consumers increasingly moved to the suburbs during the 1950s and as shopping malls began to replace shopping streets as preferred centers of consumption¹⁶, the area around Coward and the physical state of the store itself declined — both in symbolic and commercial value. The store’s modern architecture, once its draw, began to appear dated, its iconic first floor of large windows were renovated to be less transparent and the building fell into disrepair¹⁷. After its demolition in 2014, Brickstone Realty, the new owners of the site, built a new building that houses a co-working space¹⁸. This is part of Brickstone’s redevelopment of the area into the kind of combination high-end retail, creative work-space, luxury apartment building projects that are currently being used to attract to downtown districts those that Richard Florida refers to as “the creative class”¹⁹. The Coward building’s 2014 demolition occurred despite it being one of the first modern buildings in Philadelphia’s center city, designed by two internationally-renowned architects, and the last surviving example of Kahn’s commercial sector architecture.

Yale University Art Gallery

The Kahn Building of the YUAG was completed in 1953. Considered Kahn’s first major commission, it marked a transition in the architectural history of museums in the United States. The building includes many innovative features, including the iconic window wall that is located on the west and north sides of the building, as well as at the entry on the east. The window wall (not technically a curtain-wall since the window framing rested on the slabs and did not span continuously past the slab edges), in contrast to Coward, was constructed of standard steel framing members such as rolled shapes, channels, angles and bar stock that included an integral slab edge cover; the whole of the wall was detailed so expertly that the humble nature of the materials was elevated in a unique and artful assembly. The signature window wall located on the west elevation set into a concrete frame that is interrupted by

limestone pilasters that clad the concrete columns. The north elevation continues the inventive window wall construction but in smaller horizontal proportions and longer expanses of glass that are bordered by the limestone pilasters.

From 2001 to 2006, the architectural firm of Polshek Partnership Architects (currently Ennead Architects) designed and replaced the steel window wall with a thermally-broken aluminum window wall that closely approximates the original glazing system (essay cover figure). The replacement repaired the dilapidated appearance of the building, accounted for excessive thermal expansion and allowed for the museum’s interior humidification without any degradation to the window wall. On the interior, condensation that was created when the cold steel frames came into contact with the humidity on the interior was eliminated due the thermally-broken window wall construction and mechanical interventions to adequately heat the window wall²⁰.

Many might have wondered why Kahn chose the seemingly impermanent window wall construction for his first great work, a monumental piece of architecture. A review of the design of Coward allows architectural historians and preservationists to access Kahn’s pre-YUAG experimentation with the use of glass walls. In the case of Coward, the glass wall was a true curtain-wall that spanned in front of the floor slab edge while at YUAG the glass wall is technically, as explained above, a window-wall because the floor slabs interrupt the plane of glass, albeit in an artful and sophisticated manner that conceals the simpler construction method. One was constructed with aluminum, the other with steel. Of his other notable works (The Salk Institute, Indian Institute of Management, Phillips Exeter Academy Library, Kimbell Art Museum, Yale British Art Center and Bangladesh National Assembly Building) none uses window wall construction that is as open and transparent as the curtain/window walls at Coward and YUAG. Moreover, in Coward we see some proportions that are like those used in YUAG but on the horizontal rather than vertical orientation and similar details at pilasters on the ends of the front façade. Lastly, Oscar Stonorov and Kahn designed their work to contrast with the surrounding older buildings. The simplicity of the Chestnut Street store not only signaled the arrival of

a post-war aesthetic but a change in retail architecture that would be followed by others for years to come and that was still apparent years later in the similar appearance of both: the Martin, Stewart and Noble-designed Mercantile Library project just down Chestnut Street and Kahn's YUAG in New Haven — projects completed in 1954 and 1953 respectively²¹.

Contribution to Debate

The above case studies beg a couple of questions: 1) Why there are different outcomes for different types of buildings, and 2) What we can learn from various cases with dramatically different outcomes?

The first question appears easy to answer by pointing to the relatively higher symbolic "heritage" value granted by critics and the public to YUAG than to Coward. This answer would discount the "heritage" significance of Coward compared to the YUAG, especially since it was not until YUAG that Kahn's work began to draw the attention of contemporary architects and critics. Moreover, this answer would highlight that Kahn's commercial work was not worthy of rescue because most of his work was for institutions. Kahn had few commercial clients because they were reportedly not patient enough to work with him. His work — beyond a few residences that were then not his most recognized work — consisted mostly of institutional and public buildings. Kahn preferred to think about how his architecture would influence public life and raise everyone up along with the level of civic life. He aimed to promote a level of belonging and responsibility through his work²².

However, to argue that Coward is not worthy of preservation is to discount the symbolic value of the store as a site that allows us to understand the relationship between mid-century built forms, consumer practices, and city planning. There are, in fact, good reasons for saving commercial buildings of less renown such as Coward. First, their role as models of mid-century commercial architecture is critical for preservationists, historians, social scientists and everyday citizens seeking to access the past to understand the present. Second, buildings such as Coward can be significant in understanding the evolution of modern architecture. As explained above, the store design prefigured Kahn's future designs, including YUAG, and thereby not to preserve the building was to ignore its importance to those interested in tracing the design evolution of one of Modern Movement's finest architects.

Interestingly, Brickstone, the developer behind the demolition of Coward, decided to incorporate the Martin, Stewart and Noble 1954 Mercantile Library building into their new project. This building replaced the library's former Greek Revival home and was well-known for its 36-foot glass and aluminum façade²³, which William Whitaker has noted echoes Oscar Stonorov and Kahn's design for the Coward store²⁴. Like the new building on the Coward site, the preserved Mercantile Library is to serve as a co-working space. The preservation of the library speaks to how some kinds of buildings come to assume symbolic value over others. Libraries and museums, as cultural centers, hold higher value and are therefore deemed worthier of preservation compared to commercial buildings²⁵.

In her article on the demolition of Coward, Allison Meier notes how Ben Leech, of the Preservation Alliance of Greater

Philadelphia, pointed to how symbolic value considerations played out in the Coward case to hamper its preservation: "From our perspective at the Alliance and speaking personally as someone who values the hodge-podge diversity of architectural forms and styles you often find along commercial corridors, it's a big loss when buildings from the more recent past get scrapped before being given a chance at rehabilitation". [Leech] notes that while the Kahn association was important, it was "hard to argue that this was an architectural masterpiece", especially after the decades of dilapidation. "But it doesn't have to be a masterpiece to have value", he added. "Given more time, these 'everyday' commercial buildings will start to accrue more of the charm and interest that buildings from earlier eras have, and smart designers and tenants will be able to take advantage"²⁶.

Beyond these symbolic factors playing a role in how buildings come to be valued or not as part of our "heritage", economic factors also play a role. As William Whitaker points out the nature of commercial real estate is to focus on the constant transformation of the built environment in ways that make the expensive preservation of modern buildings less attractive to private developers than the cheaper construction of new "signature" buildings. "Change is relentless" in the commercial sector and it is driven by other factors such as the real estate market and schedule pressures that hamper the recognition of recent-past modern buildings as worthy contributions to cultural heritage. However, William Whitaker also argues that such buildings are necessary to preserve the "urbanity" of city streets. "What makes a neighborhood urbane, to quote Robert Venturi, 'is lots of many things which are very different which are close together'. As of today, this certainly remains true of Chestnut Street. Chestnut's constant is the contrast of old buildings with very new buildings and the variety of uses found along its sidewalk-friendly length. The close proximities, the interlacing of architectural styles and scales — grand and small, Queen Anne to Moderne, are ingredients that, for now, make Chestnut Street a model of Philadelphia's genteel urbanity"²⁷.

Stewardship of buildings is important in their preservation. Commercial real estate pressures, argue Angel Ayon and Uta Pottgiesser, make it hard to preserve such buildings to the degree that institutional buildings like YUAG are preserved, if at all²⁸. No commercial building by Kahn survives while all his institutional buildings have been or are being preserved, even in poorer countries where there is a struggle for funds. In YUAG's case, the building was a symbol of the institution and its largest piece of "artwork". The building was also fortunate to be in the hands of a wealthy owner.

Solutions and Suggestions

*What are we going to do with the recent past in the not-too-distant future?*²⁹.

There is a tremendous and immediate need to re-evaluate how we determine building heritage and significance, and extending from this, their worthiness for preservation. Preservation-focused groups should think more about how

to conserve buildings whose owners have no interest in preservation given real estate market pressures and schedules. Perhaps building constituencies advocating for tax incentives alone are not enough.

I argue that international and national advocacy and preservation groups should take a more active role in local preservation societies (like the Greater Philadelphia Preservation Society). By active I mean the encouragement of foundations to administer fund-raising development to acquire and preserve significant buildings before they end up on the lists of endangered buildings, just a few steps away from the wrecking ball. By active I also mean more concerted public education campaigns to build and mobilize coalitions of public, professional, and political actors to support such efforts to stop the demolitions. None of this happened in any significant and sustained manner with Coward and as a result, in 2014, the wrecking ball destroyed a valuable link to our recent past and our understanding the later work of Kahn. As Peter Woodall, co-editor of Philadelphia's *Hidden City Daily*, explained in light of Coward's demolition: "The hope is that the next time something like this comes up, people will be a little bit more ready and a little more open to thinking of these buildings as important and historic, even though they are commercial and are modernist, and if they have been altered in unfortunate ways... Perhaps if more people notice its slow demise, and the quiet loss of similar mid-century architecture around the country, more of these structures can get on local preservation lists and attract the supporters they need to survive as part of 20th-century architectural history"³⁰.

Our built heritage deserves nothing less. Otherwise we risk not listening to Kahn's admonition that we "not discard the lessons these buildings teach for they have the common characteristics of greatness upon which the buildings of our future must, on one sense or another, rely"³¹.

Acknowledgements

A special note of gratitude is owed to my former employer, Ennead Architects, and to Gaston Alonso for his patient research for and editing of this paper.

Notes

- 1 Louis Kahn, "On Monumentality", in Robert Twombly (ed.), *Louis Kahn: Essential Texts*, New York, W. W. Norton & Co., 2003, 22-23.
- 2 "Mid-century" refers to the period of development after WWII in the 20th century.
- 3 Lloyd L. DesBrisay, "Yale University Art Gallery: Louis I. Kahn: Challenges for the Rehabilitation of Modern Museum Buildings", in Susan MacDonald, Kyle Normandin and Bob Kindred (ed.), *Conservation of Modern Architecture*, Shaftesbury, Donhead Publishing, 2007.
- 4 William Whitaker, "The Other Shoe Drops on Modernist Landmark", *Hidden City Philadelphia*, 13 August 2014.
- 5 This article which is meant as a provocation to stimulate further debate and, perhaps, new thoughts and solutions regarding the questions above. I am no longer employed at the architect-of-record for the YUAG renovation and I do not speak for that office. Instead I write from a qualified position as the project architect for the construction phase during the three-year long rehabilitation of YUAG and the author of a technical case study of that project. See Lloyd L. DesBrisay, *op. cit.*
- 6 Angel Ayon and Uta Pottgiesser, "The American Experience with Steel-Frame Assemblies to Date", *Facade Tectonics World Congress*, Los Angeles, 10-11 October 2016; Susan B. Bronson and Thomas C. Jester, "Conserving the Built Heritage of the Modern Era: Recent Developments and Ongoing Challenges", *APT Bulletin: The Journal of Preservation Technology* 28:4 – Mending the Modern, 1997, 4-12; Allison Meier, "How Louis Kahn's Last Commercial Work Fell Quietly in Philadelphia", *Hyperallergic*, 4 February

- 2014; William Whitaker, *op. cit.*
- 7 Susan B. Bronson and Thomas C. Jester, "Conserving the Built Heritage of the Modern Era: Recent Developments and Ongoing Challenges", *op. cit.*
- 8 Louis Kahn, *op. cit.*
- 9 Thomas C. Jester and David N. Fixler, "Modern Heritage: Progress, Priorities, and Prognosis", *APT Bulletin: The Journal of Preservation Technology* 42:2/3 – Special Issue on Modern Heritage, 2011, 6.
- 10 Susan D. Bronson, "Authenticity Considerations for Curtain-Wall Buildings: Seminar Summary", *APT Bulletin: The Journal of Preservation Technology* 31:2, 2001, 5-8; Michael McClelland, Graeme Stewart and Asrai Ord, "Reassessing the Recent Past: Tower Neighborhood Renewal in Toronto", *APT Bulletin: The Journal of Preservation Technology* 42:3 – Special Issue on Modern Heritage, 2011, 9-14.
- 11 William Whitaker, *op. cit.*
- 12 Michael McClelland, Graeme Stewart and Asrai Ord, *op. cit.*
- 13 William Whitaker, *op. cit.*
- 14 *Id.*
- 15 Pamela Jerome and Angel Ayon, "Can the 1960s Single-Glazed Curtain be Saved?", *APT Bulletin: The Journal of Preservation Technology*, 45: 4, 2014, 60-62.
- 16 Kenneth T. Jackson, *Crabgrass Frontier: The Suburbanization of the United States*, Oxford, Oxford University Press, 1987; Lisabeth Cohen, "From Towncenter to Shopping Center: The Reconfiguration of Community Market Practices in Postwar America", *American Historical Review* 101:4, 1996, 1050-1087; Lisabeth Cohen, *A Consumers' Republic: The Politics of Consumption in Postwar America*, New York, Vintage Books, 2003.
- 17 Allison Meier, "How Louis Kahn's Last Commercial Work Fell Quietly in Philadelphia", *Hyperallergic*, 4 February 2014.
- 18 *Id.*; James Jennings, "Brickstone is Buying Up the Block Near East Market Project", *Curbed*, 30 October 2014.
- 19 Richard Florida, *The Rise of the Creative Class And How Its Transforming Work, Leisure, Community, and Everyday Life*, New York, Basic Books, 2003.
- 20 For a more detailed case study of the technical matters, see: Lloyd L. DesBrisay, *op. cit.*
- 21 William Whitaker, *op. cit.*
- 22 Paul Golberger, "The Mystic", *The Nation*, 5-12 June 2017. On Louis Kahn's relationship with commercial as opposed to institutional clients and to his views on public architecture also see: Robert McCarter, *Louis I. Kahn*, London, Phaidon Press, 2005; and Sarah Williams Goldhagen, *Louis Kahn's Situated Modernism*, Yale, Yale University Press, 2001.
- 23 Ben Leeche, "Almost Nude", *Hidden City Philadelphia*, 12 January 2012; Sandy Smith, "Buildings Then and Now: The Mercantile Library awaits the next chapter of its story", *PhillyLiving*, 10 August 2014.
- 24 William Whitaker, *op. cit.*
- 25 It is important to note that another commercial building using glass (and granite) that Louis Kahn designed in Philadelphia at the time (designed in 1954 and built in 1957), the American Federation of Labor Medical Service Building, was demolished in 1973. Russell Trzaska, "Remembering Louis Kahn's Demolished Work in Philadelphia", *MyPhillyCondo*, 20 February 2017.
- 26 Allison Meier, *op. cit.*
- 27 William Whitaker, *op. cit.*
- 28 Angel Ayon and Uta Pottgiesser, *op. cit.*
- 29 Michael Lynch as cited in Thomas C. Jester and David N. Fixler, *op. cit.*, 3.
- 30 Allison Meier, *op. cit.*
- 31 Louis Kahn, *op. cit.*

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Louis Kahn, Trenton Bath House, Ewing, New Jersey, USA, 1955. Mural by Marie Kwo restored by John Canning & Co. © Brian Rose, 2010.

The Trenton Bath House Restoration: Challenges in Sustainability

BY MICHAEL MILLS AND ANNE WEBER

The Trenton Bath House complex holds an important place in Louis I. Kahn's oeuvre. As he stated: "The world discovered me after I designed the Richards Laboratories building, but I discovered myself after designing that little concrete bath house in Trenton"¹. Given its significance, a thoughtful restoration that allowed the buildings to remain in active use was imperative. Because the complex embodies in miniature many of the theoretical and practical considerations that accompany the work of Kahn and other modern-era architects, the process, outcome, and projected future of the restoration effort are instructive.

Project background

Louis I. Kahn was hired by the Trenton Jewish Community Center (JCC) in 1954 to design a new community and recreation complex for the organization, which was relocating from an urban site. The first plans were produced in February 1955. The design and program for the Bath House evolved through the spring of 1955 and included changing rooms for men and women with showers and toilets; a place for patrons to store belongings; and a snack bar. The Bath House and the adjoining pool were the first portions to be built (figure 02), and opened for use on Sunday, July 31, 1955, without their roofs, which were then constructed by October 1955.

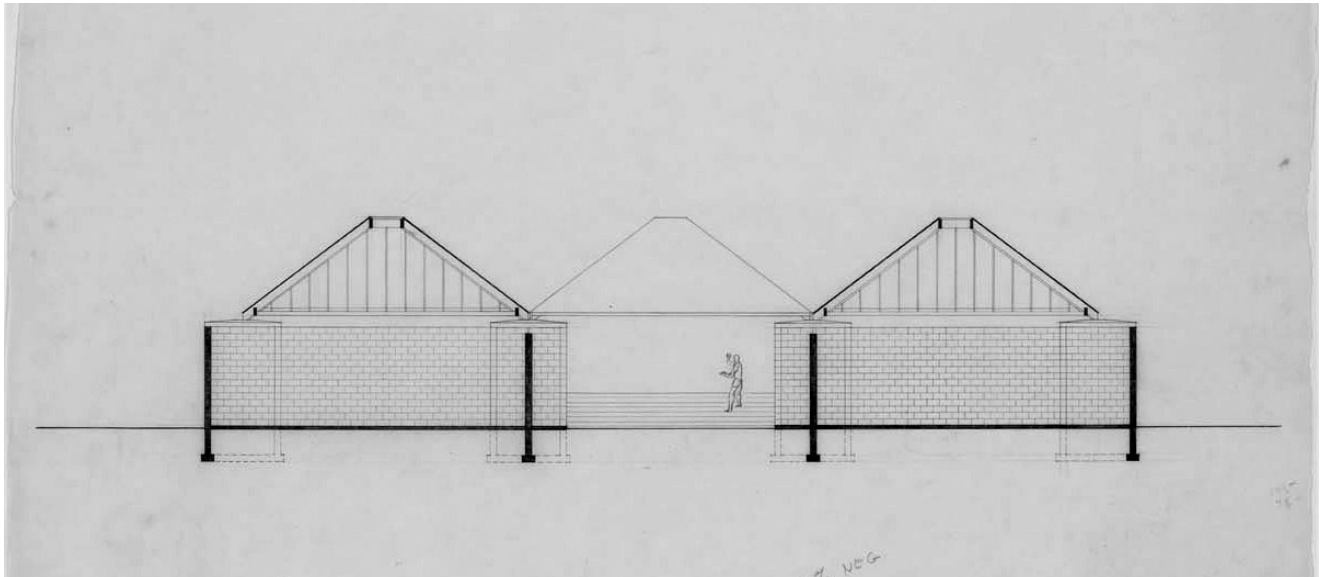
The JCC operated a summer day camp program to provide structured recreational activities for the children of its members as part of its mission. The Day Camp Pavilions were conceived and constructed within an extremely short period of time: an early drawing is dated 1957, and construction was completed by August of the same year. The day camp program continues today under the auspices of the Ewing Township Recreation department, and is extremely popular. Ultimately, the Community Center, the largest component of the complex, was not designed by Kahn, but rather by the firm of Kelly and Gruzen and completed in 1962. This building serves today as a Senior Center for Ewing Township.

The Bath House and Pavilions reflect an important advancement in the way modern principles were infused with lessons from the past. The Bath House comprises five square, concrete block "rooms" arranged in a Greek cross plan (figure 06). Four of the rooms are covered by wood-framed roofs with black asphalt shingles; the fifth is an open courtyard. The roofs, which appear to float, are pyramidal in shape and rest lightly on large concrete block "columns" with concrete caps. These columns generate the narrow servant zones for the primary served zones, a device that Kahn developed further in the Richards Labs and other ma-

jor works. The four Day Camp Pavilions are centered on a small courtyard and each is set at a slight angle to the next, their arrangement recalling Kahn's sketches of the classical temples at Corinth (figure 07). The Bath House and Pavilions were listed on the New Jersey and National Registers of Historic Places in 1984, prior to reaching 50 years of age, reflecting their high level of significance.

In 1997, the Bath House and Day Camp were included on Preservation New Jersey's 10 Most Endangered list when the JCC applied for a demolition permit for two of the Day Camp Pavilions. There was international outcry about the possible destruction of any of Kahn's design which led to a series of meetings between the JCC, AIA Historic Resources Committee, the New Jersey Historic Preservation Office, the Ewing Township Historic Preservation Commission, and Preservation New Jersey. The JCC was advised about the availability of capital grants from the New Jersey Historic Trust and the need to prepare a Historic Preservation Plan as a prerequisite.

Although the JCC had long performed routine maintenance, and little physical change had occurred, there was not a full understanding of the vulnerability and ongoing needs of the historic fabric. Both the Bath House and the Day Camp had suffered from continual exposure to the elements, magnified by the temporality of the materials and original design features, including: freestanding block walls with no copings, no gutters at the roof edge, and inadequate drainage of both the building and site. When asked if Kahn had ever considered gutters, project architect Anne Tyng said they had not. She reported that they liked the poetic effect of water running over the masonry as if it were a ruin and did not want to interrupt that pattern. Unfortunately, the materiality of the complex was not resilient enough to resist deterioration in the freeze/thaw weather cycles of New Jersey. And with the lack of resiliency, this monumental complex based on classical design principles fell into extreme disrepair.



01 Louis Kahn, Trenton Bath House, Ewing, New Jersey, USA, 1955. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

02 Louis Kahn, Trenton Bath House, Ewing, New Jersey, USA 1955. © Marshall D. Meyers Collection, The Architectural Archives, University of Pennsylvania.



03 Louis Kahn, Trenton Bath House, Ewing, New Jersey, USA 1955. © Marshall D. Meyers Collection, The Architectural Archives, University of Pennsylvania.



04 Louis Kahn, Trenton Bath House, Ewing, New Jersey, USA, 1955. View of Bath House during construction with removed demising walls. © Mills + Schnoering Architects, LLC, Michael J. Mills, FAIA, 2010.



05 Louis Kahn, Trenton Bath House, Ewing, New Jersey, USA, 1955. Restored Bath House courtyard with paved circular element. © Brian Rose, 2010.

In 2000, Susan G. Solomon published a monograph on the Trenton Jewish Community Center and established a website: *Friends of the Trenton Bath House*. The book and website drew attention to the buildings' significance and vulnerability. In response, the JCC sought and received a grant from the New Jersey Historic Trust for a Preservation Plan. Mills + Snoeering Architects' predecessor firm, Farewell Mills Gatsch Architects, was retained by the JCC and completed the plan in early 2001. More international attention was focused on the Bath House in 2003 with the release of the film *My Architect* by Nathaniel Kahn, Kahn's son, in which he highlighted its declining condition and its precarious future.

In 2005, prior to any restoration work, the JCC announced their relocation to another site and sale of the property. Newspaper articles contemplated the demise of the buildings and underscored the difficulty of rescuing a building of the modern era. The site did not appear sustainable as a recreational resource and was likely to be subdivided into numerous small lots for development. At this critical juncture, the County of Mercer intervened with interest in maintaining the pool and community center as a County and Ewing Township resource.

In 2008, using State and County Greenacres funds, Mercer County purchased the entire property, and began planning its restoration and future use with assistance from the National Trust for Historic Preservation. The County ultimately conveyed the site with preservation easements to Ewing Township, but shepherded the buildings through a comprehensive planning and restoration program using funds from the New Jersey Historic and County Open Space Trust Funds. The transition was smooth and the facility remained open each summer. By 2010, the facility was fully renovated and functioning, with a new snack bar designed so as not to compete with the original structures (figure 8).

In 2011, the County began the effort to re-plan the site with Mills + Snoeering Architects (m+sa) assisted by landscape architects Heritage Landscapes and civil engineers The RBA Group. The landscape design and parking areas derive from a sustainable interpretation of Kahn's 1957 Master Plan, and feature a community green as originally intended with perimeter parking that is permeable and groves of trees that create outdoor rooms (figures 09–11).

Restoration process

The mission of the project was threefold: to implement repair and restoration of the Bath House for ongoing use; to reconstruct, based upon Historic American Buildings Survey documentation, two Day Camp Pavilions; and to interpret the site and improve access with a new snack bar and new landscape features intended by Kahn but never completed. The design approach was rooted in the initial Preservation Plan, the Preservation Plan update prepared in 2007, and a Cultural Landscape Assessment.

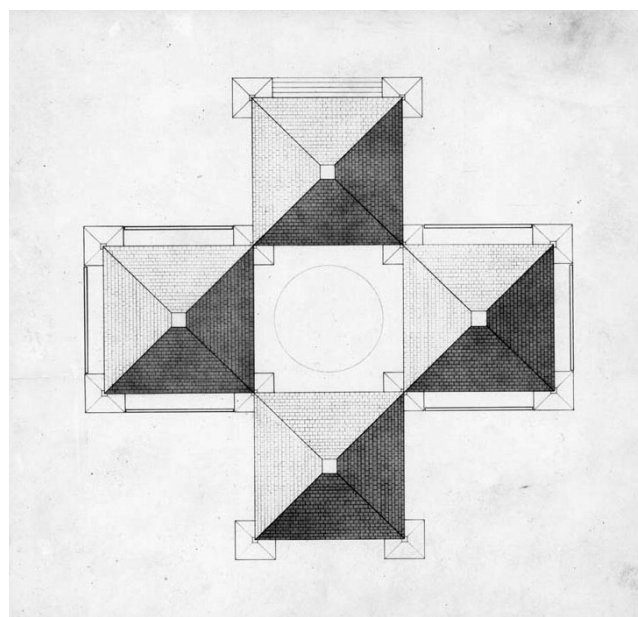
In updating the Preservation Plan for the Bath House, m+sa personnel undertook additional research in the Architectural Archives of the University of Pennsylvania, reviewing design drawings for the complex and original

completion photographs by John Ebstel. This yielded information regarding the evolution of the design of the roofs, the original fencing and gates, the entry mural, and the landscape plan. The team also had the opportunity to meet with Anne Tyng to talk about the original project, and to obtain her thoughts about the restoration and new features. One of the original engineers for the project, Nick Gianopulos of Keast & Hood Company, provided guidance to the project, and met with the design team, Anne Tyng, and William Whitaker, Director of the Architectural Archives at the University of Pennsylvania.

At the Bath House, several significant original features were restored, including the entrance mural (essay cover figure) and the central, circular atrium floor detail (figures 09–10). Within the Bath House, structural repairs were made to concrete slabs and Concrete Masonry Unit (CMU) walls to improve site and building drainage; severely deteriorated slate toilet partitions were replaced with black granite; and exterior and interior materials were restored.

A mural marking the entrance to the Bath House was a part of the original construction, designed and painted by Kahn and members of his staff. The design highlighted the module of the concrete block in white, black, gray, and peach. For many years it had been painted over with gray paint. As part of this project, it was recreated through careful exposures, analysis, and study of original drawings and photographs².

The open center court of the Bath House had an original circular feature, believed to have been intended to be a spray or wading pool. Photographic evidence shows it filled with river stone at the time of the opening, and as a lawn panel with paver edges within a year or so. By the 1990s, all the concrete had been replaced, obliterating the feature (figure 04). Functionally, a spray or wading pool was not acceptable, and the lawn panel had been worn to dirt due



06 Louis Kahn, Trenton Bath House, Ewing, New Jersey, USA, 1955.
© Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

07 Louis Kahn, Day Camp Pavilions, Ewing, New Jersey, USA, 1957. Day Camp Pavilions after restoration. © Brian Rose, 2010.



to foot traffic when it existed, so that was not an option either. The design team instead used exposed aggregate concrete to create the circular element as part of the concrete paving, recalling the original temporary stone treatment while maintaining full access for the disabled (figure 05).

All the concrete floor slabs at the Bath House were highly deteriorated, with significant cracking, heaving, and subsidence. The original design included carefully placed drains with scored patterns outlining the drainage areas. These areas echoed the roof patterns, with central drains below the oculi and trench drains along the outer walls. After years of movement, many drains had been left at high points in the slabs, or cut off from the flow of drainage by heaved sections of concrete. Areas of standing water accelerated the deterioration and created an unpleasant atmosphere in the changing rooms. After the removal of the slabs to install new drainage, clay soil layers and perched water pockets were discovered. These were likely the cause of the extreme deterioration. A plan to punch holes in the clay layers and install dry wells to drain the perched water was implemented, and new slabs installed to reinstate the original drainage and scoring patterns.

The CMU walls are a character-defining feature of the Bath House. These walls weathered very differently depending on their placement with respect to the roof edges. Walls set at the interior faces of the hollow columns were well protected, and in a very good state of preservation. Walls set at the outer faces of the hollow columns, such as those around the changing rooms, were in fair condition because their top surfaces were exposed. The walls set directly below the edge of the roof, between the central court and the changing rooms, were in very poor condition. At these locations, water poured off the pyramidal roof directly onto the top of the wall. This constant water infiltration led to disaggregation of the CMU, extreme moss and other biological growth, serious cracking, and overall staining. These walls were removed and reconstructed with new footings. To mitigate the water infiltration situation, a stainless steel gutter was recessed into the top of the wall, and downspouts concealed at each end. These alterations are invisible from the ground. To address ponding at the top surfaces of the outboard walls and hollow columns, a liquid-applied

08 Louis Kahn, Trenton Bath House, Ewing, New Jersey, USA, 1955. Snack Bar and restored plaza. © Mills + Schnoering Architects, LLC, Andrew Burian, 2011.



membrane system was installed, which is also not visible from the ground, but which waterproofs the surfaces.

The success of reconstructing the walls at the center court depended in large part on matching the original CMU, and having it blend with the existing weathered units. Because of the run-off patterns, many of the blocks were significantly eroded and permanently stained. Finding an appropriate material for the replicated block at the Bath House required a multi-faceted effort. The original specifications were consulted during the design phase, and the initial approach was to find a modern block that matched those specifications in texture and color. Conservation analysis of the existing block provided additional information, revealing that the aggregate was a local crushed Delaware River stone with sands indigenous to southern New Jersey.

To mimic the texture required, several trials were conducted, including sand blasting and power washing. After two rounds of trials, it became clear that the process did not provide an approximation of the weathered block. The appearance that resulted was not granular enough and yielded a surface that was too uniform.

Kahn's specifications called out Waylite block, an early type of lightweight block. With additional research, the team discovered that a manufacturer of Waylite block was still in operation in southern New Jersey. They provided a sample that showed the standard texture and color. The texture was a close match to the existing and was accepted with only a minor adjustment. The next round of submittals focused on achieving the correct amount of aggregate and color pigments; approximately 12 samples were produced before a block with the rich tan color accented with speckles of blue and light orange aggregate was selected.

While the new block was a close match for the original, it was used primarily for reconstruction of larger areas, with salvaged block used for scattered infill.

The original slate partitions in the women's changing room also did not stand up to extreme exposure. The edges of these large slabs, up to 4' x 6', were exposed and subject to continual moisture and freeze-thaw damage. The panels delaminated and fractured, and no panel was intact at the start of the restoration project. A fine-grained black granite with a honed finish was selected as a replacement material

for shower and toilet partitions, retaining the appearance of the slate but with greater durability.

The Day Camp Pavilions are a very important part of the Community Center operations and were included in the restoration project. Two of the pavilions were restored and two rebuilt following a program of Historic American Building Survey documentation. The circle of gravel paving that contained the pavilions, long gone, was recreated by using a composite material that is a resilient, accessible, and maintainable surface resembling the original and contained within a new circular concrete curb.

The Day Camp Pavilions were designed with readily available local materials, including clay chimney tiles and locally manufactured concrete plank, and may have been partially constructed with JCC volunteer labor. The two largest pavilions were designed as open structures, one comprising four bays and the other five. The two smaller pavilions were partially enclosed and contained restrooms and storage. As early as the 1960s, the solid concrete fill began to cause the clay tile to exfoliate. Eventually, the clay tile was removed, and the remaining concrete columns were stuccoed and painted. Remnants of the clay tile remained at the partially enclosed structures, providing a color to match for the new material.

The roofs were formed of precast concrete plank spanning between beams above the uprights at the perimeter. At the two larger pavilions, if there had ever been any roof membrane, it was gone by the early 2000s. This allowed water to enter the plank, attacking the concrete and reinforcing steel. Because of the configuration and nature of the reinforcing, the plank could not be repaired without a substantial change to the appearance of the structure, and

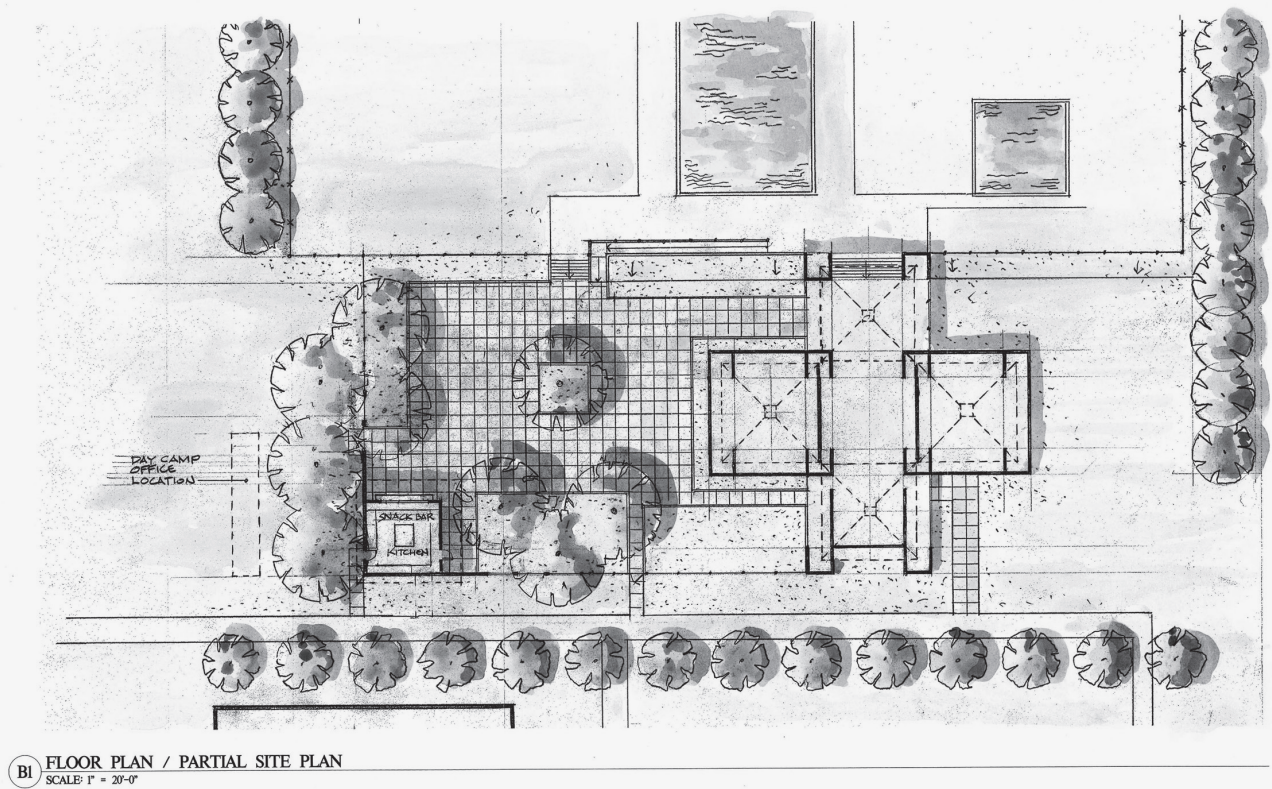
it was subject to brittle failure. The team advised the JCC that the pavilions should be closed to the public because the roofs could fail without warning. Because of the extent of the failure of these original systems, reconstruction with new systems was recommended, and this approach was approved by the NJ Historic Sites Council and the Ewing Historic Preservation Committee.

For the columns, a system of terra cotta over steel columns without solid fill was selected. The *terra cotta* could be colored and molded to match the appearance of the original chimney tile. Selecting a system for the roof was more difficult. Current concrete plank is not made to match the 16" wide dimension of the original plank. The planks have rounded corners, so this system of joints was highly visible from the interior of the pavilion. Modern planks are generally made to a 24" width, which would create a 50% increase in the joint spacing. This was an unacceptable impact. The team turned to a proprietary floor system used for mid-rise commercial construction called Filigree. It consists of a precast base panel with concrete poured on top, interconnected by reinforcing. The module is 48" in width, so false joints could be created at 16" centers to match the appearance of the original plank while providing a more monolithic slab and eliminating two thirds of the opportunities for leakage between panels. A roof membrane was installed at both new pavilions with no visible change to the edge conditions from the ground. The new pavilions are very close in appearance to the originals.

A new, free-standing Snack Bar, which grew from an intra-office design competition, was one of several site improvements envisioned by Louis Kahn but never realized



- 10 Louis Kahn, Trenton Bath House Ewing, New Jersey, USA, 1955. Site Plan, with the new Snack Bar location. © Mills + Schnoering Architects, LLC, 2011.



- 11 Louis Kahn, Trenton Bath House Ewing, New Jersey, USA, 1955. Mills + Schnoering Architects, LLC and Heritage Landscapes, 2012. Kahn-inspired landscape improvements. © Aislinn Weidele, 2016.

and had been addressed through temporary structures over the years. The new Snack Bar was built in one of several locations shown in Kahn's drawings, another square module to the west of the Bath House. The location mediates between the Bath House and the Day Camp Pavilions, a functional advantage for the site. The intent of the design was to honor Kahn's work but not mimic it. It incorporates a butterfly roof that hovers over the concrete masonry walls much like Kahn's pyramidal roofs do at the Bath House. The concrete block walls intentionally do not match the color and texture of the original, so that the Snack Bar will not be mistaken as part of the original fabric. As sited, the Snack Bar forms the corner of the fenced plaza and the larger pool enclosure.

Other site improvements included removing foundation plantings installed by the JCC and replacing them with bosques of trees in keeping with Kahn's master plan (figure 11); and installing open-mesh fence at the perimeter (figure 08).

Barrier-free access was an important consideration in making the Bath House a functional public recreational complex. The site is extremely flat, which in general facilitates access. However, the procession through the center court up the stairs to the pool is key to the design (figure 05). A new concrete ramp leading from Bath House level to pool level now facilitates access both for visitors with disabilities and families with strollers or wagons.

Within the structure, accessible toilet and shower stalls were added. The baffled entrances to the changing rooms had an inch to spare on clearance for wheelchairs, so no alteration to those features was needed. Throughout the site, paving materials were selected to be accessible, as well as to be slip-resistant in wet conditions. Fortunately, the original concrete finishes generally met these criteria and were replicated in kind.

Conclusion

One of the most important questions considered during design and construction was how best to preserve the monumental and spiritual character of Kahn's Trenton Bath House in the future. The approach was to confront directly the challenges of sustaining the materiality of the complex despite the ephemeral nature of its components. Wherever possible, the design team took measures to strengthen the resiliency of the complex to ongoing aging, weathering, and daily use while conserving historic features. These measures included:

- Adding a weather resistant surface to the top of the exposed concrete block walls.
- Hiding built-in gutters in the top course of two walls where the drip line of the roof coincided with the wall location.
- Adding a liquid-applied, water shedding membrane to the top slabs of the concrete masonry "columns."
- Replacing and upgrading the piped drainage system for the buildings.

- Replacing the concrete floor slabs on a new drainable substrate to restore the function of the original design.

Mercer County's purchase, in 2008, brought with it an opportunity for the Bath House and Day Camp to be more fully integrated into the wider community, and renovated with important but unobtrusive design improvements to make the complex more sustainable. County officials were tireless in determining how best to preserve the site with creative programming in support of Ewing Township's community needs. As a project, this effort perfectly dovetailed with the County's focus on open space and Ewing Township's growing desire for a new senior center. In addition, the County sought to educate the public by developing an award-winning website³ that emphasized the site's history and significance. Donna Lewis, Mercer County Planning Director, noted, "The eyes of the world were on us. It was about teaching a wider audience that history comes in all shapes and sizes, and about preserving our own modern legacy".

Finally, a maintenance plan was prepared by the design team to guide Township officials and staff in implementing appropriate preservation and maintenance procedures. The intent is to slow down the deterioration of the historic material and provide guidance on its repair and conservation.

Both the summer pool program and day camp continue in popular use. With the educational programs offered by the Township and County, including periodic showings of *My Architect*, more people understand and appreciate the complex.

In the Bath House complex, Kahn created very simple structures using commonplace materials – and yet the result is an incredibly moving, vibrant work that is at once thoroughly functional and responsive to the changing effects of light and weather (essay cover figure). The restoration project sought to address the challenges in sustaining the site. The buildings are a lesson to us all that even the most modest of commissions can have a profound effect on the history of architecture and design.

Notes

- 1 Susan Braudy, "The Architectural Metaphysic of Louis Kahn", *New York Times Magazine*, 15 November 1970, 86.
- 2 John Canning, the decorative painter who directed the work, found it so handsome that he created a full size version for a Louis Kahn exhibit at the Vitra Museum and another for his own modern-era home in Connecticut.
- 3 <http://www.kahntrentonbathhouse.org>

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Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957-1961.
 © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

The stair towers ^{between} serve
 cooling and air handling
 systems of air and for
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 many chimneys of the
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Managing Expectations – Contemporary Design Culture, Conservation and the Transformation of The Richards Laboratories

BY DAVID FIXLER

Louis I. Kahn's Richards Laboratories at the University of Pennsylvania are a paradoxical building. At the same time that they perhaps represent the epitome of Kahn's literal expression of structure and material hierarchy, servant and served spaces and the role of mechanical systems in determining architectural form, these powerful ideas never came together programmatically to enable a fully functional, complete work of architecture. This paper describes the quest to solve the functional conundrum and technical shortcomings of Richards, to bring the architecture and program closer together. Through a synthesis combining transformation – a significant change in use that allowed the opening of the laboratory floors to the unique light and views that were always latent in the promise of Kahn's essential architectural idea – and rehabilitation, where the best aspects of Richards – the glazed, vitrine-like façades and the beautiful logic of the building services distribution, were renovated for enhanced performance, Kahn's original architectural vision and present function were able to be successfully reconciled.

Introduction

Architectural culture in the 1950s was widely perceived by many architects and scholars as having largely become dominated by formulaic responses to the demands of the commercial market and the embrace of the economic expediencies of curtain wall technology by the construction industry. Reactions to this trend ranged from the "New Formalist" explorations of architects such as Edward Durrell Stone (1902–1978) and Minoru Yamasaki (1912–1986) to the highly diverse geometric explorations of Eero Saarinen (1910–1961), but perhaps the most critical and complex response to these soft intellectual paths came in the deliberate search by Louis I. Kahn for an architecture that would speak directly to its own material and function.

Designed in 1957–58 and with construction substantially complete in 1961, the Alfred Newton Richards Bio-Medical Research Laboratories at the University of Pennsylvania in Philadelphia signal an epochal statement in Kahn's maturation as a designer and more fundamentally, in the direction of architectural discourse in post-WWII America. Two essential principles are particularly in evidence:

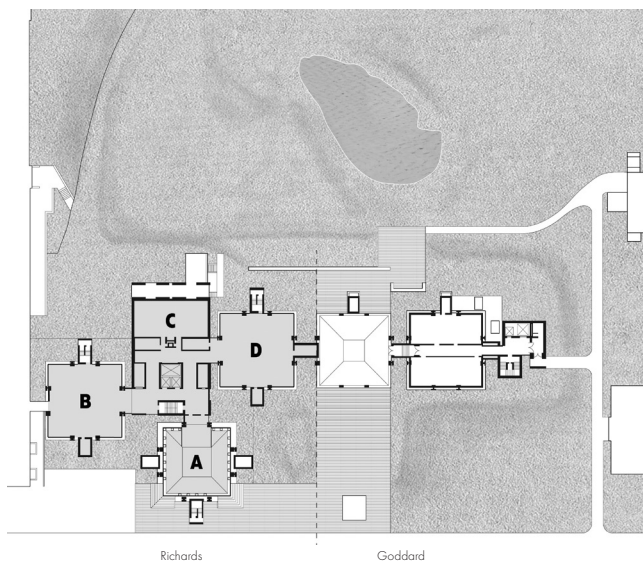
1) the laboratories are perhaps the quintessential example in Kahn's oeuvre of the careful treatment of materials to reflect and celebrate their fundamental nature through their tectonic and honorific role in the structure, and 2) no other building of Kahn's (with the possible exception of the Salk Laboratories) more lucidly expresses Kahn's signature concept of the separation of primary use and service functions within the buildings into "servant" and "served" spaces and volumes.

The Richards Building was immediately recognized and widely heralded as signaling a new direction both in American architecture and the trajectory of Modernism. Scholars such as Vincent Scully (1920–2017) proclaimed its genius, and the Museum of Modern Art in New York mounted an entire show on Richards alone in 1961 — prior to its final completion. Curator Wilder Green stated in the exhibition catalog that Richards is "considered by many authorities here and abroad as possibly the most significant example of post-war architecture in the United States... [and] as individually authoritative an act of architecture as exists in this country today". Though it was sometimes called a Brutalist building due to the honesty of its tectonic expression, Reyner Banham (1922–1988), the original author of the term the "New Brutalism", in fact had problems with the hierarchy of expression in the Richards Building, and consequently did not embrace its design nearly to the degree exhibited by most other contemporary architectural critics, notably among them William Jordy (1917–1997)².

It is perhaps fitting that unqualified praise of this magnitude could only be stated prior to Richards becoming fully operational, as the flaws in its functional logic (some pointed out by Reyner Banham) soon became apparent. Kahn at this moment in his career imagined the way in which the scientists would want to work to be analogous to that of the architect — in open, relatively partition free studio spaces. He is alleged to have commented on his design for the lab floors as follows: "No space you can devise can satisfy these requirements. I thought what they should have was a corner for thought, in a word, a studio instead of slices of

space”³. Due to tragic communications disconnect during the planning process, Kahn failed to fully grasp what was actually desired relative to the spatial configuration and light control requirements in the labs, resulting in a compromised ideal articulated by Kahn’s greatest champion Vincent Scully who notes: “They are (...) a town of colleagues, but in a material sense they function not perfectly at all”⁴. The Richards Building is thus a rare if not unique example of a property with iconic, globally recognized architectural status that has been effectively dysfunctional for most of its working life. Fortunately, the chronic, seemingly intractable functional issues that have led to numerous planning studies and piecemeal interior transformations that have compromised the purity of Kahn’s vision have not altered the building exteriors (excluding replacement of several lights of glass), thus maintaining the essential integrity that helped it to achieve status as a National Historic Landmark (NHL) in 2009, the highest honor that the United States can confer on a work of architecture.

By the first decade of the 21st century however, it had become apparent that a comprehensive re-thinking of the core function and purpose of the Richards Building would be required for it to remain a functionally viable structure. Given its conceptual tectonic purity and the additional protection mandated by its NHL designation, which protects the integrity of the building exterior and key interior spaces visible from the outside, it was determined at an early stage that the resolution of the functional issues could only come through a radical re-thinking and ultimately re-purposing of the building program to accommodate the parameters set by the unique configuration of the building. This paper will describe the ideas, process and mechanics that ultimately enabled a successful transformation to its current use.



01 Richards and Goddard Laboratories. Site Plan. © EYP, 2016.

02 Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. Construction photo. © University of Pennsylvania Architectural Archives, 1961.



The building – character defining features

The Richards Building is conceived as a series of reinforced concrete tower structures whose exterior expression is reflective of their interior purpose. The plan consists of three nearly identical “served” laboratory towers (called towers A, B and D) set in a pin-wheel arrangement around a central “servant” tower (tower C) in a designed landscape setting (figure 01). The lab towers are seven stories above grade with a basement level with a clerestory at grade. Each of these is defined by large expanses of glass that rise above brick knee walls on each floor to engage the stepping pre-cast concrete Vierendeel frames (they are not true trusses – despite the frequent use of this term) that support the floor above. The virtually windowless service tower has eight stories plus a mechanical penthouse. Each of the towers is separated by a continuously glazed vertical strip window slot, and the rhythmic verticality of the complex is further accented by smaller, artificially attenuated exterior brick service shafts — originally dubbed “schnorkels” by Kahn — housing exhaust ductwork and fire stairs⁵.

The collective ensemble of a highly articulated structure with clear architectural expression of the separate elements carrying the building services speaks to the fact that the integration of structure and building services was of particular concern to Kahn in this building. He began this quest with his structural explorations with Anne Tyng in the tetrahedral waffle-slab concrete system of the original Yale Art Gallery (which proved to be problematic in terms of building services integration) and next used a primitive Vierendeel frame structure as a way of integrating services and structure in the American Federation of Labor (AF of L) Medical Services Building (1953–55, subsequently demolished) in Philadelphia. Following the AF of L project,

Kahn began to work with August Komendant (1906-1992), a structural engineer and visionary in his own right, on a structural system that could better accommodate the heavy building services demands — and need for flexibility — inherent in a laboratory building. The system developed for Richards cantilevers the Vierendeel frames off perimeter columns, creating voids of sufficient depth towards the heart of each floor, to accommodate the necessary services. The design of this system celebrates the architectural expression of structure and services more than any prior or subsequent Kahn building. The exposed concrete frames hung from eight columns placed at the exterior third points (two each side) of each square tower are the primary structure of the served towers, resulting in column-free interior spaces. The concrete structure is sheathed in brick at the servant tower, but there are subtle articulations in the planes of the brick cladding and exposed concrete floor edges that distinguish bearing from infill walls, and thus give clues to how this element is structured as well.

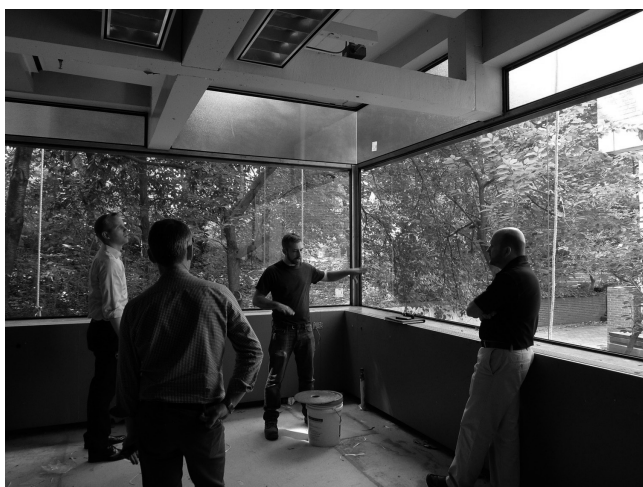
One of the signature elements of the Richards Building is the remarkably detailed vitrine-like exterior envelope of the glazed served towers where all elements — exposed concrete structure, monumental lights of monolithic glazing set in minimal stainless-steel frames, and brick knee-wall between the sill of the windows and the slab — are absolutely co-planar (figure 02). The glazing system that enables this expression is of particular significance and merits special examination as a unique component assembly. Originally conceived by Kahn as a technical exploration that he began with the 1953–55 AF of L Building referenced above, following a less than satisfying experience with the conventional steel window system employed at the first Yale Art Gallery, Kahn continued to develop and refine this idea throughout his career — reaching its final and most complex iteration in the Yale University Center for British Art that was completed after his death in 1974. The essence of Kahn's idea is that existing metal glazing systems — whether rolled steel

or extruded aluminum — were not available in assemblies that would yield the ideal combination of strength and an absolutely minimal “truthful” appearance desired by Kahn. The basic component of the system is heavy gauge (c. 3.20 mm) matte finish sheet stainless steel bent on a brake-form into a U-shaped profile with an upturned leg (for a glazing stop) that produces sharp corners and a deep reveal, forming a shadow line that makes most of the frame appear as a void. It also has the benefit of being a material that can easily be employed in its natural state, as was Kahn's preference — no coating system is required as would be the case for carbon steel, which would require paint, or most aluminum systems, requiring paint or anodization. The result is a unique, incredibly simple and highly elegant glazing system (figure 04).

The character-defining features of the interior are the original material palette of the walls and ceilings and the architectural alignment and organization of the original building systems. In order to retain a “sacred zone” between the sill and the head of the monumental windows (between approximately 90 cm and 2.60 m above finish floor) free of services or devices, Kahn's team developed a hierarchy for the placement and distribution of systems throughout the floor (figure 07). Of less significance was the plan subdivision of the laboratory floors; although these were also given an organizing system by which partitions would be placed along the lines of the 9-square primary planning grid dictated by the overhead exposed trusses, and secondary 4-square grids set within each of the primary bays (figure 05).

Renovation drivers

In the early 2000s, faced with increasing dissatisfaction over the ability of the Richards Labs to meet program need, the University of Pennsylvania (Penn) began to formulate a methodical plan with the ultimate goal of keeping the essential character-defining qualities of the building intact while making the changes necessary — in program, services, and where necessary to the structure of

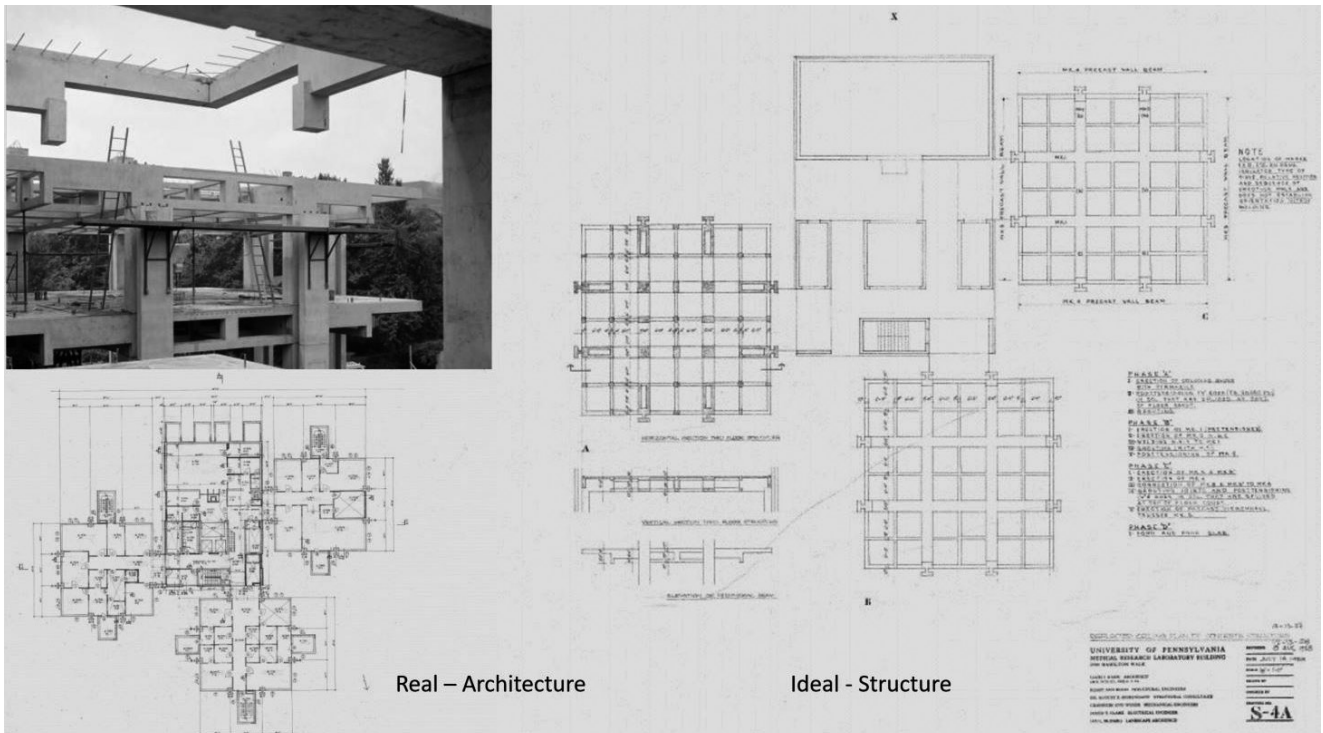


03 Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. Photo of mockup of W-1 and W-2 lights *in-situ*, with project team members. © David Fixler, 2014.



04 Louis Kahn, Richards Laboratories, Philadelphia, USA, 1957–1961. View between two towers showing stainless steel glazing frames. © Mildred Schmertz Photograph, University of Pennsylvania Architectural Archives, 1961.

05 Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957-1961. Original structural and architectural plans and construction photo of concrete frame erection. © Marshall Meyers, University of Pennsylvania Architectural Archives.



the building itself, that would enable it to be fully adapted to accommodate the rigors of 21st century science. As the building aged and attempts had been made at mitigating some of the chronic acute issues, it became increasingly apparent that the building was unable to support the type of science for which it was originally designed. Structural movement resulting from creep of the cantilevered concrete elements, expansion of the brick veneer and subsequent distortion of the window frames had weakened the glazing gaskets. The windows leaked and were easily broken in high winds as the size of the larger units also stretched their structural capacity. Finally, the exquisite, carefully articulated exposed concrete and cinder block walls and ceilings inside the building had become so soiled and damaged in many areas that they had been covered up or painted — further diminishing the material qualities of the interior.

Over time, as piecemeal renovations were undertaken within individual labs, the logic of Kahn's original organizing principles for routing systems and architectural interventions was lost, and supplemental or replacement systems, materials and devices failed to meet the standards originally developed for the building. Program issues were further compounded by the difficulty of subdividing the laboratory floors into appropriately sized spaces because of the dictates of locating partitions only along the lines of the overhead structure. This resulted in some spaces — in particular the corner offices in each served tower — being too large and flooded with an overabundance of light from the oversized windows, and others being undersized, with inadequate access to natural light.

The original building systems were outdated and inefficient from an energy use standpoint, hindering Penn's goals of achieving high energy performance standards across its entire physical plant. In addition, two key factors were driving the need to maximize the project's sustainability quotient. The first of these is that Penn has joined hundreds of other institutions in signing on to the American College and University Presidents Climate Commitment to meet specific carbon reduction targets by 2030⁶. The second is that the project was funded by a Century Bond Initiative whose primary mandate is to underwrite energy/sustainability upgrade projects.

A key decision then was made to change the use from a wet-bench bio-medical, HVAC intensive series of laboratories to a computational based Center for Cognitive Neuroscience, thereby eliminating the need for fume hoods and the volume of associated ductwork for the HVAC system. This also made it possible to explore more sustainably aggressive alternatives to the traditional variable air volume system that had been employed, to further optimize energy conservation.

Interventions

The primary project drivers were thus energy performance, envelope failures and an imperfect program fit. The charge to the project team was to craft a design that would effectively accommodate the repurposed dry lab, computational program to the structural, material and spatial qualities of the building. In the fall of 2010, the Facilities and Real Estate Services (FRES) group of the University of Pennsylvania in conjunction with the Perelman School of Medicine released a Request for Proposals (RFP) to define the scope and nature

The glass itself however had to be replaced for reasons both of energy performance and safety. Typically, replacement glazing in a Northern climate involves the use of

The team therefore tested, mocked up and ultimately employed high-performance laminated glass – identical in appearance to the original lights – with a coating on the number two (interior of outer layer of glass) surface adjacent to the PVB interlayer, that yielded the optimal energy performance possible without the use of an IGU, and was able to be properly fixed within the restored bespoke stainless-steel brake-metal frames. This final design

Essays

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- Figure 10: Window and door frame details. The figure contains three cross-sectional diagrams of a window frame. The left diagram, labeled 'Existing condition', shows a window with an existing frame and glass. The middle diagram, labeled 'Preferred: Laminated glass in existing frame', shows the same window with laminated glass and a new counterflange. The right diagram, labeled 'Alt: IGU in new thermally broken frame', shows a new frame with a thermally broken section and an insulated glass unit (IGU). Each diagram includes detailed annotations for components like the existing frame, glass, counterflange, and various fasteners and seals.

was successfully developed and implemented through close collaboration between the design team, owner, glass manufacturer and the glazing installer (figure 03). Ultimately this enabled the envelope performance to improve sufficiently due to 1) the computer scanned laser cut fit of the new glass which was precisely scribed to the distorted openings, which enabled a far tighter seal against resistance to air infiltration and 2) the ability of the glass to resist solar heat gain. Together these factors improved the envelope performance sufficiently to permit the installation of new HVAC that moves from a conventional VAV system to chilled beams, which use far less energy. Through these measures, and by changing all of the lighting to LED sourced fixtures, the team was able to achieve about 80% of the maximum energy savings possible in the renovation, yielding the optimal “energy frugal” structure sought by Penn without compromising Richards’ integrity as a work of significant modern heritage (figure 08). Like all of the building systems, these elements are exposed within the space between the bottom of the Vierendeel frame and the underside of the slab above, which means that they are both carefully chosen for their aesthetic as well as performance features and carefully worked into the hierarchy of ductwork, conduit and piping components running within the open frames.

The adaptive reuse of any historic structure will inevitably require substantial change to the interior layout and furnishings, and it is here that creative architectural design and conservation must arrive at an optimal balance that brings out the essence of the original building while enabling the functional and often aesthetic improvements that are necessary to maintain the work as a viable institutional resource. In dealing with a building and an architect of this importance, it also becomes critical to develop a material palette and design language that complement the original work without being overtly mimetic; they must have their own design integrity. Research on the whole of Kahn’s oeuvre reveals a consistency of material and detail that give clues as to what could then be appropriately adapted in developing a “kit of parts” for the fitting out of Richards’ interior.

The primary planning issue concerned the right-sizing and equalization of the offices and the attendant opening up of the typical laboratory floor to enable better access to natural light and an ability to perceive the space as it was originally intended by Kahn. In order to accomplish this, the team had to fully understand – and then break — the rules. The typical partitions within the labs were constructed of Concrete Masonry Units (CMU) and, as noted, followed the lines of the overhead structure. This both blocked access to natural light and created very large offices in each of the corners — offices that exceeded the university’s space standards and yielded inadequate adjacent interior offices. Careful examination of the original Richards construction documents uncovered a detail that demonstrated a way to create a line of partitions that did not conform to the structural grid, but enabled an offset through the use of an infill ceiling panel flush with the bottom of the overhead concrete frame (figure 10). This detail was updated

(the original included use of an asbestos acoustic panel that was changed to perforated matte finish aluminum) and utilized to both increase the dimension of the central open area on each floor and to adjust and right-size each of the perimeter offices. The right-sizing of the offices also involved the introduction of an interior glass corner placed just inside of the exterior glazing to borrow light from the oversized windows. These units employ a special non-glare glass that minimizes reflection and thus is virtually invisible when perceived from the exterior. An important planning decision was also made to always leave at least one corner open on each floor to maximize natural light and views, and to enable the full appreciation of the power of Kahn’s own vision for a sort of universal space.

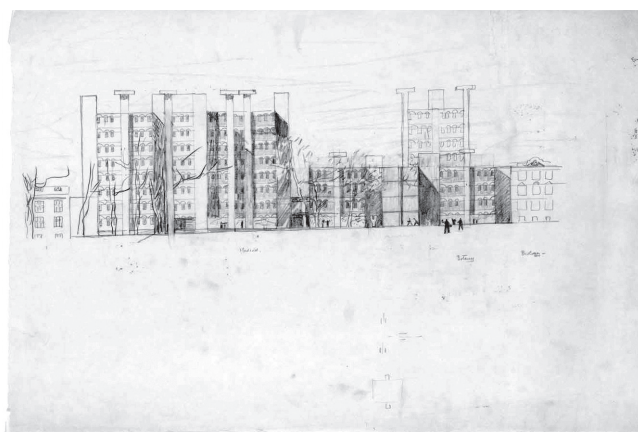
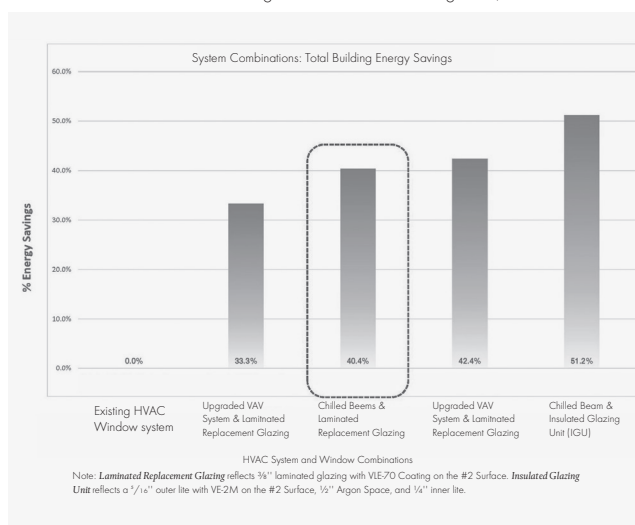
The other major change in the walls was the change from masonry to flush full-height panels of wood and glass to allow light and views to fully penetrate the floors. The interior architectural elements include a partition system utilizing a minimal bent steel frame that is the closest commercially available equivalent that could be found to the original system proposed by Kahn for the building (changed late in the design and never executed) and to the exterior window frames. It incorporates full height (to bottom of overhead structure) flush panels of Kahn’s favorite red oak wood and a combination of clear and obscure glass (for privacy reasons), and perforated horizontal metal ceiling closure panels, all of which are chosen as a sympathetic counterpoint to the concrete frame. The ceiling closure detail lends additional flexibility in enabling partition placement off the lines of the structural grid where necessary to accommodate program. This system then builds upon Kahn’s material palette and language, both in this building and as he consistently developed it in subsequent work, but is clearly meant to be understood as a contemporary intervention. It was tested, evaluated through a series of mock-ups, and finally implemented in the first phases of construction. The result opens up the center and one full quadrant of each of the laboratory floors and realizes Kahn’s original idea of being able to experience the full extent of each glazed volume (figure 15). At the perimeter knee wall in the served towers, previous building renovation had sometimes incorporated a full height floor-sill metal enclosure to protect the perimeter fin-tube radiation units. The design team refined this idea, taking advantage of the space within the unit to add conduit for power and data conduit and moved the heating element (within the enclosure) closer to the window above for greater efficiency and to minimize the potential for condensation (figure 16).

The windowless servant (C) tower was repurposed to hold service, testing and conference spaces. Here as elsewhere within the interiors, conservation issues primarily focused on removing paint and cleaning exposed concrete. The design team worked with conservators from Penn and the industry to ensure the lightest possible touch in cleaning the concrete. The results still exhibit many of the more serious stains and imperfections that have accumulated through the years, but the overall effect is nonetheless transformational, as the cleaning has revealed the degree to which the concrete has

- 07** Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. Interior construction showing routing of systems. © University of Pennsylvania Architectural Archives, 1961.



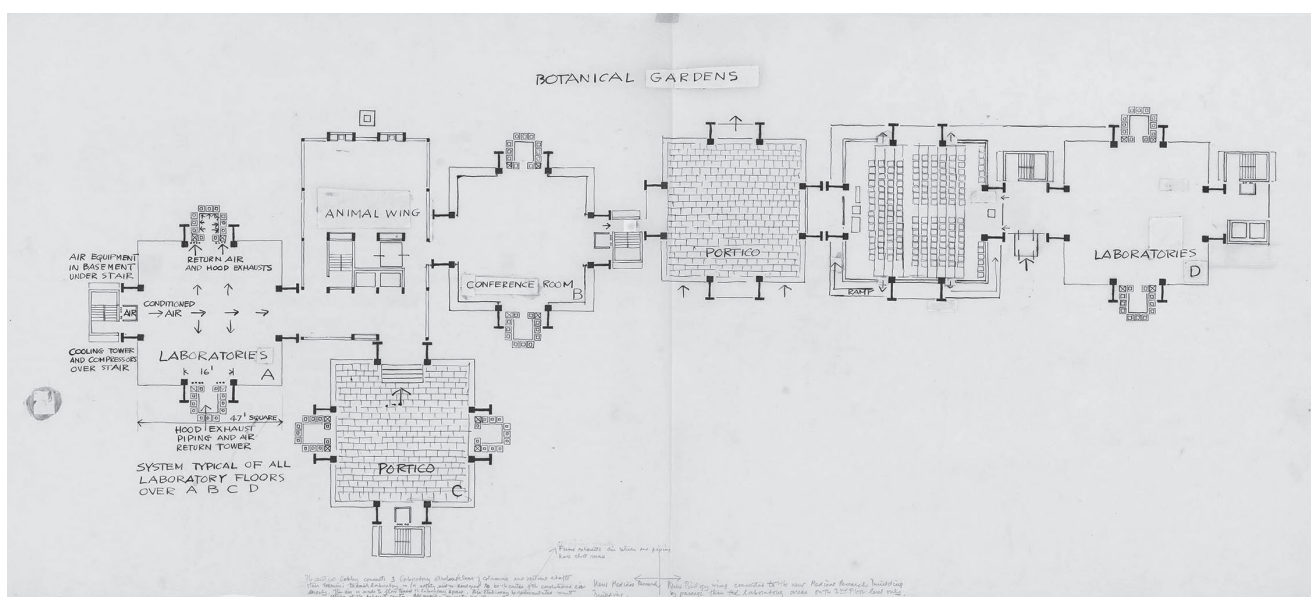
- 08** Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. Energy performance comparison with different HVAC and glazing system combinations. © R. A. Heintges Architects & Urban Engineers, 2014.



- 09** Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957-1961. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.



- 10** Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. Completed 6th floor Tower D workspace prior to furnishing, showing full height glass and wood partitions offset from grid with infill ceiling. © Jeff Goldberg, ESTO, 2015.



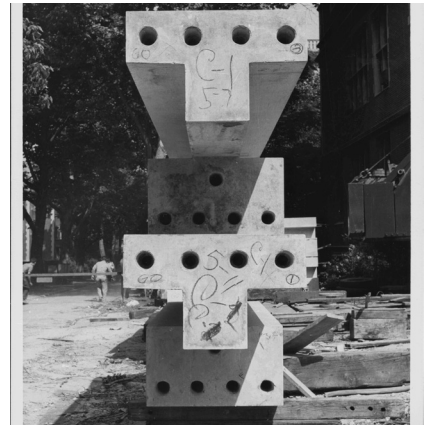
- 11 Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. Preliminary plan with early schemes for structure and systems.
© Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.



12 Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. © Marshall D. Meyers Collection, The Architectural Archives, University of Pennsylvania.

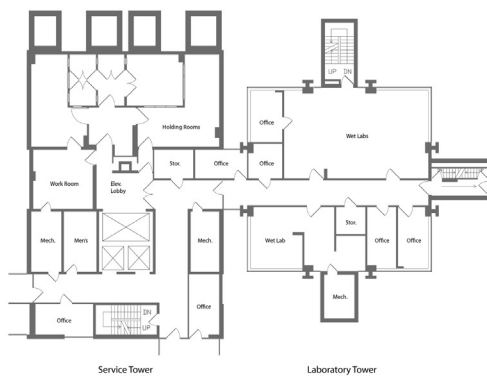


13 Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. © Marshall D. Meyers Collection, The Architectural Archives, University of Pennsylvania.



14 Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

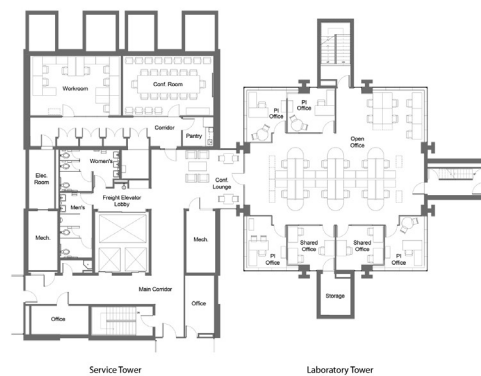
15 Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. Tower D, 6th floor plan before and after renovation. © EYP Architecture and Engineering, 2015.



Service Tower

Laboratory Tower

Original 6th Floor Plan



Service Tower

Laboratory Tower

2015 6th Floor Plan



16 Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. Typical renovated corner office showing knee-wall enclosure and interior glazing along offset line. © Halkin Mason, 2015.



17 Louis Kahn, Richards Bio-Medical Research Laboratories, University of Pennsylvania, Philadelphia, USA, 1957–1961. Exterior from West. © Halkin Mason, 2015.

warmed in tone and acquired a genuine and pleasing patina through the process of carbonation.

The one important exterior change that will ultimately be required for the Richards Building is to provide a gracious accessible entrance to the building. Presently individuals with disabilities must enter through the adjacent Johnson Building because the entry platform for Richards is about a meter above surrounding grade. When the final renovations are complete, there will be a limited use/limited access lift placed within the brick service tower to the east of the entry pavilion (tower A) that has become redundant with the reconfiguration and modernization of the building services. This has been designed to enable access from the surrounding plaza in a manner that will not be visible from the public way as a change to the historic appearance of the building. The lighting at this entry platform will also be subtly improved to create a safer and more welcoming entrance to the complex. Future conservation efforts will be required for the exterior concrete frame, which is already showing signs of wear, and this is being monitored closely by both FRES and the School of Medicine to ensure the safety and integrity of the building (figure 17).

Conclusion

The transformation of Kahn's Richards Laboratories demonstrates both the possible successes and limitations inherent in working with significant modern buildings — especially those that have had chronic functional or performance difficulties throughout their history — and starts to point a way towards how to achieve the best possible results in creating a successful renovation. At the top of the success list, one of the key tenets of conservation practice is that wherever possible a building should maintain something of its original function or use value through the process of transformation.

Although Richards has lost its wet benches it very much remains a building for scientific research, after early thoughts of possibly converting it to housing or even a new home for Penn's school of architecture. Second, the retention and enhancement of the essential exterior material palette ensures that the historic public appearance of the building will be retained, even through the course of future possible renovations, with the only limitation being that the envelope will never be completely as robust from an energy standpoint as would be possible with contemporary construction.

The interior transformation speaks conceptually to Kahn's idea for the building but the interventions are for reasons of both desire and necessity completely different from the original interior elements (aside from the reinforced concrete walls and some of the CMU partitions). In this sense they represent a subjective, creative act — one arrived at through an iterative, consensus-based process with a large group of stakeholders, that is meant to reveal, enhance and engage the best qualities of Kahn's material and spatial idea for Richards without ever trying to upstage it. As I stated in the conclusion of a companion article in the proceedings of the 14th International **docomomo** Conference in Lisbon:

It is never possible to fully anticipate the consequences of the transformation of any building. Though it was predictable that the opening of the floors would enable the appreciation of the full impact of the space; what has also become apparent is the degree to which the stark, weathered quality of the building structure has re-asserted its autonomous architectural power in contrast to the elegant steel precision of the new partition system. This is an appropriate outcome, as Kahn's building is in the end an expression of tectonics, systems and space as something decoupled from though not entirely independent of function, and the clarity of this distinction has never been more apparent than at present⁷.

This is a delicate balance; the solution may not be perfect — there will always be room for differing opinions — but it works; the new users of the building are generally satisfied from the point of view both of function and ambiance. As the later phases of the renovation approach completion it is hoped that the Design Guidelines that were crafted near the outset of the project and have continued to evolve throughout the course of design and construction will also continue to both maintain consistency of approach and help guide the inevitable change that future users will bring to the building. For this time however we take comfort in Inga Saffron's assessment "that the building has for the first time become what Kahn wanted it to be"⁸.

Notes

The project team roles and responsibilities were as follows. Owner: University of Pennsylvania (Department of Facilities and Real Estate Services (FRES); Perelman School of Medicine); Lead Architect, Design and Phase I Execution: EYP Architecture and Engineering; MEP/FP Engineer: Urban Engineers; Structural Engineer: Keast and Hood; Glazing/Window-wall: R. A. Heintges Architects; Materials Conservation: Building Conservation Associates; Executive Architect: Phases II-IV – Atkin, Olshin, Schade.

- 1 Wilder Green (curator), *Richards Medical Research Building*, Louis Kahn, Architect, New York, Museum of Modern Art, 1961, p. 1 of the press release.
- 2 Both Banham and Jordy wrote extensively about Richards at the time of its construction. Jordy writes lyrically and in great depth in an article first published in *Architectural Review* in 1961, and then expanded for inclusion in the *American Buildings and Their Architects* series in 1972. Banham noted in particular in his 1962 article for the *Architectural Review* and his 1966 update to "The New Brutalism" that despite the claims of others to the contrary, Richards did not move architectural discourse beyond where Le Corbusier had left it 30 years earlier.
- 3 Quote attributed to Louis Kahn, source uncertain.
- 4 Vincent Scully, *American Architecture and Urbanism*, London, Thames and Hudson, 1969, 215.
- 5 Thomas Leslie, *Louis Kahn Building Art Building Science*, New York, George Braziller, 2005, 121.
- 6 American College and University Presidents 2030 Climate Commitment: this group seeks a 30% reduction in carbon emissions from their institutions by 2030.
- 7 David Fixler, "Transforming an Icon on its own Terms: repurposing Kahn's Richards Building" in Ana Tostões and Zara Ferreira (ed.), *Adaptive Reuse. The Modern Movement towards the Future*. 14th International Docomomo Conference Proceedings, Lisbon, Docomomo International/Casa da Arquitectura, 2016, 940.
- 8 Inga Saffron, Changing Skyline, "Turning Richards Labs into the Building Louis Kahn Wanted it to Be", *Philadelphia Inquirer* 9 January 2016 [http://articles.philly.com/2016-01-09/entertainment/69618013_1_louis-kahn-towers-my-architect].



Louis Kahn, Salk Institute, La Jolla, California, USA, 1959-1965. Overall view, looking southeast across the plaza, following completion of project.
© Elizabeth Daniels, 2017.

Conserving the Teak Window Wall Assemblies at the Salk Institute for Biological Studies

BY SARA LARDINOIS AND KYLE NORMANDIN

In 2013 the Salk Institute for Biological Studies partnered with the Getty Conservation Institute (GCI) to commence development of a conservation program for the long-term care of the teak window walls. Phase 1 of the program included preliminary historic research and an assessment of significance, surveys and investigative inspection openings, wood and fungus identification, and analyses of past surface treatments. Guidelines were then developed based on three treatment approaches, ranging from *in situ* cleaning and treatment, to selective repairs, and finally in-kind replacement of teak wood. In Phase 2 of the work, the GCI and Wiss, Janney, Elstner Associates, Inc. (WJE) developed a trial mock-up program to assess the protocols of the three treatments. This article will review the overarching goal of the treatment approaches, integrating conservation and repair needs with select modifications to the window detailing to improve long-term performance, including surface treatments to protect the teak wood and retard fungal growth and weathering over time.

Each [Jonas Salk and Louis Kahn] lived partly in a poetic, intangible world and partly here on ground, making tangible things. Each was in touch, as Kahn came to say in the early stages of the Institute – with both the measurable and the immeasurable – the scientific and the poetic. Each thought and created at the level of absolutes, of purity, of, as each would often say, the cosmos. Yet individually, and together, they accomplished and made things of lasting value here in the physical realm¹.

Introduction

Situated on a Southern California bluff overlooking the Pacific Ocean, the Salk Institute for Biological Studies (the Salk Institute, 1965) is one of architect Louis I. Kahn's finest works. Among the major architectural elements of the complex are just over 200 prefabricated teak window wall assemblies, set within openings in the concrete walls of the studies and offices that flank the Institute's iconic plaza (figure 01). After 50 years in an exposed marine environment, the window assemblies were deteriorated, weathered, and in need of repair. The Salk Institute embarked upon a conservation-based repair program from 2013 to 2017 to address the deterioration of the window walls; the aim was to develop a conservation program in which the original window assemblies could be retained, as they are a critical part of the site's cultural significance. This article provides a brief overview of the history and design of the Salk Institute and then discusses the significance of the window wall assemblies, the approach taken to conserving them, and some of the key challenges of the work.

History and significance

The Salk Institute was founded in 1959 by Jonas Salk, the creator of the first successful polio vaccine. His goal was to

establish an institute where biologists and scientists from other specializations would explore questions about the basic principles of life and, through their collaborative work, consider the wider implications of their discoveries for the future of humanity. Over 50 years later, the Institute is home to internationally renowned and award-winning scientists whose main areas of study and research include the neurosciences, genetics, immunology, and plant biology.

The buildings that would house Dr. Salk's institute were a key part of his vision as a place of collaborative science and individual contemplation. For their creation, he turned to architect Kahn. Dr. Salk first met and visited Kahn in Philadelphia in December 1959, where they discussed the relationship of science and the humanities. Given the desired design program to build a laboratory complex, Dr. Salk visited Kahn's work at Richards Medical Research Laboratories at the University of Pennsylvania in Philadelphia. The visit marked the beginning of their work together on the Salk Institute, as a well as a friendship and collaboration between the two men that was to last until Kahn's death in 1974. Dr. Salk was an involved client and both men regarded one another favorably throughout their collaboration on the project, with Kahn calling Dr. Salk "my most trusted critic"².

The City of San Diego made a gift of a 27-acre parcel of land in La Jolla, north of San Diego, to establish the Institute. Initial design work began in 1959; the first concrete was poured in 1962; and construction was completed in 1965. Kahn originally conceived of a tripartite design for the campus complex, consisting of laboratories, meeting places, and living places; however, only the laboratory complex was constructed. It consists of two nearly identical wings of laboratory space, free-standing study towers,

and office space, each wing mirroring the other on either side of the paved central plaza. In the early 1990s, the East Buildings were added to the complex to provide additional space for the Institute, in part to provide programmatic spaces originally proposed for the original tripartite design.

The recently completed conservation management plan (CMP) for the site found the Salk Institute to be culturally significant as 1) an outstanding building by one of the most important architects of the late 20th century; 2) an outstanding example of an innovative research laboratory; and 3) an outstanding example of landscape design, with the juxtaposition of the buildings and paved plaza with the canyon and ocean. This significance is further enhanced through its association with Jonas Salk and other leading scientists, and with the architect Kahn, as well as the landscape architects who contributed to the design³.

Teak window wall assemblies

The teak window walls are prefabricated assemblies consisting of different combinations of horizontal sliding window sashes, louvers, and/or paneled shutters, with an internal pocket where required to accommodate these sliding components (figure 03). They were constructed using teak structural members and softwood stud framing, with asbestos-cement (transite) board which performs structurally similar to sheathing. The exterior face of the wall is clad in vertical tongue-and-groove teak siding, and the interior face is clad in oak paneling or gypsum board, installed over the transite board (figure 04). In some locations, the design includes oak shelving for the office occupants. Narrow glazed lights at either side of the assembly served as shim space when the assemblies were set in the wall, and allow for additional light to wash the concrete walls of the work spaces. Prefabrication was selected as both a means of reducing project costs and increasing quality, as the units were partially assembled in a local cabinetmaker's shop prior to being transported to the site and lifted into place by crane.

The window wall assemblies are an exceptionally significant element of the Salk Institute, expressing a human scale element within the monumental structure. One of the design features of the Salk Institute is the physical separation of the singular “domestic” cells of the study towers — which Kahn often referred to as the “architecture of the oak table and the rug” — from the collective work space of the laboratories, with their “architecture of cleanliness and area adjustability”⁴. The use of individual window walls, in contrast to the large expanses of metal-framed window walls at the laboratories, is an exterior expression of these different spaces. The focus on the individual in the studies is further expressed through the functionality of the various sliding components: occupants are able to modulate light and ventilation within their work spaces.

The use of wood and concrete, “often conceived of as materials of opposite character”, for the window walls results in a contrasting but complementary effect⁵. Their fine-grained detailing, with narrow vertical tongue-and-groove boards and horizontal trim set in multiple planes,

contrasts with the larger expanses of relatively flat planes of concrete walls.

Although research carried out to date has not produced any statements directly attributable to Kahn on the choice of teak for the exterior cladding, the consensus among Kahn's design associates, as well as scholars of his work, is that the teak was specified because it was thought to be a durable, relatively maintenance-free material requiring no finish coating, and that its natural bleached white to gray weathered appearance would be compatible with the color of the adjacent concrete, contributing to the overall subtle palette of building materials⁶.

The use of natural materials such as the teak also demonstrates Kahn's architectural philosophy of using and honoring the unique properties of materials. Wood, a natural material, reveals its origins through color, texture, grain, and natural finish, with subtle to moderate differentiations in appearance. The natural weathering of the exterior wood elements results in a character of age and patina that would have been anticipated by Kahn.

Though the window walls are prefabricated units — often thought of as an industrialized process — Kahn innovatively synthesized industry and craft through the customization of the units and the detailing of the teak by carpenters to fit many different concrete openings in the building complex.

The design of these window walls is also significant within Kahn's larger body of work, as they expand upon a language of custom exterior millwork designed and established in his office; remarkably, custom designed wood materials also survive today in Kahn's residential projects as seen at the Margaret Esherick House (1959–1961) and the Dr. and Mrs. Norman Fisher House (1960–1967), both in the Philadelphia area (see figure 06, p. 45 – Fisher House), and in institutional buildings including the Class of 1945 Library at Phillips Exeter Academy (1965–1972) in Exeter, New Hampshire. While different woods are employed at these sites, the Library at Philips Exeter also makes use of exterior teak for its windows set within its brick walls⁷.

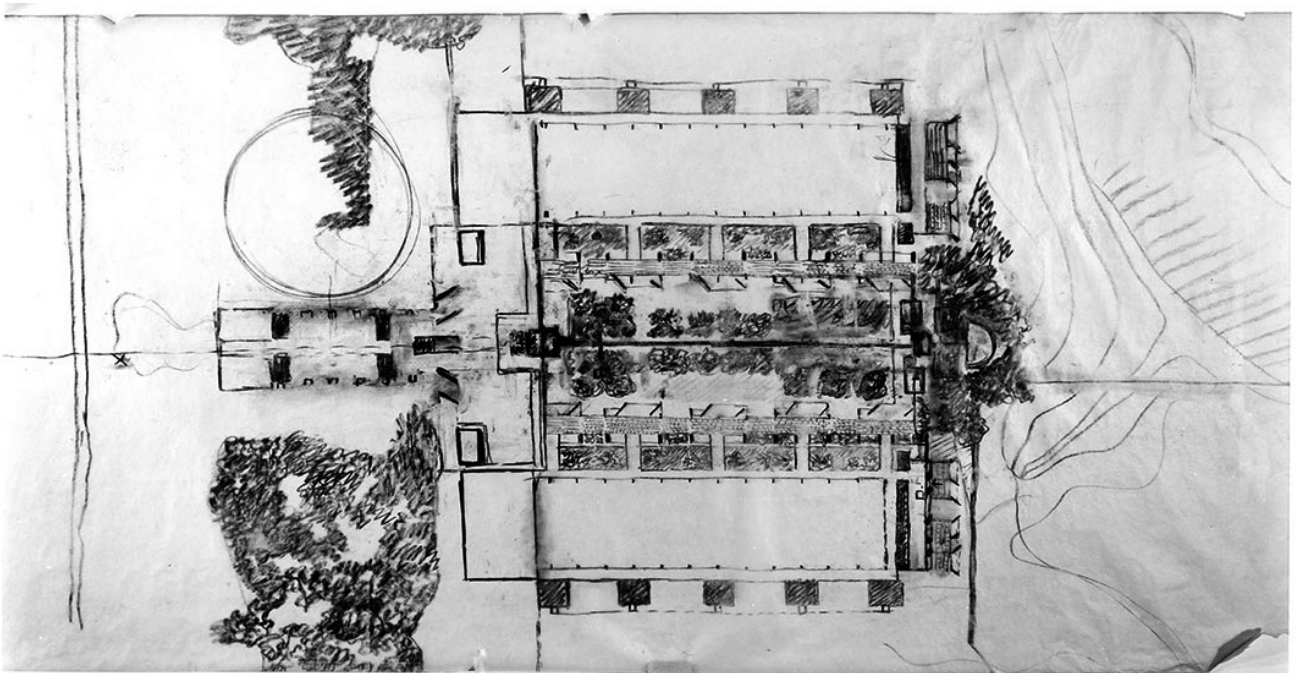
The Institute has a long history of good stewardship of the site. Over time, it has carried out minor to moderate maintenance efforts and repairs to address localized deterioration and aesthetic concerns at the window assemblies. However, as the Institute approached its 50th birthday — an age when many modern buildings require their first major repair or intervention — the window assemblies were weathered, deteriorated, and in need of a major repair and maintenance program. The long-term exposure to the marine environment and sunshine in La Jolla had led not only to surface erosion but overall degradation of the window assemblies that varied significantly across different elevations of the building. The assemblies also suffered from air and moisture infiltration, which resulted in preferential termite damage dependent on the degree of sunlight and exposure. A mildew or fungal biofilm appeared on the surface of the wood as early as 1967, spreading from nearby Eucalyptus trees and resulting in a black appearance that varied considerably by exposure. At that time, the presence of this fungus was particularly troublesome to Dr. Salk, and

01 Louis Kahn, Salk Institute, La Jolla, California, USA, 1959–1965. Overall view, looking west toward the Pacific Ocean, prior to commencement of project. © Leslie Schwartz, 2015.



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Essays



02 Louis Kahn, Salk Institute, La Jolla, California, USA, 1959–1965. Preliminary site plan sketch indicating a planted central court. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

it became a unique challenge for the Institute, whose desire was to retain the appearance of freshly milled teak.

Given these challenging conditions over time, the Salk Institute had originally assumed that total replacement of the teak might be necessary. Yet the Institute realized that such a project would result in the loss of a significant amount of the buildings' original fabric and that this loss would also raise questions about whether replacing such a quantity of a rare natural resource, Southeast Asian teak, was necessary.

Conservation approach

In 2013, the Salk Institute partnered with the Getty Conservation Institute (GCI) to determine if there was way to conserve, rather than to replace, the existing teak window assemblies and better protect the site's significance. The resulting project, the Salk Institute for Biological Studies Teak Window Conservation Project (2013–2017) demonstrated how a conservation-based approach could be applied to address the care of the window assemblies and place in a comprehensive, long-term manner. The project utilized a standard conservation methodology that has long been applied to a variety of heritage sites, including modern heritage sites. This process can be summarized as:

- Understanding the place and what is significant about it.
- Gathering information about its physical condition, external requirements such as codes, client requirements, and feasible uses before.
- Developing principles or guidelines that retain that significance in future use or development.
- Applying principles to guide a design response and implementation.

The project was divided into four phases. Phase 1 of the program included preliminary historical research and an assessment of significance, surveys and investigative inspection openings, wood and fungus identification, and analyses of past surface treatments. Conservation principles and guidelines were then drawn up to guide the development of initial treatment approaches. In Phase 2 of the work, the GCI and the Salk Institute's conservation architect, WJE, developed a trial and mock-up program to assess the protocols of the three treatments. At the end of this phase, the treatment approaches were refined by WJE and developed into a project manual that included construction repair drawings and technical specifications (Phase 3). The construction project (Phase 4) was completed in June 2017.

For the Salk Institute, making the first shift from an asset management approach that included responding to issues as they arose, to a long-term asset management approach with conservation at its core, helped to provide much needed guidance in caring for the site. The second shift was in securing an approach that adopted a conservation methodology in developing and implementing the physical repairs. This shift included starting with documentation and research to understand the problems and their causes, and then developing solutions to address these problems. As part of this process, a trial repair program confirmed the

efficacy of the solutions — this process presented a clear parallel with the scientific research process that the Salk Institute practices in its biological studies and research.

Conservation project

The following conservation principles were considered when developing the three different conservation treatment approaches — ranging from minor to major interventions — that were implemented across the site:

- Preserve the overall integrity of the wall assembly through preservation of the original teak cladding and sliding windows, louvers, and shutters to the greatest extent possible.
- Fulfill the assembly's primary purpose as functional windows and a barrier to the elements by retaining the functionality of the windows, encouraging improvements to enhance performance, and mitigating hazardous materials.
- Preserve and respect the natural characteristic of the wood and the complementary relationship between the select palette of materials.
- Allow for subtle to moderate variations in the exterior wood, but avoid high or extreme variations by retarding the growth of the fungal biofilm and removing past surface coatings.

Minor interventions included in-situ cleaning and repair of existing window wall assemblies exhibiting minor to moderate erosion (with no signs of termite damage) at the teak cladding. Moderate interventions included in-kind replacement of tongue-and-groove teak siding exhibiting erosion and minor deterioration in the internal framing. While major interventions included in-kind replacement of tongue-and-groove teak siding and other components exhibiting severe erosion, structural repair of major frame deterioration was also carried out at areas of severe termite damage. All three levels of interventions included cleaning and removal of past surface coatings, application of new surface treatments to retard the growth of the biofilm and better integrate existing and replacement teak, and preventive treatment to control termites. For moderate to major interventions, improvements to resist air and moisture infiltration were carried out, to enhance the overall and gain long-term performance in order to sustain and further protect the window assemblies.

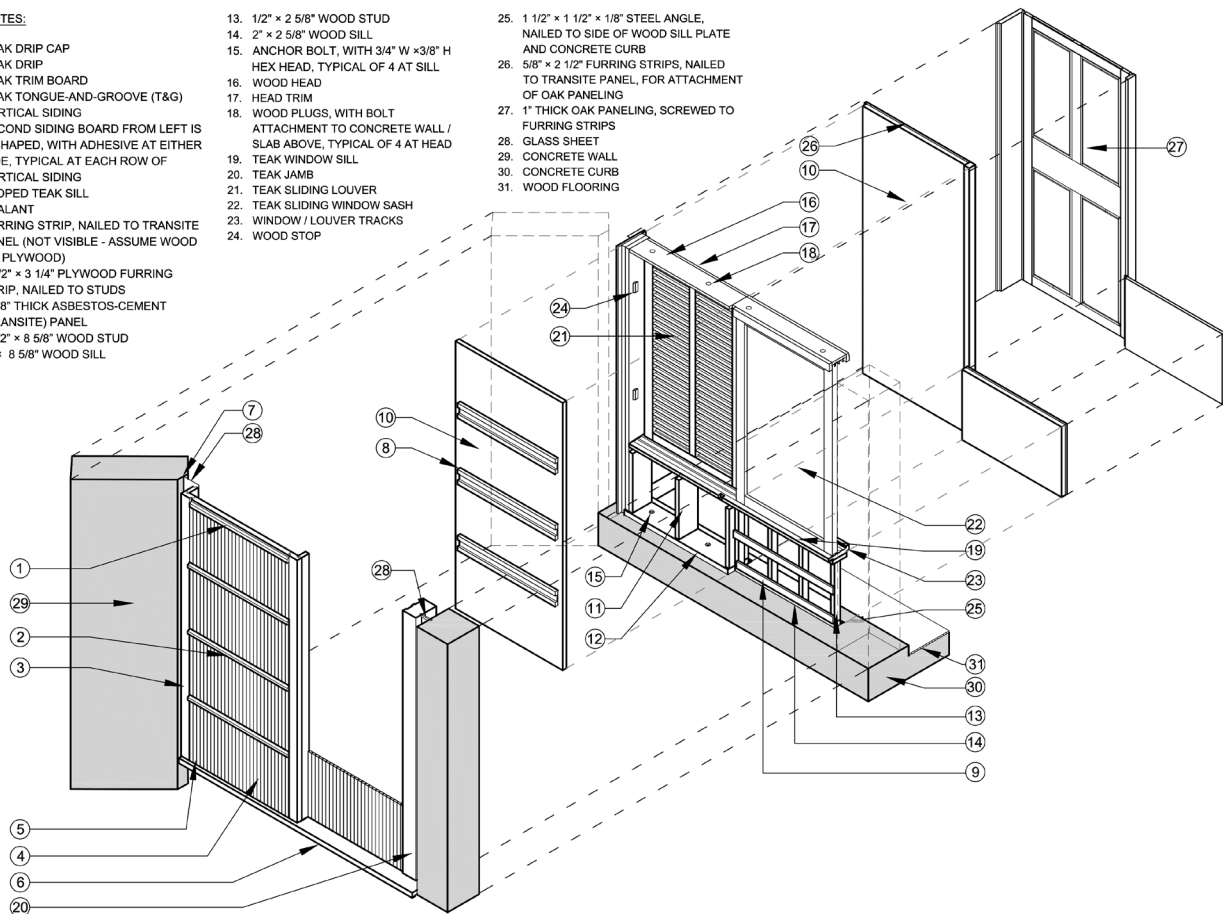
Conservation challenges

Shortly after completion of original construction in the 1960s, various reports of challenges related to window construction detailing and overall performance of the wood materials began to emerge. For example, in 1966 water leaks were observed in the study towers, resulting from improper construction of the teak panels and window wall systems⁸. Throughout the early stages of the project, from 1963, the construction budget was under threat on numerous occasions; budgetary cutbacks had led to a reduced specification for the millwork of the studies and office wings and in particular, the omission of weather stripping and flashings that provided weather-proofing as originally designed by Kahn's office⁹ (figure 06).



KEY NOTES:

1. TEAK DRIP CAP
2. TEAK DRIP
3. TEAK TRIM BOARD
4. TEAK TONGUE-AND-GROOVE (T&G) VERTICAL SIDING
5. SECOND SIDING BOARD FROM LEFT IS T-SHAPED, WITH ADHESIVE AT EITHER SIDE, TYPICAL AT EACH ROW OF VERTICAL SIDING
6. SLOPED TEAK SILL
7. SEALANT
8. FURRING STRIP, NAILED TO TRANSITE PANEL (NOT VISIBLE - ASSUME WOOD OR PLYWOOD)
9. 2 1/2" x 3 1/4" PLYWOOD FURRING STRIP, NAILED TO STUDS
10. 1 5/8" THICK ASBESTOS-CEMENT (TRANSITE) PANEL
11. 1 1/2" x 8 5/8" WOOD STUD
12. 2" x 8 5/8" WOOD SILL
13. 1/2" x 2 5/8" WOOD STUD
14. 2" x 2 5/8" WOOD SILL
15. ANCHOR BOLT, WITH 3/4" W x 3/8" H HEX HEAD, TYPICAL OF 4 AT SILL
16. WOOD HEAD
17. HEAD TRIM
18. WOOD PLUGS, WITH BOLT ATTACHMENT TO CONCRETE WALL / SLAB ABOVE, TYPICAL OF 4 AT HEAD
19. TEAK WINDOW SILL
20. TEAK JAMB
21. TEAK SLIDING LOUVER
22. TEAK SLIDING WINDOW SASH
23. WINDOW / LOUVER TRACKS
24. WOOD STOP
25. 1 1/2" x 1 1/2" x 1/8" STEEL ANGLE, NAILED TO SIDE OF WOOD SILL PLATE AND CONCRETE CURB
26. 5/8" x 2 1/2" FURRING STRIPS, NAILED TO TRANSITE PANEL, FOR ATTACHMENT OF OAK PANELING
27. 1" THICK OAK PANELING, SCREWED TO FURRING STRIPS
28. GLASS SHEET
29. CONCRETE WALL
30. CONCRETE CURB
31. WOOD FLOORING



In addition, the window walls were exposed to weathering and ongoing moisture infiltration over time. Additional deterioration occurred due to termite infestation in both the internal framing and in some of the teak framing and cladding. Challenges related to the external teak woodwork also presented themselves once the building was in service. Only a few years after construction, beginning in 1967, the Institute started to wash the entire external woodwork of the teak wood window assemblies in an effort to consistently remove the surface accumulations of the black fungal biofilm; however, the fungal biofilm returned and routine washing of the teak wood continued routinely over 50 years. In the 1970s, surface treatments and coatings were tested and applied with the intent of protecting the wood; however, the treatments eventually gave the teak a deep red appearance that strongly discolored the wood and aesthetically contrasted with the adjacent concrete areas (figure 07).

Solutions and remaining questions

In addressing these challenges, the project team grappled with how to balance technical and philosophical questions and arrive at viable solutions. One of the largest technical problems was how best to make the windows more weathertight, provide the flashings that had been omitted from the original design, and install other weatherproofing improvements, including an air and moisture barrier system in the internal wall cavity. Given that the flashings were part of the original design, integrating this detail in the conservation program was critical (figures 08 and 09). However, there remained a challenge of how to integrate a weather barrier system to improve the overall performance of the assembly without significantly altering the visual characteristics, construction detailing, and craftsmanship of the original design.

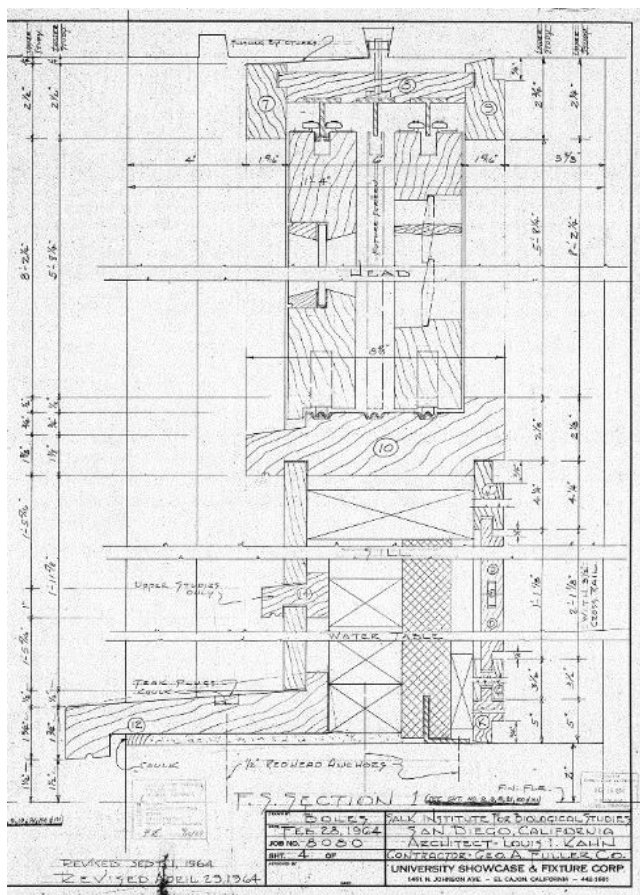
Perhaps one of the primary overarching questions was how to balance the need for material and visual integrity. As the Salk Institute is an architecturally significant site with high aesthetic value, it was important to maintain not only material integrity but also a high degree of visual integrity, to the extent that was possible and practical. The three treatment approaches that were developed for the project respond to the varying material conditions. In selecting a treatment for a specific window assembly, it was important to consider not only the physical condition of the material fabric but also how the treatment might impact the overall visual integrity of the site, particularly if different treatments would vary greatly in appearance. Consideration was given to applying a treatment to a particular area of the building or across an entire elevation. Ultimately, the differences in appearance between the three treatment approaches were minimized, and new surface treatments further helped to maintain visual integrity.

The project team also grappled with the question of how to treat the surface of the wood. Kahn had intended for the teak wood to be left unfinished and anticipated that as the natural material weathered, it would be somewhat varied in appearance and would remain aesthetically compatible



05 Louis Kahn, Salk Institute, La Jolla, California, USA, 1959-1965. Under construction. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

with the adjacent concrete appearance. However, by contrast, given the environmental conditions along the coast of La Jolla, leaving the wood unfinished was not aesthetically successful over the last 50 years – primarily due to not being able to prevent or manage the black fungal biofilm accumulation that is present from the surrounding eucalyptus trees of the site. Given the Institute's preference for a more uniform pristine and fresh milled appearance of the teak wood, this ultimately led to the application of numerous surface treatments, some of which contrasted greatly with the building complex. Over the past 50 years, both the fungal growth that continued to return and the variety of surface treatments had resulted in extreme variations in the wood appearance that detracted from the architectural integrity and monumental form of the complex. The conservation team considered and evaluated a number of options for addressing these issues, from design improvements to reduce moisture accumulation in the wood that allowed the fungus to thrive, to a range of surface treatments to address the varying appearance of the teak and control the fungal growth. Ultimately, a balanced repair approach, with new treatments that retained the significance and the original design intent, was implemented. Minor design modifications were made to reduce moisture accumulation and a trans-



06 Louis Kahn, Salk Institute, La Jolla, California, USA, 1959-1965. Window Shop Drawing, University Showcase & Fixture Corp, 1964. © Salk Institute for Biological Studies.



07 Louis Kahn, Salk Institute, La Jolla, California, USA, 1959-1965. Treatment discoloration and varied weathering patterns. © Wiss, Janney, Elstner Associates, Inc. 2015.



08 Louis Kahn, Salk Institute, La Jolla, California, USA, 1959-1965. New metal flashing at top of window. © Wiss, Janney, Elstner Associates, Inc. 2016.



09 Louis Kahn, Salk Institute, La Jolla, California, USA, 1959-1965. Folded metal flashing installation at top of window. © Wiss, Janney, Elstner Associates, Inc. 2016.



10 Louis Kahn, Salk Institute, La Jolla, California, USA, 1959-1965. Overall view, looking southeast across the plaza, following completion of project. © Elizabeth Daniels, 2017.

lucent surface treatment with a fungicide and ultraviolet light inhibitors was applied to the teak, both to protect the wood and retard the growth of the fungus, giving it an appearance similar to freshly milled teak. This surface treatment also helped to integrate the appearance of the repair work which included both existing weathered and new un-weathered teak; this was considered particularly important where existing and new teak were used side by side within a single window wall assembly or area of the building. In selecting an appropriate surface treatment, it was critical to manage the Institute's expectations in terms of the continuing effects of environmental conditions and routine monitoring, maintenance, and reapplication would most likely be required in the years ahead.

One of the major successes of the project is that over two-thirds of the original teak wood was conserved in place, preserving not only material authenticity but also a rare natural material resource – Southeast Asian teak (figure 10). The conservation repair approach represented a dramatic shift from a complete window replacement program that had initially been anticipated by the Institute for the window wall assemblies.

The conservation-based methodology used for the window project successfully demonstrated that this approach can also be applied in caring for the palette of materials

represented throughout the building complex and its setting – i.e., concrete, travertine, metal, and brick areas. And now, this approach is incorporated in the asset management process for the Salk Institute through the adoption of the recently completed conservation management plan for the setting and place, which will guide the care of the complex, including the buildings, spaces, and material fabric, for many years to come.

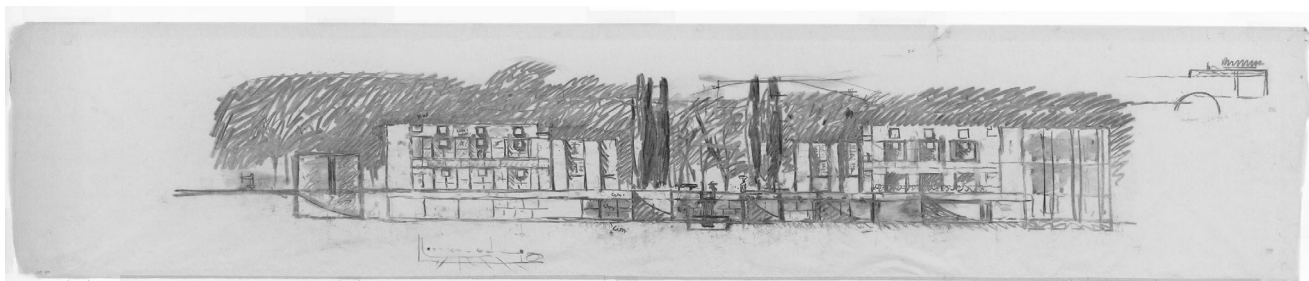
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Acknowledgements

Susan Macdonald, FAPT, Director of Projects and Sites, with Getty Conservation Institute and Deborah Slaton, FAPT, a Principal with Wiss, Janney, Elstner Associates, Inc., are gratefully acknowledged for their constructive and detailed reviews.

Notes

- 1 Jonathan Salk, son of Jonas, spoke at the DFC Technology and Innovation Summit in 2015, Design Intelligence, September 23, 2016 [<https://www.di.net/articles/reflections-on-the-relationship-between-lou-kahn-and-jonas-salk>].
- 2 David Brownlee and David DeLong, *Louis I. Kahn, in the Realm of Architecture*, New York, Rizzoli, 1991, 95.
- 3 Wiss, Janney, Elstner Associates, Inc., Inskip and Gee Architects, and Liz Sargent HLA. *Conservation Management Plan, Salk Institute for Biologi-*



12 Louis Kahn, Salk Institute, La Jolla, California, USA, 1959-1965. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

cal Studies, La Jolla, California, May 2017.

- 4 Louis Kahn, "Form and Design", *Architectural Design*, n. 31, 1961, 151.
- 5 David Brownlee and David DeLong, *op. cit.*, 100.
- 6 During the design phase, several alternatives to the teak were considered as a means of reducing project costs; however, the only viable alternative, Honduras mahogany, was rejected by project architect Jack MacAllister because it "is very red in color and would create problems of appearance with the color of the concrete. It would also have to be treated periodically with a preservative or have to be varnished", MacAllister urged that this substitution should be made only as a last resort. In April 1966, soon after the completion of construction, Louis Kahn himself noted, "I think the tone now, the concrete and the wood, blends together much". For quotation sources, see Sara Lardinois, *Salk Institute for Biological Studies Conservation Project, Phase 1: Research and Investigative Results and Preliminary Conservation Proposals*, Los Angeles, The Getty Conservation Institute, 2017, 23.
- 7 During Phase 1 of the conservation project, the GCI has included discussion with the facilities team at Phillips Exeter Academy about the repair work carried out at the library windows between 2002 and 2003. For details on these discussions see Lardinois, *op. cit.*, 321-327.
- 8 *Conservation Management Plan, Salk Institute for Biological Studies*, *op. cit.*, 214.
- 9 Reference memo dated March 9, 1967, to the Weather Stripping Company. MacAllister's memo of 3 April 1968 recorded that all the weather stripping in the studies and office wings was deferred to bring the construction cost in line with the budget. Salk Institute Archives.

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Kyle Normandin

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Louis Kahn, Yale Center for British Art, New Haven, USA, 1966–1977. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

The Yale Center for British Art: a Building Conservation

BY GEORGE KNIGHT

The Yale Center for British Art was designed by acclaimed American architect Louis I. Kahn to house a collection of British art on the campus of Yale University. The Center, Kahn's third and final museum building, was designed between 1970 and 1974 and opened its doors to the public in 1977. By 2002 it was evident that the building was fast approaching a crossroads: finishes had reached the end of their lives, program space was in desperate demand, patron amenities and life safety measures no longer met contemporary standards and, worst of all, infrastructural systems strained to sustain the environments demanded to protect the collections. The integrity of Kahn's architecture was in jeopardy.

What follows is the story of what came next: how the building was painstakingly researched and analyzed, and how a series of projects ensued to re-equip the Center to present and protect its collection for decades to come.

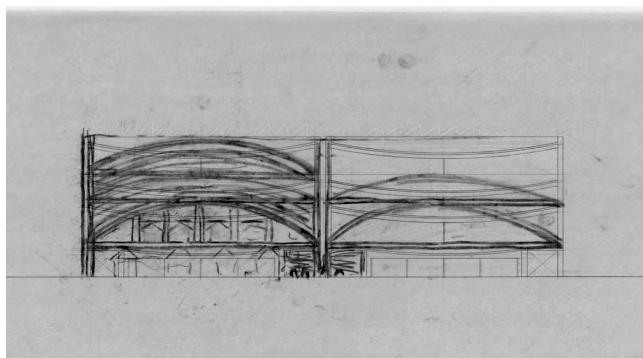
Conserving Louis I. Kahn: the Yale Center for British Art renewed

In 1966 Paul Mellon, son of an Englishwoman and lifelong anglophile, set forth a vision for a center for the study of British culture in America at his alma mater, Yale University. Mellon provided funds to acquire a property at the edge of the university's central campus in New Haven; to construct a building; to fill it with his extraordinary collection of paintings, drawings, prints, rare books, manuscripts, and sculpture; and to endow it with resources for maintenance and growth. The resulting Yale Center for British Art holds the foremost collection of British art outside of the United Kingdom and hosts visitors and scholars from around the world. It is also one of the most celebrated buildings of the 20th century and is forever associated with its acclaimed architect, Kahn.

An incontestably brilliant architect and artist, Kahn was nonetheless best known as an educator and theoretician for most of his early career which began in earnest when he was hired to teach at the Yale School of Architecture in 1947. It was not until 1951 when he won the commission to design the expansion of the Yale Art Gallery (completed in 1953) largely due to the endorsement of the Chair of the Architecture Department at Yale, George Howe, that Kahn's career as an architect was launched. He subsequently produced such noteworthy buildings as the Richards Medical Research Laboratories at the University of Pennsylvania, the National Assembly Building in Dhaka, the Phillips Exeter Academy Library, the Indian Institute of Management in Ahmedabad, and posthumously, Franklin Delano Roosevelt Four Freedoms Park in New York, constituting one of the most important architectural legacies of the 20th century.

While the Yale Art Gallery, the university's first modernist building and Kahn's first large scale commission, had been largely successful, it was not without some controversy and, as it came time to select an architect for Mellon's bequest, Kahn was among a group of architects that included Philip Johnson, Robert Venturi, and I. M. Pei. Pei had recently been commissioned to design both the Mellon-supported East Wing of the National Gallery of Art in Washington DC and the Paul Mellon Arts Center at nearby Choate Rosemary Hall and appeared to have a distinct advantage. However, despite this formidable competition, Kahn was selected on the strength of his recently completed Salk Institute for Biological Studies in La Jolla, California (completed in 1963) and the still under-construction Kimbell Art Museum in Fort Worth, Texas.

With the design process beginning in 1970, the building site itself was immediately controversial. Never before had Yale, still affected by the civil unrest that beset New Haven two years prior, built its core campus across Chapel Street, New Haven's historic boundary between town and gown. Ironically, this decision would foster some of the more deft and innovative measures in the design such as the inclusion of storefronts along the commercial street, the restrained massing which reinforces the street wall, and the inclusion of a public plaza at the building's western edge. By late 1971, the design of the current building was largely resolved and approved for development by the Yale Corporation at the end of that year. The design details were completed in Kahn's Philadelphia office and contract drawings were released in 1972 with construction beginning later that fall. Alas, Kahn would die in New York City in March of 1974 with the building structure reaching only the second floor. The firm of Pellecchia and Meyers, comprised of two



01 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966–1977.
© Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

of Kahn's former staff, Anthony Pellecchia and Marshall Meyers, was hired by Yale to oversee the completion of the project. Construction was substantially concluded in 1975 and the Center opened its doors to the public in April of 1977 following the moving and installation of the collection and the staff.

...You see, we consider the building itself to be the largest and most complex work of art in the collection'.

Crisis and conservation

In a building as well-cared for, well-loved, and well-endowed as the Yale Center for British Art, a reasonable person might ask, why would one need to embark on a large-scale building conservation project? However, as she assumed directorship of the Yale Center for British Art in 2002, it was already clear to Amy Meyers that Kahn's building, approaching its fourth decade of uninterrupted use and enjoying an unimagined expansion of staff, collections, and scholarly research, had begun to drift from its original intentions. For example, the Center's Lower Court, an exterior space accessed from a monumental stair from Chapel Street and dubbed by Kahn as the building's "third court", had been disfigured by undisciplined accretions and fanciful alterations that disembodied the court from the Center itself. Incongruous trellises, latticework and small structures haphazardly colonized a space once precisely defined and conceived. Its association with the Center had been completely camouflaged and was largely imperceptible to passers-by on Chapel Street. Even more dire was the failing condition of the stairs themselves. Intended as a monumental public amenity, the steps and the Lower Court had become dangerous, unusable and unsightly and signaled the most visible symptom of a larger illness looming on the building's horizon. Similarly, many the building's infrastructural systems, so crucial to maintaining the proper environments within the museum, were showing signs of desperate fatigue. A pre-emptive strike was necessary.

Recognizing the inefficiency and potential damage of addressing such necessary repairs in a piecemeal fashion, Meyers instead directed her attention to a comprehensive assessment of the building so that larger priorities could be identified, policies regarding renewal and preservation



02 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966–1977.
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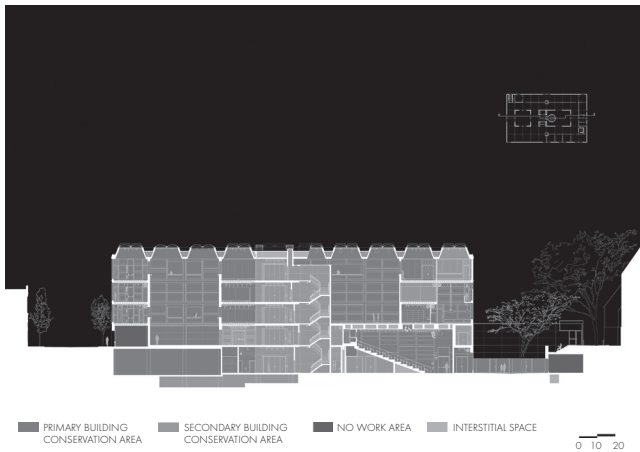
established, and a deliberate process instated towards tactically addressing mounting needs in the building. Meyers commissioned the London-based conservation architects, Peter Inskip + Peter Jenkins Architects, to embark on a study of the building which ultimately resulted in the book *Louis I. Kahn and the Yale Center for British Art: A Conservation Plan* written by Peter Inskip, Stephen Gee and Constance Clement and formally published in 2011².

The book served as an instrumental guide to the subsequent research, design, and construction of a multi-phase Yale Center for British Art Building Conservation Project from 2008 through 2016 led by Knight Architecture LLC³. Spanning virtually the entire building at various levels of intensity, the work, particularly that executed from 2013–2016, addressed the following four interconnected categories: finishes, program spaces, systems, and patron amenities and life safety.

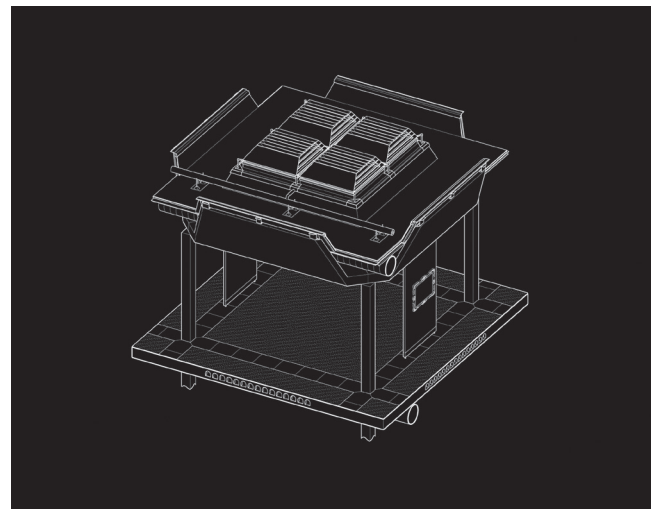
Kahn differentiated himself from other architects by saying that he was "premise-minded" rather than "solution-minded". His method was to eliminate peripheral or transitory considerations which he called, "circumstantial", in order to get back to first principles. Indeed, as Kahn put it, he wanted to get back not to the number one but to the number zero⁴.



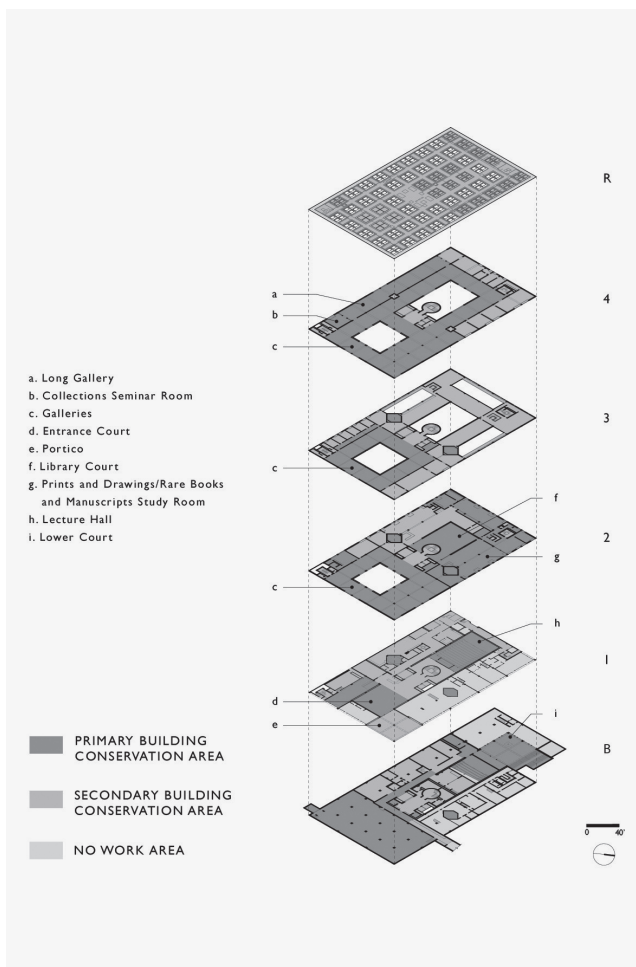
03 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966–1977.
© Knight Architecture LLC.



04 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966-1977. Longitudinal section. © Knight Architecture LLC.

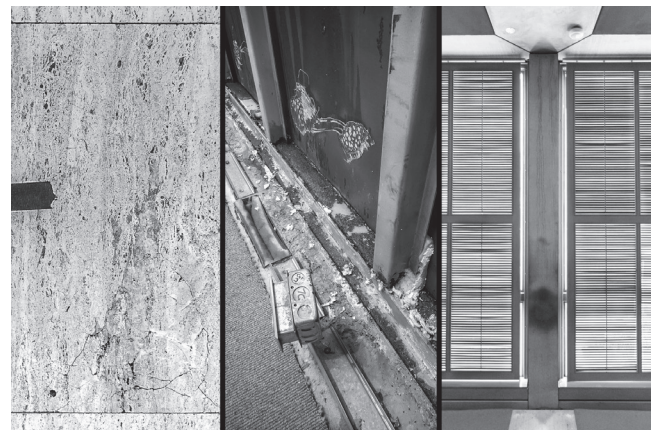


05 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966-1977. Fourth floor bay axon. © Knight Architecture LLC.



06 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966-1977. Axonometric floor plans indicating areas of conservation during building conservation project. © Knight Architecture LLC, Daphne Kalomiris, 2016.

07 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966-1977. Existing condition of original materials prior to building conservation project. © Knight Architecture LLC, Daphne Kalomiris, 2014-2015.



08 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966-1977. Prints & Drawings and Rare Books & Manuscripts Reading Room. Left: pre-conservation. Right: post-conservation. © Left: Knight Architecture LLC, Dylan Hayn, 2011. Right: Esto, Elizabeth Felicella, 2016.

Finishes

The Yale Center for British Art features a restrained palate of interior finish materials that confer a serene sense of order and continuity throughout the building. Kahn selected each material used in the building as a means of coding program and uses, of delineating hierarchies of served and service spaces, and of establishing an aptly stable backdrop for the exhibition of the collection. He favored the use of natural materials to synthetic one due to the former's inherently more animated, and thereby humane, qualities. For example, gallery and office floors are covered in warm-toned carpeting set within margins of Roman travertine that demarcate the building's twenty-foot planning module; stretched Belgian linen ennoble wall surfaces presenting art; unstained white oak trim and paneling frame and focus wall surfaces; and an unusually refined cast-in-place concrete forms the building's gridded structure, ceilings, shear walls and iconic stair tower. As is frequently the case, worn finishes were among the first and most evident signs that the Yale Center for British Art needed revitalization and refreshment.

The Center was originally carpeted with a woven, undyed natural wool carpet as specified by Kahn. Following two decades of wear and tear this carpet was removed in 1998 and was replaced with one of similar color and tone but made of synthetic fibers instead of natural wool. As it came time to renew, once again, this worn second-generation carpet, its material specification was again taken up by architects, conservators and material scientists. Over the course of several months, a suitable substitute was identified. Tufted rather than woven, the new carpet was made entirely of natural, undyed wool and, following a series of mock-up installations within the Center to confirm seaming and performance, a final specification was confirmed.

Roman travertine tiles are installed extensively as flooring in the Center. The stone is used as a margin defining the bay module throughout the galleries, as treads within the central stair tower, and throughout the entrance court as a field material. The naturally brittle and porous travertine had not been specified with any filling slurry and consequently exhibited voids large enough to cause one to catch a heel or otherwise trip. A well-intended but poorly executed campaign of fills years prior had left the stones spotted with darkened patches which proved to be too numerous and too hardened to excavate. Nonetheless, numerous remaining voids were filled with color-matched mortar. Additionally, cracked tiles throughout the galleries were lifted, mended, and reset on new setting bed. In a handful of cases, new tiles were either fully or partially installed. In these instances, new materials were obtained from the same geological source as the original. Finally, to avoid future cracking of the tiles, each stone was sounded for any voids in the setting bed. Where found, a small hole was drilled in the stone and a filling mortar injected.

Linen wall covering, trimmed in white oak, is used throughout the Center on those walls which are intended to present paintings. As was the case with the carpet, the original linen within much of the gallery space was replaced in 1998. Due to the wear of frequent mounting and



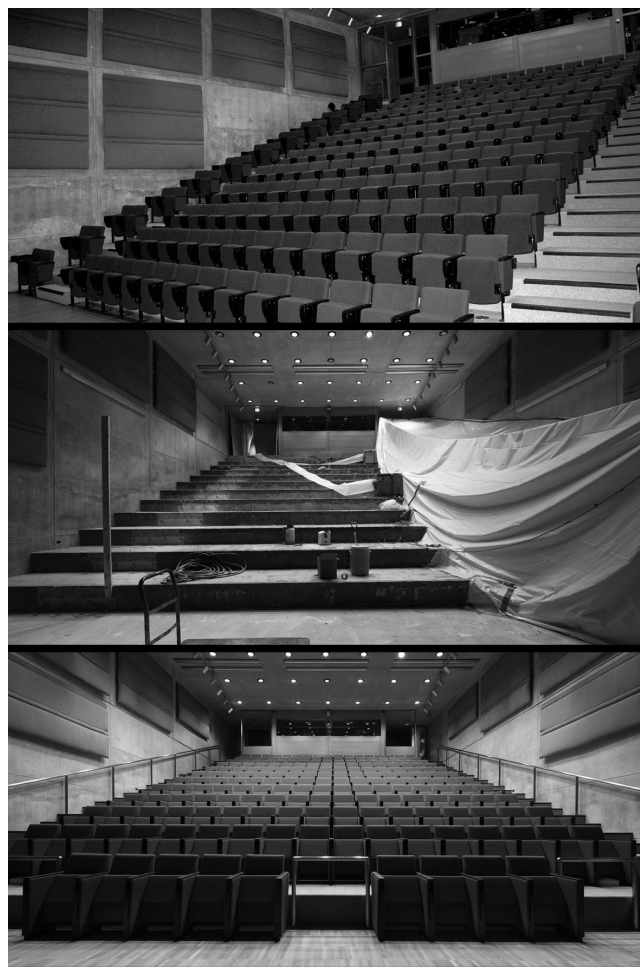
09 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966-1977. Fourth floor "Turner Bay" displaying the exterior wall sequence that was typical throughout the project spaces. Top to bottom, left to right: 1) pre-conservation, 2) exterior panels, 3) insulation, 4) air barrier, 5) substrate, 6) finishes, 7) post-conservation. © 1) Yale Center for British Art, Richard Caspole, 2007; 2-4) 2015, 7) 2016, 5-6) Knight Architecture LLC, Daphne Kalomiris, 2015.

dismounting of paintings using threaded fasteners and the material's propensity for staining when handled, the material had grown unsightly and in need of replacement. After trialing various weaves and supplemental applications of flame retardants and stain inhibitors, a suitable natural-flax linen produced by the Belgian mill, Libeco, was approved. The linen reinstallation precipitated a reconsideration of the substrate beneath and, following a series of trials to confirm screw-holding properties, fire-retardant plywood was selected to replace the sorely degraded and non-retardant particle board from the original installation.

The Center's interior concrete finishes, entirely cast-in-place except the pre-cast "V-beams" forming the ceiling of the fourth floor, remain in remarkably good condition. While investigations and trials were conducted to determine if long-existing calcium scaling on ceilings in the galleries could be removed, it was determined that these features were inherent to the material and as such a welcome presence. The prevalence of staining from human-derived oils was another matter. A dark, oily stain demarcated human head and hand levels across concrete surfaces throughout the galleries. A poultice treatment was devised



10 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966–1977. Long Gallery. Top: pre-conservation; center: construction; bottom: post-conservation. © Top: Yale Center for British Art, Richard Caspole, 2014. Center: 2015. Bottom: Yale University, Michael Marsland, 2016.



11 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966–1977. Lecture Hall. Top: pre-conservation. Center: construction. Bottom: post-conservation. © Top: Knight Architecture LLC Daphne Kalomiris, 2013. Center: Yale Center for British Art, Richard Caspole, 2015. Bottom: 2016.

to remove the soiling while assuring that the concrete “fines”, the microscale particulate which confers the unusual smoothness to the Center’s concrete, were not removed.

One of the Center’s signature materials is unstained American white oak millwork which is used as running-trim framing linen exhibition walls, as doors and window shutters, and as expansive paneling in numerous locations throughout the building. A warm counterpoint to the comparatively cooler and harder finishes in the building, Kahn uses wood throughout the building to invite human contact and confer nobility to spaces. With modest maintenance over the years, wood surfaces had lost their original lustrous finish particularly in those areas where they received direct sunlight. Additionally, hardwood sills in various locations suffering from the effects of imperfect condensation management exhibited signs of discoloration, mold and even rot. Throughout the Center, putties and filling materials used to conceal the fasteners in the trim had become conspicuous and unsightly. The far-reaching extent of the building conservation project presented the opportunity to comprehensively restore, and only in a handful of instances replace, the millwork throughout the galleries and the two

atria – the entrance court and the library court. Particularly in the case of these multi-story spaces, the wood responded beautifully to cleaning and refinishing, regaining its honey-toned sheen. Even the parquet flooring of the Library Court, restored with a soy-based finish, gained greater depth and complexity.

An early phase of the building conservation project, focused on the renovation of the Center’s Study Room and Rare Books and Manuscripts Reading Room, double-height spaces surrounding the Library Court. In each space, existing linen panels lining the room’s upper levels were replaced with wood ones. The decision to do so was based on drawings discovered in Kahn’s archive which had called for such a finish treatment but which had never been executed – presumably due to cost-control measures at the time of construction. In this circumstance, the adoption of Kahn’s premise that wood not be stained required accepting a discernable difference between the new material and the existing.

In addition to the restoration, renewal and replacement of existing finish materials, the work of the building conservation project called for the installation of materials

intended to seamlessly extend the existing finishes. In each case, care was taken to study the physical properties of the original materials, their sources, and the construction techniques used in their assembly. All new materials were sampled, compared to their precursors, and mocked up prior to being accepted into the work. These materials included concrete masonry blocks and mortar, anodized aluminum ductwork, 2D finish stainless steel, painted steel, and brick flooring. Most challenging among these was the demand for a small quantity of “pewter stainless steel”, the grey, metal cladding used on the exterior of the Center. Despite extensive research into the creation of this material and numerous replication experiments, it has proven to be virtually inimitable. Nonetheless, as part of the restoration of the Lecture Hall Lobby, small sections of the material were successfully created by a local metal fabricator, Engineered Building Products.

Program spaces and elements

Though most commonly understood as a museum building, the Yale Center for British Art was designed for a diverse program including exhibitions, lectures, seminars, individual study, research, administration, security and invigilation, photography and imaging, staff lounges, workshops, retail spaces, and extensive mechanical spaces. Kahn considered each of these uses and carefully distributed them within the building to achieve the greatest aesthetic effect and most logical arrangement of functions. However, as it approaches its fortieth anniversary, the Yale Center for British Art, a thriving component of a larger thriving academic institution, has grown beyond many of its originally foreseen needs. For example, its ever-expanding and diversifying collection has demanded increased space for storage, curation and conservation. The increasingly vigorous exhibition schedule, frequently featuring borrowed work from global partners, has required that the Center expand its staffing in all categories. The demands for teaching spaces which can access the collection has grown dramatically. These factors, along with the integration of familiar digital technologies, made it clear that the Center’s original program was under stress and with it, the integrity of Kahn’s architecture. Several projects affecting the building’s programming ensued from this deliberation including the following.

Set within beautifully mottled cast-in-place concrete walls, the Center’s raked, two hundred seat Lecture Hall is one of the building’s most beloved spaces. While the hall was initially envisioned for the presentation of slides and lectures, its elegance has made it a favorite venue for diverse uses such as films, dramatic performances, music, and even dance. The space was comprehensively renovated including the replacement of all seats, carpeting and stage flooring – all of which had exceeded their reasonable lifetime; new step lights and power outlets were installed to conform with contemporary demands; the seating arrangement was slightly altered to allow for the inclusion of handrails; accessible seating was distributed throughout the space; original theatrical lighting, long since obsolete, was replaced with highly versatile LED fixtures; and the

antiquated equipment within the projection booth was completely replaced to expand capabilities for lighting control, amplification, recording, and broadcasting.

The building conservation project offered the chance to rescue a number of spaces adjacent to the lecture hall that had been colonized for use as storage. For example, an underused and long abandoned set of basement bathrooms near the Lecture Hall’s lower egress were converted into an imaging room offering x-ray, infra-red, and photography facilities to better study the collection; a small transitional space was reconceived as a “green room” to support the expanded performance repertoire of the Lecture Hall; and the Lecture Hall Lobby, an elegant, glazed space opening onto the Lower Court, was reclaimed from use as a back-of-house storage.

To supplement the exhibition walls found throughout the building and atria perimeters, Kahn had planned demountable exhibition panels, dubbed “pogo panels” or more simply “pogos” referring to their compression-pole structure, which could be deployed throughout the galleries according to the design of a given exhibition and the predilections of a given curator. Kahn’s incomplete design for the pogos was significantly altered by Pellechia and Meyers following his death in 1974. Consequently, the pogo panels installed in the building at the time of completion and altered over the course of a replacement campaign in 1998 had significantly drifted from the original vision. Additionally, the panels had proved problematic for the increasingly frequent mounting and taking down of exhibitions at the Center. The Building Conservation Project afforded the chance to reconsider both the aesthetics of the pogos and their engineering. Along with numerous technical improvements which bolstered the resiliency, strength, handling, and mount-ability of the pogos, the new pogos feature notable aesthetic alterations. The latter raise the base of the pogos approximately three inches above the floor to allow light and air to pass beneath and alter the edge detail where white oak blocking is inserted into, rather than applied atop, the sides of the panels. Each of these modest measures was included in Kahn’s sketches and has dramatically reinforced the impression of continuity of space within the galleries.



12 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966-1977. Fourth floor gallery following building conservation project featuring redesigned “pogo” walls. © Yale Center for British Art, Richard Caspole, 2016.



13 Louis Kahn, Yale Center for British Art, New Haven, USA, 1966-1977. Library Court following building conservation project. © Yale Center for British Art, Richard Caspole, 2016.

The Long Gallery is a linear exhibition space on the south side of the sky-lit fourth floor which was originally envisioned by Kahn and Jules Prown, the Center's founding director, as a teaching space within the galleries. However, with large pogo panels dividing the space, sparsely hung paintings, and ill-coordinated doorways, the aspiration for the longitudinal study gallery had never been fulfilled. The building conservation project restored this vision by removing the partitions, altering the configuration of the doorways to promote more logical circulation, and reinstating the dense, "salon-style" hanging of pictures. In addition, an office space at the end of the long gallery was transformed into the Collections Seminar Room, a newly wood-paneled space where works in various media can be presented in an intimate setting.

With a growing collection and increased staff in the Rare Books and Manuscripts and Prints and Drawings curatorial departments, there was a dire need for expanded art storage and office space. Taking advantage of space formerly dedicated to filing and typing rooms, the building conservation project refashioned both private offices as well as group workspaces in these rooms, original metal desks specified by Benjamin Baldwin were reinstated and complemented by the addition of refabricated furnishings such as wall-hung bookshelves, coat closets, and bulletin boards. To accommodate an ever-growing collection of works on paper, numerous newly-made white oak art storage cabinets, designed to match those designed by Kahn, were added throughout. Similar improvements to the administrative offices on the fourth-floor relieved desper-

ate overcrowding and regained the generous order of the original arrangement.

Systems

Kahn is noteworthy among modern architects for the care with which he considered the design of a building's support infrastructure or what he termed its "systems". For Kahn, these elements merited comparable architectural design and authority as those spaces hosting a building's primary functions. His oft-cited distinction of "served" spaces and "servant" spaces frames the strategy and is vividly exemplified throughout the Center. As a building dedicated to the exhibition and preservation of art, the Center has especially demanding criteria for such services as air-quality, air-pressure, temperature, humidity, lighting control, security, smoke detection and management, and back-up power among others. Most of these critical systems had reached the end of their serviceable lives and required significant repair or outright replacement. In addition, numerous new systems, unimagined at the time of the original design, had already begun to invade the building and jeopardize its carefully conceived architectural order.

The building conservation project began by addressing obsolete and under-performing existing systems. Unearthing an existing area-way in the parking lot, otherwise concealed beneath asphalt, gave access to the Center's vast mechanical room. A large bank of electrical switchgear, referred to by Kahn with his frequently used anatomical analogs as the building's "heart", was replaced by a version smaller, more resilient and more efficient; wiring, or the

building's "nervous system", was largely replaced to conform to contemporary standards; and provisions were made to better integrate with the University's centralized back-up power source. Similarly, the building's two air handling units, or "lungs," were substantially rebuilt in place. In both cases, new fans, controls, humidification, filtration, and coils were introduced to offer higher performance while ensuring greater resilience.

Not surprisingly, fire and smoke suppression were issues of enormous concern to the Center – both for the safety of patrons and for the preservation of the collection. While large metal fire shutters had been installed in the numerous openings surrounding the building's atria when the Center opened to the public, they were soon after deemed non-functional. Similarly, smoke detectors were not positioned to perform effectively and were near-impossible to maintain; and stairway doors were not designed to close in case of emergency. Each of these deficiencies was corrected over the course of the Building Conservation project by reworking existing building components and employing technologically advanced devices such as air sampling systems and magnetic door hold-opens. More challenging was introducing sprinklers, required by fire codes, throughout the Center's office spaces, classrooms, laboratories, atria, lounges, storage spaces and most of its gallery space. Recognizing that this fire suppression system was essential – though one not planned with the original building – the design objective was to ensure not that the sprinklers were invisible (a physical impossibility) but that they harmonized with the spatial and material disposition of the building.

The building had suffered several campaigns of well-intended technological upgrades that included security cameras, sensors, Wi-Fi access points, alarms, strobes, exit signage, proximity readers, and key management devices. Each of these efforts had left a predictable residue of exposed conduit, mismatched components and discrepant positioning. The comprehensive extent of the Building Conservation project allowed for the consolidation, simplification and coordination of these elements. Kahn had dubbed these conspicuous devices "fraternity pins" such as those he must have noticed on the lapels of students at Yale and the University of Pennsylvania. His original design included several strategically located wood and metal stiles, lapels, on which such devices could be positioned in an orderly and inoffensive way. These stiles were used extensively and even added in several critical locations to host new devices required by contemporary systems.

A building's exterior envelope is a critical component to the performance and resiliency of a given structure, particularly one enclosing irreplaceable works of art. While the Center's exterior envelope had successfully prevented rainwater from entering the building, its thermally-bridged wall construction and insulation assembly were not sufficiently designed to account for the condensation that, on the coldest New England evenings, would propagate due to the temperature and humidity requirements of an art collection environment. The building conservation project addressed the persistent and ultimately corrosive condensation by

stripping off all finish and substrate materials to the inboard face of the exterior metal cladding; de-scaling corroded steel framing and recoating it with a resilient primer; re-insulating the walls with non-gas-emitting rock-wool insulation packed tightly into the wall assembly; and installing a galvanized metal air-barrier and providing concealed stainless steel reservoirs set on the warm side of the wall into which the unavoidable condensation is diverted and from which it ultimately evaporates into the gallery environment.

Kahn worked closely with lighting designer Richard Kelly and manufacturer Edison Price in designing the artificial lighting for the Center. Comprised entirely of aluminum tracks suspended from the concrete ceilings and fitted with metal fixtures coordinating with the cylindrical ductwork and handrails, the lighting emits a warm glow throughout the gallery. At the outset of the building conservation project, the most precarious of all the systems was arguably the lighting controls which relied on dimmer panels for which replacement parts were long since unavailable. The building conservation project replaced this outdated control system completely and, ever interested in opportunities to reduce energy consumption, undertook an analysis of LED lighting as an alternative to the halogen lamps which had been used from the outset. Working through numerous mock-ups and trials, such criteria as color, temperature and color-rendition were evaluated. Ultimately the Center determined that, though LED technology continues to improve dramatically, the warm quality of the lighting could not yet be properly replicated. The anticipated transition to the LED was therefore deferred until such time as new lighting could be more certainly matched to that from the original lighting.

Patron amenities

From the outset, the Yale Center for British Art has always endeavored to offer an inviting and serene setting to visitors. Kahn was cognizant of "museum fatigue" and ensured the galleries included comfortable seating where patrons can re-energize themselves; large windows offer refreshing views of the city and the Yale campus from within the galleries; and the Center even boasts national recognition for its accessible design. Seeking ways to make visitors more welcome and comfortable the building conservation project introduced numerous improvements to the suite of patron amenities and life-safety provisions already in place.

These upgrades included new white oak storage lockers, evoking the millwork details found throughout the building, for backpacks and book bags; two new gender-neutral accessible restrooms and an accessible drinking fountain; the replacement of original gallery furnishings designed by Don Chadwick with fire-resistant versions of the original, also by Chadwick; a new egress door from the Entrance Court to the service hallway; miscellaneous improvements to the control and operation of the elevators; installation of fire-retardant materials throughout; abatement of hazardous materials in a number of locations; and increasing the safety and resiliency of stairs, glazing, and rainwater systems throughout the Lower Court. In all cases, the work was designed to coordinate with

existing, original features within the building and intended to extend the sense of welcome, security and gracefulness so characteristic of Kahn's architecture.

Conclusion

As his buildings pass into their second half-century of use, Kahn's architecture faces an inevitable point of reckoning. Fatigued materials need to be refreshed, repaired, or replaced wholesale; functional elements need to be reconsidered for contemporary uses; ingeniously integrated systems, even ones entombed within the fabric of a given building, need to be assessed and re-engineered; and ubiquitous alterations are required to ensure that the buildings conform to current standards of safety, comfort, and usefulness.

These factors, if not addressed with care and consideration, imperil the integrity and enduring appeal of Kahn's architecture. The Yale Center for British Art building conservation project profoundly benefited from the following steps orchestrated as a preemptive strike against such threats.

The Center's prescient commissioning of Peter Inskip + Peter Jenkins Architects to undertake an exhaustive study of the Center's history and material substance proved invaluable. The publication *Louis I. Kahn and the Yale Center for British Art: A Conservation Plan* was used extensively, even in manuscript form, to guide the conceptualization, design and execution of numerous ensuing projects. Equally importantly the book, with its authoritative research, lavish illustrations, and professional presentation, cultivated due appreciation of the building's value amongst staff, users, affiliates, patrons, and university leadership. Without this institutional recognition, the building conservation project could never have summoned the necessary clarity and authority to proceed.

In 2009 the Center implemented a simple but vitally important step to relieve the mounting strain on Kahn's building. Taking control of an underutilized building recently procured by the University two blocks to the east, 270 Crown Street, the Center relocated several space-starved administrative departments which did not require occupancy in the Kahn building. While not satisfying all the programmatic demands threatening the arrangement of spaces in the building, the expansion did relieve the most immediate pressures and, in doing so, allowed for sufficient time to comprehensively consider the alterations and improvements required to serve their contemporary mission.

Throughout the work, the team profited from the use of mock-ups and field samples that allowed for the deliberate evaluation of various building elements. Inevitably time-consuming and frequently incurring additional cost, the opportunity to sample aspects of the work in place was essential to the success of the project.

The constraints of schedule and funding on any project are inescapable and always influence the outcome of the work. One of the most productive and liberating criteria of the Yale Center for British Art Building conservation project was to allow the work to occur over a series of projects rather than within one comprehensive campaign. For example, most of the work described above occurred over

the course of eight years and within three broadly defined projects. By pursuing such a deliberate and incremental approach, the Center managed the cost and impact on its operations, staffing, and special projects. Underlying this approach is the acceptance that the work of conservation is never complete. Indeed, at the time of writing additional work is being identified and is certain to persist into the foreseeable future⁵.

I know of no other architect as cognizant and inspired by the effect of time on a building's design and construction as Kahn. His lifelong fascination with architectural ruins, memorialized by his poignant sketches of antique sites, is evident in the design of the Center which, like so many of his buildings, is comprised of materials encoded with a sense of their relative permanence. Given Kahn's predisposition, each generation of his building's conservators, despite the struggles and consternations ever associated with such work, can be encouraged to know that the building itself is ever-moving towards an inevitable future beyond all pragmatic concerns — one that was envisioned by Kahn at its outset.

Notes

- 1 Amy Meyers, YCBA Director. Oral, not written, statement.
- 2 Peter Inskip, Stephen Gee and Constance Clement, *Louis I. Kahn and the Yale Center for British Art: A Conservation Plan*, New Haven, Yale Center for British Art, 2011.
- 3 Credits: Knight Architecture LLC: George Knight, AIA; Daphne Kalomiris; Niko Tombras; Megan Milawski; Jeffrey Pollack, AIA; Kyle Dugdale, AIA; Dylan Hayn; Thomas Day; Dan Shea; Amrita Raja; Britton Rogers. Yale Center for British Art; Yale University Office of Facilities; Turner Construction Company; Peter Inskip + Peter Jenkins Architects; BVH Integrated Services, PC; Wiss, Janney, Elstner Associates, Inc.; Cavanaugh Tocci Associates; Hefferan Partnership Lighting Design; Staples & Charles Ltd; Philip R. Sherman, P.E.; Michael Morris Strong Cohen LLC.
- 4 Jules David Prown, *The Architecture of the Yale Center for British Art*, New Haven, London, Yale University Press, 1977, 18.
- 5 The Yale Center for British Art Building Conservation Project has been recognized with the following awards: AIA Institute Honor Award for Architecture (2017), AIA New England Honor Award for Historic Preservation and Adaptive Reuse (2016); AIA New England People's Choice Award (2016); AIA Connecticut Honor Award (2016); Connecticut Trust for Historic Preservation Award (2017), Society for College and University Planning Excellence in Architecture Honor Award for Building Additions, Renovation or Adaptive Reuse (2017), **docomomo** Modernism in America Design Award of Excellence | Civic (2017).

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Preservation, Restoration and Upgrade of the Indian Institute of Management in Ahmedabad, India

BY BRINDA SOMAYA

Indian Institute of Management in Ahmedabad (IIMA), is under an ongoing conservation project to preserve, restore and upgrade the built fabric of the iconic and modern heritage structures designed by Louis I. Kahn, in India. These include eighteen dormitory buildings and the main complex (the school) housing four faculty blocks, the classroom complex and the Vikram Sarabhai library building. The project entails carrying out a detailed study of the cultural significance of the buildings, conducting surveys for preparation of as-built drawings, building condition mapping and assessment, preparation and execution of a detailed conservation plan and strategies for restoration, retrofitting and upgrading the built fabric along with its spatial expression, with due consideration to both its status as a significant work of 20th century monumental architecture and as a premier management institute of the country.

Somaya & Kalappa Consultants (SNK) were appointed as the conservation architects for the project of preservation, restoration and upgrade of the Indian Institute of Management in Ahmedabad (IIMA), in 2014. The first step was to understand the story of evolution of IIMA campus and the cultural significance of its buildings; not only with respect to Louis I. Kahn's design but also its contribution as modern built heritage from India's post-independence period.

The IIMA and Louis Kahn

Modern India

The introduction of Modern Movement ideas within Indian architecture was brought by European schools of thought, in particular the practices introduced by the British during its colonial rule. In Indian society, the idea of being "modern" was considered as an overall approach towards life, an inventive and progressive way of living with better standards and adopting modern technology, including the ideas of futuristic minds like Jawahar Lal Nehru (1889–1964). This was particularly evident in 1911, when the capital of British India shifted from Calcutta to New Delhi and a new form of modern architecture was introduced: a blend of European style with Indian elements, by Edwin Lutyens (1869–1944) and Herbert Baker (1862–1946), defining the new and progressive India.

However, after the Independence (1947), Chandigarh, the "dream city" of India's first Prime Minister Jawahar Lal Nehru (1947–1964), planned by Le Corbusier (1887–1965), became the modern symbol of newly independent India. In the 1950s, Le Corbusier was

invited to design the Mill Owners' Association Building and Villa Sarabhai, in Ahmedabad. The architect Balkrishna Doshi (1927–) — who had worked for Le Corbusier in Paris (1951–1954) — invited Kahn to execute a master plan for the nascent IIMA. Thus, Kahn became the next significant architect for India. His buildings, combining a pure expression of material and monumentality with regional elements, went beyond the mere concepts of functionality, giving rise to a new dimension to Indian modern architectural design.

A IIM in Ahmedabad

Ahmedabad was chosen as the capital of Gujarat state after the bifurcation of the Bombay state on 1 May 1960. With classical and colonial European styled buildings lining the city's streetscapes, Ahmedabad became a metropolis, and a center of higher education, science and technology, through the establishment of many educational and research institutions. In 1961, at a time when professional management was a little-known concept, Vikram Sarabhai (1919–1971) and Shri Kasturbhai Lalbhai (1894–1980), with the support of the then-Chief Minister of Gujarat, Jivraj Mehta (1887–1978), and a group of enlightened individuals, founded and established the IIMA.

In a true spirit of public private partnership, the IIMA was set up through a coalition of central and state governments, local industrialists, the Ford Foundation and the Harvard Business School. The founders wanted the IIMA to generate knowledge that would be applied for development, and every move made towards its establishment strove for excellence.

Despite the founders having initially offered the commission for IIMA to architect Balkrishna Doshi, Doshi recommended Louis Kahn for the project, arranging the commission so that the architecture students at the National Institute of Design would have the opportunity to work with him. Kahn translated this educational philosophy into infrastructure by designing spaces that supported and promoted easy personal interaction and provided inspiration. He achieved what every architect strives to achieve: the embodiment of a philosophy in a timeless structure.

Introducing Kahn's architecture

Architecture has to have the element of time. How can you judge a work today, let's say a work by anyone among these well-known architects that is exciting and wonderful? And then what will happen to it 20, 50 years later? That's the measure. That is why the Salk Institute will always be as perfect as it was conceived. The teak wood may fade away... probably did or has... but the spirituality of that project will remain. Now that building will withstand the test of time, no question about it.

Monumentality, timelessness and spirituality are elements that formed a part of the legacy of Kahn. IIMA demonstrates the poetry of light and the creation of monumental architecture beyond the human scale. Encouraged by the appreciation of the traditional city fabric and inspired by its ruins, Kahn absorbed relevant experiences of Indian architecture — the medieval Mughal monuments, the 20th century buildings of Lutyens in New Delhi and Le Corbusier in Chandigarh — to concept the building.

Kahn conceived the IIMA with four functions: the school, dormitories, faculty housing and staff housing:

The school and the dormitories are a unit, like a monastery. Corridors are avoided by having deep porches, off all the dormitory rooms, where tea is served and things are discussed. The school is around a court which has in it an amphitheater. Everything here is planned around the idea of meeting².

He referred to institutes as "houses for inspiration", places that were defined by the need to shelter learning within a supportive community through a combination of collective and individual activity. This, combined with his interest in exhibiting the idea of



01 Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962-1974. Construction of dormitories. © UPENN Archives, SNK, 1960s.

urban planning and appreciation for monastic solitude, influenced his design for IIMA, where spiritual qualities were transformed into strong and monumental structures. From the initial conceptualization of IIMA (1963) to 1974, numerous master plans were put forth, evaluated and modified due to the client's requirements and cost-related issues.

I made all these buildings answerable to each other even though the scale of the house and the school is so different. The material of brick bearing walls and piers with concrete floors is retained throughout the larger spans giving rise to arches and buttresses, the more modest spaces simple slabs on walls. Consistent with the order of brick construction and the introduction of concrete, the concrete combines with the characteristics of brick in the making of the flat arches. In the houses, where there is not sufficient dimensional expanse to use a full arch, concrete restraining tension beams are introduced to counter the thrust of the flat arches³.

Blending modern architecture and Indian tradition, the IIMA planning, with walkways and arcades interconnecting the blocks, reflects the streets of the old city of Ahmedabad, while the use of local materials pay homage to the Indian vernacular culture. Kahn was fascinated with brick as a building material; while before he had used brick as a veneer, in IIMA he used it as a structural material. Several mock-ups and test constructions were done to demonstrate the construction of brick arches and the bricks used were hand-molded and cut to shape at the site.

Kahn's architecture under restoration

The school building and the dormitories form one unit that is interconnected with passages, courts and the Village Street. These buildings were executed from 1964 to 1975 and cover an approximate built-up area of 396,690 sq ft (36,854 m²) and site area of 8.3 acres (3.36 ha).

The school building comprises the library, classroom complex and faculty blocks with the Kahn Plaza at the center. The main entrance to the school building is located on the east with a ceremonial entry from the mango tree leading towards the Harvard Steps.

The Vikram Sarabhai library building is divided into two wings by a central staircase. One wing is the stack area and on the other side there's the main entrance lobby on the first floor and a reading hall on the second floor. The library counter is located at the entrance on the first floor.

The library is an important element of the court. It was given greater authority and presence, becoming almost freestanding at the head of the court when its site was adjusted to accommodate the mango tree at the entrance.

The elevations correspond to the needs of the building. The north-east elevation was constructed using piers that were required to take the loads of the book stacks, with the solid load bearing walls protecting the triple height of the reading room. The oculus is supported by a brick ring beam without any concrete ties. Facing problems with the glazing of the circular oculus, Kahn experimented small scale aluminum sections. However, the existing heavy timber members are designed by Anant Raje (1929-2009).

In classroom complex, each classroom is designed as an amphitheater, a semi-circle of seating set within a square, as Kahn believed this would increase active participation between the students and the teacher. The entry foyer, which is shared with the neighboring classroom, forms a gathering space very illuminated and well ventilated. Generous meeting spaces between the rooms, and a long open corridor connecting them, represents his belief that learning should continue outside the classroom as well. The long corridor terminates in two-story porches on either end, each lit by a giant oculus. The ground floor of the complex serves as administration offices. On the rear elevation, the

walls are buttressed with outward stepping.

The faculty blocks are located on the south-west side of the court connected by a long cloister similar to that of the classroom complex on the east wing. The corridors also connected to the individual courts that separate the faculty wings. The faculty wing is divided into rooms on either side of a central passage.

In the Kahn plaza, the court was never intended to be open on the north-west end but was meant to be enclosed by the construction of a dining hall. The hall was to be serviced by a circular kitchen, designed to ensure the smell of cooking would not permeate the court. However, in 1974 after Kahn's death, the dining hall was redesigned by Anant Raje and situated at its current location, leaving the court open.

Currently the court is used for convocation ceremonies and other important activities. It is one of the main features of the old campus.

Concerning dormitories: while D1 to D15 were constructed initially (1964-1969), D16 to D18 were constructed at a later date (1971). D1 to D15 are triangular in plan with two sides comprising rooms with a central court used as a communal space and the main staircase extending as a semicircular block through this space. The pantry and bathing facilities are housed in an attached service block.

The ground floor of the perimeter blocks was intended to have double height arcades used for common and general purposes. However, in the present day they have been converted to rooms to increase the existing capacity of the dormitories.

D16 to D18 responded to a different program, and so the service blocks are located at both ends of the row of student rooms.

Building condition assessment

From 2014 to 2015, detailed condition mapping of the school building and 18 dormitories were carried out by SNK to understand the



02 Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962-1974. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

extent of deterioration in the external and internal built fabric. Non-destructive tests were carried out to analyze the state of the building materials such as brick, concrete, cement mortar, reinforcement bars, condition of structural members, and the soil.

The main causes of deterioration of these buildings were the techniques used for construction and localized repair carried out thereafter. It was found that cover blocks used during the reinforced cement concrete construction were either absent or inadequately sized leading to the carbonation of the slab to its full depth. Concrete encasing was not used to protect the embedded reinforcement bars in the brickwork to prevent the bars from rusting and today the rusting of these bars has led to the cracking of the brickwork. Bricks used at IIMA were found to be the second-class bricks as per IS 3102-1971 with average compressive strength of 4.89 N/sqmm and with inbuilt efflorescence. These were found to be made from the local soil available, hand molded and kiln fired. Due to use of such type of bricks and the brick edges being blunt, face filled pointing was used to hide the blunt edges. When such type of pointing gets damaged, it allows the collection of water causing further damage and ingress of the water into the masonry. Cement mortar repairs have been carried out on the exposed brick façade blocking the breathability of the existing exposed brick surface. New layers of terrace waterproofing have been added without removing the old and damaged waterproofing which has led to the damage of the terrace slab.

The dormitories

The dormitory buildings were the first set of buildings taken up for construction, with dorms D1 to D15 built between 1964 and 1969 and dorms D16 to D18 added in 1971. It was noticed that D1, D2 and D15 show higher levels of structural distress due to the type of construction techniques used (such as missing or inadequately sized cover blocks). D4, D7 and D10, which are built on built-up ground, show some amount of floor settlement in the passage and staircase area. D16, D17 and D18 mostly show deterioration on the third-floor level where the waterproofing of the terrace has failed, leading to the spalling of RCC slab cover. A change from English to Flemish bond was also noticed in dorms such as D1 and D15. It was found that, when the dorm buildings were built in the beginning of 1964, English bond was preferred instead of Flemish, because it was stronger and, being easy to construct, it probably reduced the quantum of construction supervision required. Due to the inferior appearance of English bond for exposed brickwork, during the construction of the experimental arch (1964), it may have

been decided to switch over to Flemish bond. The closing of the full height vertical opening in the duct wall and reduction of the staircase drum roof (after its collapse during the 2001 earthquake) was also noted. The alterations are not in sync with the original character of the buildings and threaten its cultural significance. These alterations will be reversed and the buildings will be restored as originally planned as far as possible and to the best of its feasibility to respond to the future needs.

The school building

Even though the school building was constructed later (1968–1975), the construction issues seen in the dormitories were noticed there too. Unlike certain dorms, the construction of this building is executed in Flemish bond. Excessive damage was found at the terrace slab with numerous cracks and water leakage in the library building, faculty blocks and the classroom complex. The library was found to be the most affected, with the ceiling revealing signs of spalling and exposed reinforcement bars, and mortar repairs done on the slab in patches. External walls have numerous vertical separation cracks running the full height of the building, and the bottom of the parapet horizontal separation cracks. In the faculty blocks, cracks were found in arches spanning between the two blocks, due to corrosion of the embedded reinforcement bars. During the 2001 earthquake part of the parapet of the classroom complex was severely damaged and had to be demolished. As a part of the building restoration process, this parapet will be rebuilt.

Trial solutions for architectural and structural restoration

On reviewing the condition of these buildings, a list of trial solutions for architectural and structural restoration was formulated by SNK to test the workability and feasibility of these solutions at the site. Final results were approved by SNK and IIMA before the final execution was to be undertaken. The suggested solutions were carried out at the site by contractor M/s Savani Construction Pvt. Ltd. in the presence of the architect's team. These trial solutions were pertaining to various modern and traditional methods of brick façade cleaning (water misting, chemical, poulticing, brush abrasive and abrasive blasting), brick pointing and replacement and the removal of biological growth. A mock-up for structural stitching and repair of RCC slab was also carried out.

It was concluded that using traditional solutions for hard efflorescence cleaning (such as tamarind or vinegar wash) did not

work at the site since the salt deposit on the brick surface is very stiff and strong. This required a specialized chemical cleaning process by using cleaner which water-based having low VOC, over 70% biodegradable and is a fast-acting eco-friendly product, approved in a demonstration by the selected vendor, when trial solutions were being carried out in the presence of SNK and IIMA.

Cement forms a hard substance once it sets. When it bonds with a softer material like brick, it becomes difficult to remove the brick from cement without damaging the brick. Hence, removing the existing incorrect pointing and correcting it would be difficult as this would require the removal of all face bricks — which might end up damaging the structure. It was concluded that repointing will be done for areas only where the existing pointing is either damaged or missing. A trial for reversing the face bricks of the façade and placing the same in position was also attempted to avoid the use of new bricks. However, due to the strong bond of the cement with brick, it took almost 40 minutes to manually remove single brick without damaging the same. Therefore, it was concluded that in this case, where the brick face was damaged, part of it would be removed and replaced with new bricks that matches the finish and the color of the existing bricks while ensuring that the structural stability of the wall is not compromised. This was possible as these bricks were found to be damaged at intermittent locations.

Project planning and execution

After the finalization of the solutions, the logistics and phasing of this project were worked out in detail by SNK. During the building condition study, the library building and dorm D15 were found to require the most immediate attention, being proposed to be included in the first phase of the restoration project. Gujarat is an earthquake prone area, so a seismic analysis of the buildings was carried out by a team of experts from Indian Institute of Technology Madras (IITM), Chennai, in collaboration with the SNK team.

The project execution program and timelines were prepared by SNK in collaboration with IIMA and conservation execution tenders were floated for both buildings in the months of May-June 2016. After detailed analysis and scrutiny of the tenders submitted by various contractors, individual contractors were appointed. During the same period, Jones Lang LaSalle, IP, Inc was also appointed as the Project Management Consultant for this project.

Before the restoration works started at the site for both buildings, a detailed execution plan for their restoration work and phasing

03 Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962–1974. Louis Kahn Plaza. © SNK, 2014.



04 Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962–1974. Experimental arch built to demonstrate the construction under Kahn's supervision in 1970. © SNK, 2015.



was worked out by the entire team of SNK, PMC, the contractors and IIMA. The internal, enabling and scaffolding works were started in the monsoon month, July 2016, followed by the external works, to be executed after the monsoons.

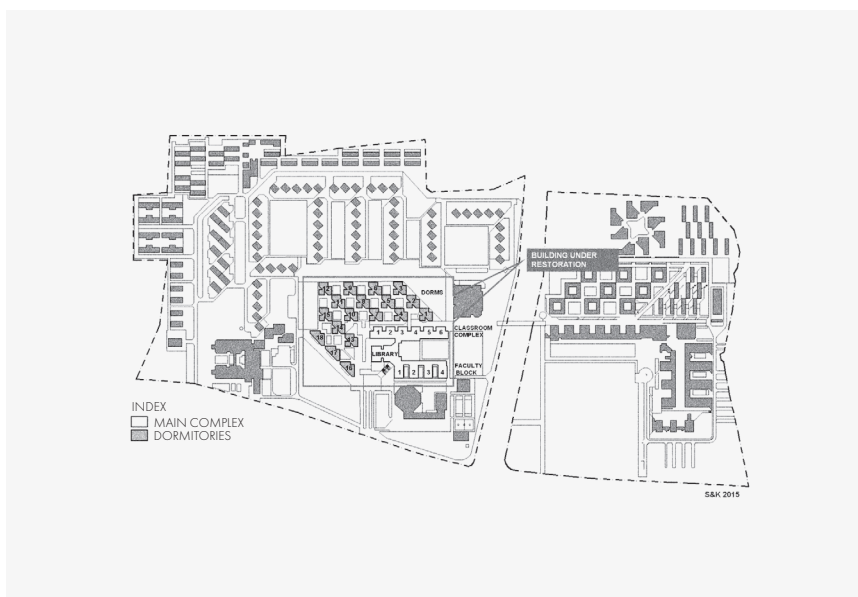
Dormitory D15

D15 was among the first set of dormitories that was constructed at IIMA. Being one of the oldest dorms, it showed a high level of architectural and structural distress compared to others. Hence, it was considered as a pilot project and the overall conservation plan and methodologies carried out at this dormitory can be applied as a base for the rest of the 17 dormitories in the coming phases.

D15 is a boys' dorm that consists of ground and two floors with a mezzanine between the ground and first floors in the toilet block. It covers a built-up area of approximately 1090 m². The dormitory consists of four areas of use – two common rooms (proposed as per Kahn's original design), 10 students' rooms (each on first and second floor), a triangular circulation lobby at every floor (with semi-circular staircase) and a service block (consisting of pantry, electrical room, bathrooms and toilets).

The conservation plan for D15 entails architecture and structure renovation, retrofitting (including seismic requirements) and Mechanical Electrical and Plumbing upgrade. It also includes restoration of architectural features and spaces designed by Louis Kahn that were earlier altered, such as the staircase drum roof and the common rooms on the ground floor.

The exterior conservation work comprises the repair of loading-bearing exposed brick walls, structural retrofitting, brick masonry crack stitching, specialized chemical cleaning for removing efflorescence and biological growth from the brick masonry, damaged brick replacement and repointing, treating



05 Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962–1974. Buildings under restoration. © SNK, 2015.

rising damp, restoring staircase roof, terrace waterproofing repair, restoration of doors and windows.

The interior conservation works includes restoration of internal exposed brick masonry, RCC slabs, masonry grouting, flooring restoration, toilet revamp, re-introduction of common rooms on the ground floor as per Louis Kahn's design, redesigning furniture, upgrade of mechanical, electrical and plumbing services through installation of new HVAC system, new electrical, low-voltage and plumbing lines as per current norms, and new lighting design.

The library building
The library building situated at the apex of the Kahn Plaza was constructed between 1968 and 1975. The library consists of ground more four floors and is divided into two

wings by a central circulation area with two staircases on either side. The reading hall on the second floor is the main feature of the building with a triple height space and large circular openings. The library covers a built-up area of approximately 4580 m².

To work out a conservation strategy for this building, intense brain-storming sessions were carried out between SNK and IIMA. This conservation plan not only entailed restoration and renovation of the existing structure, but also a complete internal re-planning and refurbishment of the library including MEP services that could cater to its current and future needs. During meticulous internal planning process, appropriate measures were implemented to make the library building barrier-free. The silent, quiet and collaborative study zone were also introduced for the students (the collaborative study zone aims

06 Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962-1974. The main reading hall, Vikram Sarabhai library. © SNK, 2014.



07 Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962-1974. Faculty blocks. © SNK, 2014.



08 Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962-1974. Lecture room, classroom complex. © SNK, 2014.



09 Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962-1974. Faculty blocks. © SNK, 2014.

to create spaces for meetings and discussions that are flexible and transparent for enhanced intellectual engagement).

The conservation works undertaken were the same referred in D15, in addition to the reconstruction of 85 damaged arches and of the southeast building, and RCC terrace slab repairs. In the interior it is also important to note that the new lighting design has taken into consideration the requirements of a library.

The restoration work is expected to be completed by May 2018.

Conclusion

Kahn's buildings are not easy to look after. There's a complexity both in the detailing and the structure. Besides, there's also a huge change in today's needs. At the time these buildings were built, systems such as plumbing and electrical services were quite

different and there was no internet; services that have now become such an important part of construction did not have the same importance at that time. Therefore, interventions started to happening over the years, with later consequences. There is a need for "a bigger picture" approach, and I think that is what is great about what is happening now. The board and the director of the IIMA are looking at the entire campus holistically. It's the first time that 20th century buildings are being addressed in this way, in India, and I hope it will set a precedent for other buildings, like Corbusier's buildings in Chandigarh.

Notes

- 1 Architect I. M. Pei on the works of Louis Kahn, from *My Architect, a Son's Journey*, *My Architect, a Son's Journey*. Directed by Nathaniel Kahn, 2003; United States: New Yorker Video, 2003. Film.
- 2 Louis Kahn, *Louis I. Kahn: Complete Work 1935-1974*, Birkhauser Verlag AG, Basel Switzerland, 1977, 291.
- 3 *Id.*

Brinda Somaya

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Louis Kahn in Tel-Aviv

BY JEREMIE HOFFMANN AND HADAS NEVO-GOLDBERST

This paper surveys the historical urban infrastructure and architecture of the School of Mechanical Engineering at Tel-Aviv University, designed by one of the greatest architects of the 20th century, Louis I. Kahn. The paper describes the monumental architecture of the building, which hints subtly to the qualities and complexity of the internal spaces. The structure is the only building ever erected in Israel by Kahn, and became an architectural icon, presenting the best in the Brutalist architectural style to be found in Tel-Aviv-Yafo, alongside other outstanding structures from the same period.

At the top of Tel-Aviv's only hill stands a sizeable gray building that, from afar, looks like the two tablets of stone given on Mount Sinai. Few, if any, know that the building was designed by a Jewish architect who was one of the greatest architects of the 20th century: Louis I. Kahn¹.

For those not physically standing inside Tel-Aviv University's campus, the sole clue to the building's existence is visible only from the Ayalon Highway, a major transportation artery crossing the length of the city. From there, one can spot upon the hilltop two curved, symmetrical façades of exposed concrete, at the tip of a half cylinder, each resembling a loaf of sliced bread, facing eastwards. This glimpse is merely a hint to the complex, large-scale structure that is the Wolfson School of Mechanical Engineering.

To understand the broad historical context of this building's construction, we must return to 1948 and the UN resolution on the founding of the State of Israel. The decision to end the British Mandate in Palestine, and to establish two new national entities in the congested landscape of the Land of Israel, transformed Tel-Aviv overnight from a peaceful, hedonistic city of white utopian Bauhaus architecture into a refuge city for Jewish immigration on an unprecedented scale.

The waves of immigration from countries all over the world, along with the corresponding need to rapidly throw together an infrastructure for the State created overnight, resulted in the most significant construction project in the history of the State, known today as "The Israeli Project"². Hundreds of thousands of new housing units, settlements, and public institutions were established throughout the country as a speedy response to a largely impoverished population of arrivals without economic means. Tel-Aviv served as a cultural and strategic center; as such, within a few short years, three hundred buildings in the Brutalist architecture style

had been erected. Their purpose was to strengthen the city's role as the seat of most of the new Israeli government and cultural institutions³. These include the Cultural Center (*Heichal Hatarbut*), the *Histadrut* Trade Union Building, the Jewish Agency Building, the Farmers' House, the Journalists' House, and more.

One municipal enterprise spearheading the strengthening of national educational infrastructures was the founding of the Tel-Aviv University campus in 1955. The campus was established to aggregate a number of research and higher education institutions active at that time in the city but dispersed throughout several buildings. The decision was made in those years to establish the university's permanent site on land which, prior to the War of Independence, had housed the Arab village of Sheikh Munis⁴. The campus master plan was designed by architects Werner Joseph Wittkower and Erich Baumann, with later collaboration with architects Dov

Karmi, Nahum Salkind and Uriel Schiller, and landscape architects Lipa Yahalom and Dan Zur. The campus was inaugurated on November 4, 1964.

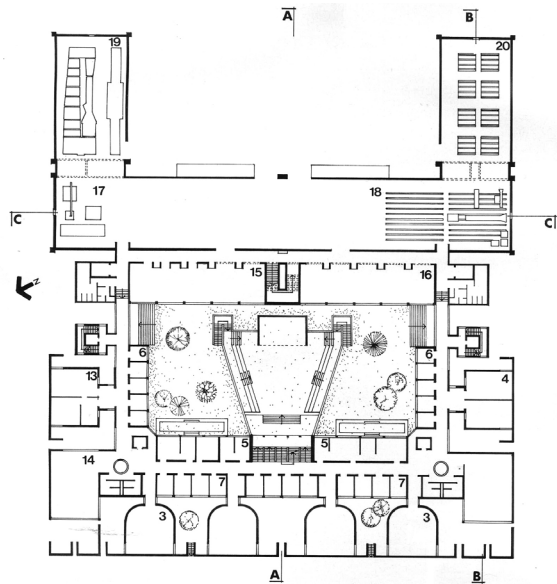
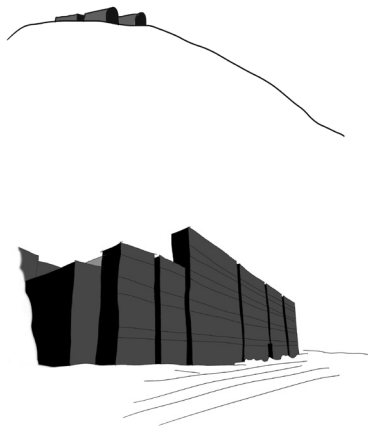
The university's master plan was integrated into the overall planning of the nearby neighborhood of Rama-Aviv, which was designed as a green residential neighborhood. The central idea informing the campus's planning was the model of a "university park" and autonomous faculty buildings in verdant surroundings, with each building one of a kind. In terms of its urban environment, the university's monumental entrance axis is a direct continuation of the boulevards branching off the sea, and it leads to the university's main plaza, surrounded by general university buildings⁵. The campus edifices were designed in a Brutalistic architecture style by the top architects of the time, revealing the genuineness of the material and the building technology. The architect Kahn was invited by the university to design the School of Mechanical Engineering, which at its completion became an architectural icon in Tel-Aviv.

The building is located in the southeastern part of the campus⁶, stretching along the campus's central inner promenade⁷. Its main façade facing the promenade is surprising in its monumental scale and restraint in design: it is a large exposed concrete wall with no windows. The only hint to the existence of a structure behind the walls is a series of vertical slots that indicate the presence of a modest entrance. The entrance and exit of the building create a powerful experience which arises due to the integration of the built-up



01 Tel Aviv University from Southeast, Israel, 1964. Aerial view of the university and the neighborhoods. © Tel Aviv University Archives: Department of Photography, 1988.

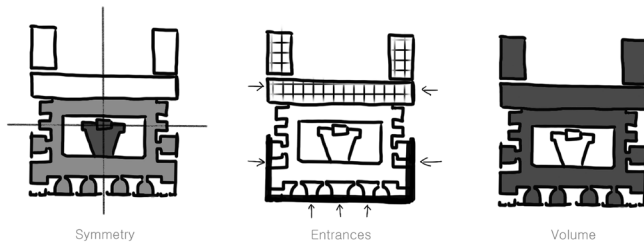
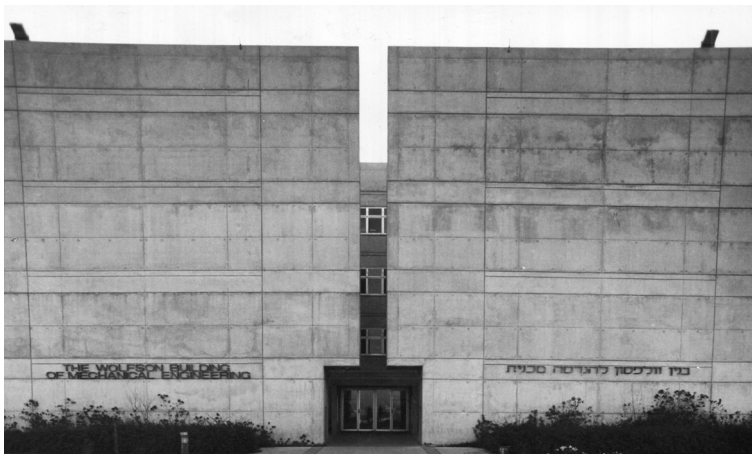
- 02** Louis Kahn, Wolfson School of Mechanical Engineering, Tel-Aviv-Yafo, Israel, 1974-1980. View from the Ayalon highway ("two tablets of stone"). © Sketch Jeremie Hoffmann, 2017.



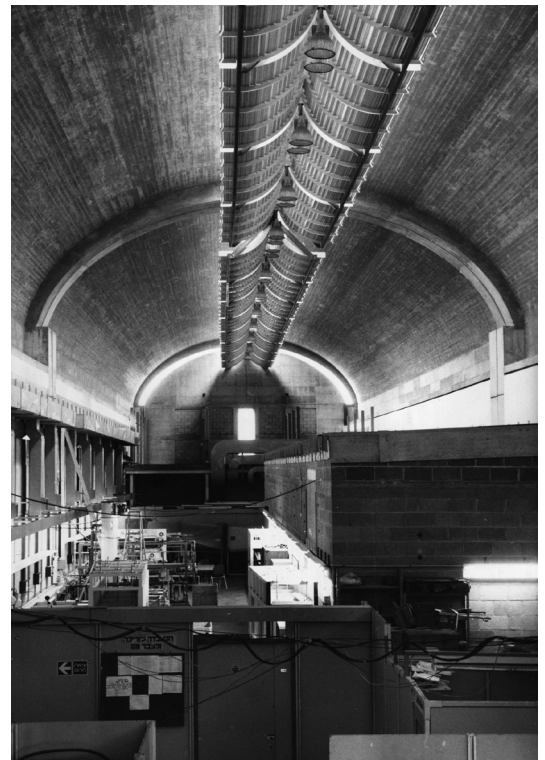
- 03** Louis Kahn, Wolfson School of Mechanical Engineering, Tel-Aviv-Yafo, Israel, 1974-1980. Main façade: slots indicating modest entrance. © Jeremie Hoffmann, 2017.

- 04** Louis Kahn, Wolfson School of Mechanical Engineering, Tel-Aviv-Yafo, Israel, 1974-1980. Typical floor. © *Architecture in Israel*, 1986.

- 05** Louis Kahn, Wolfson School of Mechanical Engineering, Tel-Aviv-Yafo, Israel, 1974-1980. Main façade facing the university. © Tel Aviv University Archives: Department of Photography, early 1980s.



- 06** Louis Kahn, Wolfson School of Mechanical Engineering, Tel-Aviv-Yafo, Israel, 1974-1980. Schemes. © Sketch Jeremie Hoffmann, 2017.



- 07** Louis Kahn, Wolfson School of Mechanical Engineering, Tel-Aviv-Yafo, Israel, 1974-1980. Central vault in the laboratory space, with wing shaped light reflectors. © Tel Aviv University Archives: Department of Photography, early 1980s.



masses and to the control over the framing of the views towards the environment.

The building is composed of two parts. The western part is a monolithic structure surrounding a courtyard and including classrooms spread throughout five stories. These classrooms are illuminated and ventilated with vertical ventilation shafts, like small inner courtyards. The eastern part of the building comprises three large laboratory spaces for the conducting of experiments. These vast empty spaces are roofed by correspondingly large concrete cycloid barrel vaults, lit at their extremities by cylindrical-shaped lighting slots emitting a soft, non-dazzling light. Additional illumination for the space is provided through an upper slit in the barrel vault ceiling, from which light is emitted directly onto wing-shaped light reflectors. The ceiling here serves as a large light diffuser, and emphasizes the sculpting of the space – similarly to the lighting units on the roof of the exhibition spaces in the Kimberley Art Museum in Texas, USA. The study rooms' central inner courtyard is designed as a hall whose roof serves as an amphitheater facing a stage, as an open-air gathering space for the school's population. This design is based on Kahn's principle of areas that receive service and areas that provide service, which are separated but simultaneously interconnected in order that the service may be provided with maximum flexibility⁸. The structures are connected to each other by a supply artery via round "nostrils" inside and outside the building, which concentrate the plumbing to provide services in all parts of the building

and provide a source of fresh air and a passageway for the air conditioning pipe system⁹.

The entrance to the building contains a gradual transition between the campus's open landscape space and the inside of the building. Likewise, between the dedicated areas (classrooms, labs, etc.), there are intermediate spaces. Regarding the latter, Kahn's architectural collaborators on this project note in an article: "These spaces represent the essence of Kahn's concept of 'transition'. These serve as a continuation of interior spaces for rest and retreat, places of silence and light"¹⁰.

The building's interior and exterior finish materials remain exposed and in their natural hues, and the concrete expression is emphasized in the façades through treatment of castings connections. The exposed concrete in various configurations in the building's two sections, including a differing reference to light, illustrates the material's virtuoso capacity.

Prior to the building's erection, the Faculty was dispersed in temporary buildings throughout the campus, and the Wolfson Building was the first to house the Faculty of Engineering. After Kahn concluded his design¹¹ there were many delays in the clearing of the designated land, followed by a national war bringing another schedule setback. It was only in 1974 that the preparation for construction finally got going; the building was completed in 1980, six years after Kahn's death¹².

In his lifetime, Kahn designed several buildings featuring Jewish or Zionist content¹³. In Israel, he drew up a design for a monumental new building – the "Hurva" synagogue, a rebuilding of the original synagogue, a very significant structure destroyed during the fall of Jerusalem's Jewish Quarter in the Old City in the War of Independence¹⁴. Kahn was also invited by a group of leading young Israeli architects to participate in the planning of a new industrial city in the desert, "The Besor City". His architectural heritage gave rise to great interest and professional admiration in Israel¹⁵.

Yet, notwithstanding these ties to Israel and the ongoing connections he forged with the country's leaders after the State's establishment, Kahn's designs were never actualized in Israel, with the sole exception of the Wolfson Building for Mechanical Engineering at Tel-Aviv University. It can therefore indeed boast of being the only Kahn-designed building ever to be erected in Israel.

Notes

- 1 The building was designed in cooperation with local architects Joseph Mochly and Ilan Eldar.
- 2 Zvi Efrat, *The Israeli Project: Building and Architecture 1948-1973*, Tel-Aviv, Tel-Aviv Museum of Art, 2004, 26.
- 3 Jeremie Hoffmann and Hadas Nevo-Goldberst, *Aphoria – Architecture of Independence, the Brutalist Style in Tel-Aviv-Yafo, 1948-1976*, Tel-Aviv-Yafo, Architectural and Landscape Heritage Research

Center, Haifa, The Faculty of Architecture and Town Planning, The Technion, 2017, 29.

- 4 *Id.*, 145.
- 5 Moshe Atzmon, "Master Plan 1980, Tel-Aviv University", *Architecture in Israel*, 1986, Tel-Aviv, Tel-Aviv University, 1986, 4-7.
- 6 The southern part of the university was physically detached from the campus in the original design. A number of plans were prepared for this area, among them by architects Louis Kahn, Joseph Mochly, and Ilan Eldar. See *id.*, 5 (in Hebrew).
- 7 The secondary main axis in the University's design is the South-North axis which encompasses the lab-intensive faculties.
- 8 Harry Frank, *Aleph Aleph. Monthly Review of Israel Institute of Architects, Association of Engineers and Architects in Israel*, Booklet 4, Israel, April 1974.
- 9 Dagan Mochly, "Wolfson Building of Mechanical Engineering, Tel-Aviv University", *Architecture in Israel*, 1986, Tel-Aviv, Tel-Aviv University, 1986, 17.
- 10 *Id.*
- 11 On his final visit to Israel, Louis Kahn confirmed models for the construction of the building. From the Tel-Aviv University Archives, photocopy of file 900.0138/10.
- 12 From the Tel-Aviv University Archives, file 900.809/4.
- 13 Susan G. Solomon, *Louis I. Kahn's Trenton Jewish Community Center*, New York, Princeton Architectural Press, 2000, 153.
- 14 "The building is considered one of the most monumental buildings of the 20th century", Zvi Efrat, *op. cit.*, 488.
- 15 *Id.*, 804.

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Post-War Modern Architecture in Tunisia

BY ELISA PEGORIN AND LUCA EULA

At the end of the spring of 1943, the German forces were finally defeated in Northern Tunisia and had to leave the country. This allowed the French protectorate to take power and in the years that followed, thanks to massive American economic aid, undertake a very important project of architectural construction and reconstruction. All of Tunisia was involved but the four main cities (Tunis, Bizerte, Sousse and Sfax), whose populations were expanding, saw entire parts of themselves reconstructed. Today, a unique experience of modernity still remains in the tissue of all these cities, but with big issues of conservation.

Una tradizione è un passato che altera il presente¹.

Tunisie, 1943

La Tunisie est le seul des trois pays d'Afrique du nord qui doit être considéré, après la guerre, comme un territoire sinistré. Les opérations militaires qui se sont déroulées dans les Régences et les destructions systématiques auxquelles elles ont donné lieu avaient durement atteint les installations de toutes sortes: les habitations, le matériel et les divers moyens dont disposait la Tunisie avant la guerre².

With these words starts the 1948 special issue of the famous review *L'Architecture d'Aujourd'hui* dedicated to Tunisia, clearly outlining the difficult circumstances in which the country found itself at the end of the WWII. Allies in fact landed in Morocco in 1942 (during the so-called Operation Torch) while General Rommel lost the battle in El-Alamein in Egypt and retreated to Tunisia, fortifying the southern part near Gabes. In May of 1943 the Allied forces, through a heavy bombing campaign, broke the defenses of the axis and hunted the Nazis at the decisive battle of Cap Bon. They would move on to Sicily within the next year, but in the meantime what they had before their eyes was a disheartening picture: about 120 connecting roads, bridges and viaducts destroyed (235 km of roads and 69 bridges), the main electric stations in the country torn down, and more than 16,000 buildings bombed. For these main reasons, the four years from 1943 to 1947, following release from the Axis forces, were called the Years of Reconstruction.

Bernard Zehruss (1911-1996) arrived in Tunis, from Algiers, when he was 32 years old. In 1939 he had been awarded a Grand Prix de Rome and obtained an official position in the French government to assess the damage that the long war had inflicted on the Tunisian

territory. His role was initially as an advisor, but almost immediately it turned into something different. His arrival coincided with the death of the Director of the Department of Architecture, for which no-one was quite prepared. Given the already critical situation, the Prefect Roger Gromand (1905-1986) immediately promoted Bernard Zehruss to head of the department. This was something which would fundamentally change the history of the country and the post-war reconstruction.

In a short time, Bernard Zehruss created a young and capable team, dividing the country into four zones and instituting pyramidal management of the territory. Every zone had its reference architect, in particular Claude Blanchecotte (1911-1996) in Tunis, Jean Le Couteur (1916-2010) in Bizerte, Robert Greco in Sousse, and Paul Laingui in Sfax. Then the group – directed by Bernard Zehruss himself – was assisted by Paul Herbe (1903-1963) (along with Jacques Marmey, the only senior architect with field experience) and Jean Drieu La Rochelle (1903-1986).

This division turned out to be remarkably important because these architects were not limited only to bureaucratic management and advisory roles, but would be the names that recurred on all major projects of the following years. They had their chance to operate in absolute freedom from centralized bureaucracies or departments due to the fact that Tunisia was never a colony, only a protectorate. As France became increasingly committed to greater efforts in Morocco and Algeria, this strategically important but enormously problematic land was left in the background.

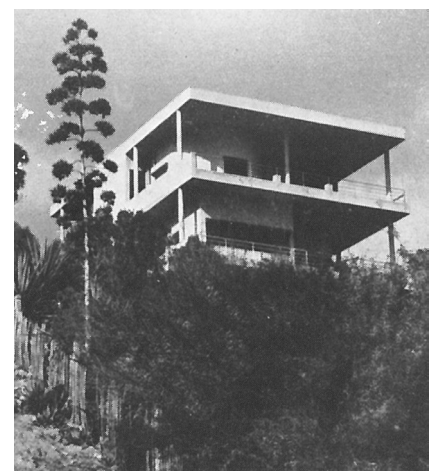
The "Reconstruction"

The first months were spent carrying out important preliminary steps: the architects traveled all over the country familiarizing themselves with the traditional architecture

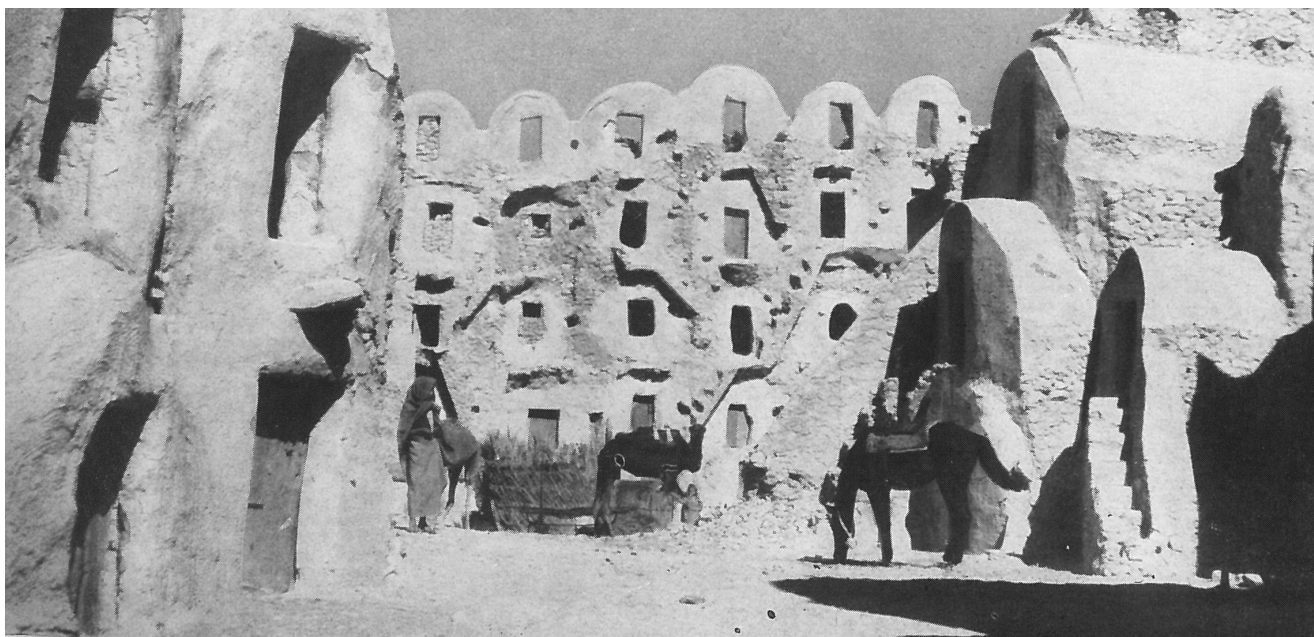
and with the situation of Tunisia at the end of the WWII. They visited the *menzels* in Djerba and the *Ksour* of Medenine and Tataouine, the brick buildings typical of Tozeur (that Jean Le Couteur (1916-2010) reused in the neighborhood *Les Andalous* in the city of Bizerte), and the great mosques in Kairouan. They saw the *medinas* and unlike the other myopic European architects before them, understood that this cluster of houses and souk was not only a traditional building, but a brilliant functional solution for climate problems of places that are very hot in the summer.

The problems of climate and sun exposure were two of the important points on which they built their thinking when it came to design. The lessons learned by those who lived there proved useful when it came to building in scorched and barren territories.

The department lasted for four years, during which the foundations were laid for a fundamental renewal for the whole country. Public infrastructure and fundamental re-housing interventions were created, in addition to the structures put to the test by the bombs. The urban projects really began only in 1945, and with the expansion of urban Bizerte (which provided for a "new town" that almost doubled the city itself on the other side of the bridge, over the last stretch of the lake of the same name) the first problems began to arise: the large number of expropriations and other uncertainties related to the creation of Bizerte-Zarzouna gave the department a bad name. Then a few years later, Habib Bourguiba (1903-2000) led



01 Le Corbusier, House Baizeau, Carthage, Tunis, 1928. © *L'Architecture d'Aujourd'hui*, 1948.



02 Traditional houses, Medenine, Tunis. © L'Architecture D'Aujourd'hui, 1948.

the liberation of the country; difficult years in which feelings against the occupying power were in themselves already intense and problematic.

The characteristics of Reconstruction, 1943-47

Generally speaking, the situation of the Regency cities was astonishingly confused. No administration, no collectivity had concerned itself with the question of urbanism, and the metropolitan areas had developed in the most disastrous disorder, with the speed characteristic of Northern Africa. Bernard Zehrfuss immediately noticed the difficult sit-

uation in which he found Tunisia. Just under three million people were living in a situation of constant emergency that threatened to block the country and which worsened from month to month. They had to act relatively quickly and simultaneously find a pragmatic solution to the widespread lack of building materials and the shortage of suitable workers. Tunisia is a very fertile land, but primary resources for the construction industry are in short supply: in fact, one of the reasons for the trips made by the architects of the Department of Architecture and Urban Planning was also to understand the construction techniques and the ways in which the various architectures were developed. A search

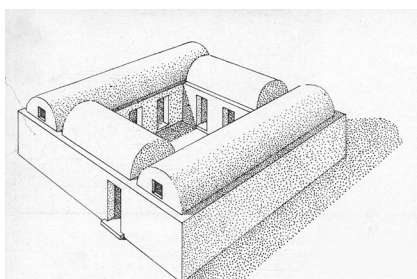
determining guidelines for the many projects that the country needed was fundamental for designers. The answer came precisely from these trips.

In addition to the link with the local tradition, the architects of the team, all relatively young, had studied at the *Écoles des Beaux-Arts* in Paris and Marseille, and during their training had come in contact with the theories of the Modern Movement. When they arrived in Tunisia they demonstrated familiarity with the principles of the Athens Charter and a distance from French academicism, which saw colonial architecture still in terms of "Arabisation".

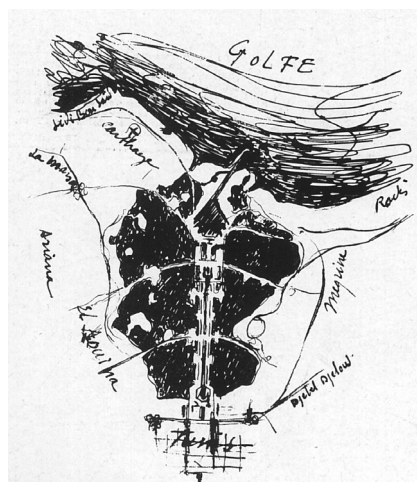
Le Corbusier himself was very much present in the memory of the architects that worked in Tunisia in those years. They were influenced by the publication in 1926 or, in 1938, by the French translation of the Athens Charter (resulted from the IV CIAM held in 1933). Le Corbusier had worked in Tunisia in 1928-29 on a house project, Villa Baizeau, located in Carthage. At the same time the architects who worked in the country in the 1940s, such as Bernard Zehrfuss, participated in CIAM and thus entered into direct contact with the main protagonists of modern architecture. Therefore, we can risk saying that their reading of tradition is both partial and mainly interested in the pragmatic aspect.

Tradition and modernity

In which traditions were the architects based? Tunisia has particular regional differences, especially depending on the geographical position, nearer or further from the sea, and more or less to the south (from the coast to the desert). Furthermore, what adds to



03 Bernard Zehrfuss and Jason Kyriacopoulos, La "maison minima tunisienne", 1943. © L'Architecture D'Aujourd'hui, 1948.



04 Paul Herbé, Drawing about the possibility to expansion Tunis in the lake, Tunis, undated. © L'Architecture D'Aujourd'hui, 1948.

these differences is the presence or not of particular construction materials. Throughout the coast, olive trees are plentiful and their wood is important for the structures of all the *medinas* of major cities. In Tozeur for example, building blocks are fundamental, while in the mid-900s houses carved into the rock of Matmata (already in full desert territory) were still inhabited. In all this, we cannot discount the importance of religious architecture, such as the mosques and *madrasas* (Coranic schools), into which the community poured its major constructive efforts. This is an important point because – as Marc Breitman also wrote in *Rationalisme, tradition, Tunisie 1943-1949: Jacques Marmey* (1986) – the fortuitous language developed by Bernard Zehruss and the research team owes much to their ability to select some of the traditional elements over others, and put them together in a modern language. Twenty years before, in 1923, the Tunisian architect and urbanist Victor Valensi (1883-1977) wrote *L'Habitation Tunisienne*, one of the first essays on traditional architecture. While it may still be considered to fit the orientalist mould, we are already faced with those elements that fascinated architects of the Department of Architecture and Urbanism of 1943: the white plastered walls, pure volumes, the roof-terrace and the absence of ornament.

The deep pragmatism of French architects allowed the typology to be summarized briefly with simple variables with which to re-build across the country. The same Bernard Zehruss would later attempt to prevent Tunisia from becoming so “big”, so they could safely use types common throughout the territory. The types were applied to houses both private and public, and to public buildings such as schools, not only to better manage the large number of projects but also for the clarity and recognition of its language and its link with the past architecture. We must not forget that Tunisia was not a colony but a protectorate, and this meant that French investment also had “other” purposes as suggested by Edward W. Said (2003): “Every empire, however, tells itself and the world that it is unlike all other empires, that its mission is not to plunder and control but to educate and liberate”³.

All these new projects were related in language but distinguishable from the pre-existing history. This occurred for strategic reasons as well; often the public buildings were outside the towns to be equidistant from agglomerations which they were to serve. This meant that they became, in connotative meaning, tracks that while strongly integrating the modern, manifested the might of the occupying power.



05 Jacques Marmey, Control civil-regional, Bizerte-Zarzouna, Tunis, 1947. © *L'Architecture D'Aujourd'hui*, 1948.

The other big reason why these architects turned to Islamic Mediterranean local tradition can be explained by the lack of materials and skilled laborers that plagued Tunisia at the time of the WWII – in fact, a school of building was created for this purpose early on, to teach builders and professionals. Using widely-known and simple construction systems was one reason why it was able to start work quickly in an area troubled by urban-housing emergencies. These projects, produced in the 1940s, spread out from the north to the south of Tunisia, stand out for their consistency, despite the many technicians and engineers involved in the reconstruction.

Another element is the great importance given to the climate issue; the architects were always looking for forms that would allow a greater degree of energy performance, with a preference for natural methods of cooling and ventilation, already an established tradition. However, what most markedly characterizes the work of the Department of Architecture and Urban Planning under the direction of Bernard Zehruss was the great freedom with which they acted, without suffering the dogmatism that Europe was increasingly codifying in the actions of many architects. They had no prejudice against using what was rooted in the architectural traditions of Tunisia, discarding the excessively decorative-formalistic. The architects did not impose typically European models of living-matrix, but maintained easily recognizable forms, offering a chance of immediate physical and cultural appropriation by the locals. They tried to take advantage of the simple forms of tradition in their modern taste, integrating it with their training in the modern European style. A tangible example of continuity is the new markets built in the 1940s, for example

that of Sidi Bou Zid, where the square is the central element and the portico serves as a rhythmic architectural element.

The effects of this design effort lasted four years, from 1943 to 1947. In contemporary Tunisia, it is clear how the architecture of the time, through its coherent language, inspired the years following the revolution. If the actual results achieved by Bernard Zehruss's team were significant, so is the component that this conceptual approach developed in those years. It is difficult to consistently trace the individual paths of the architects who worked there, and still more their training courses. Those of the European scene of the period and of Auguste Perret (1874-1954), for his theories on the structure and form of architecture, were fundamental. First, in all their designs are the presence and a tendency to purity through the use of simple shapes, figures easier to read that would allow immediate recognition of the typology. These forms can be identified by the use of the barrel vault (at the school or in the market), in the dome (often small), and the use of space and geometry, as well as the color white, typical of the Mediterranean tradition.

The actions of the Department of Architecture and Urbanism were divided into three main types, depending on their scale and directly following the contingent needs of reconstruction. The main projects involved the residential sector, as well as the construction and re-construction of public buildings (schools, clinics, markets, hospitals, roads and bridges). Working on the city with major urban projects that would respond rationally to the needs of expansion and reconstruction of the urban grid was still stuck in the orientalist dichotomy between the old town (*medina*) and new town (European). The building systems

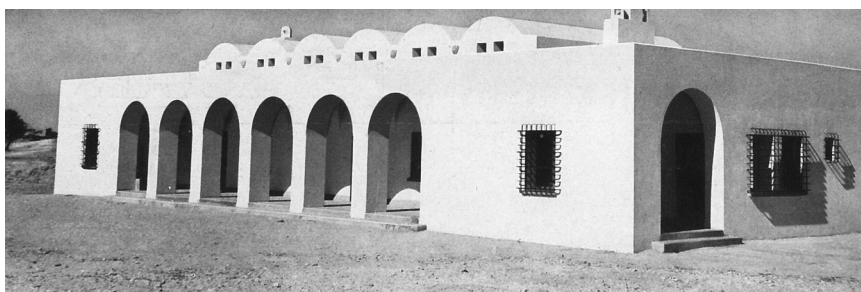
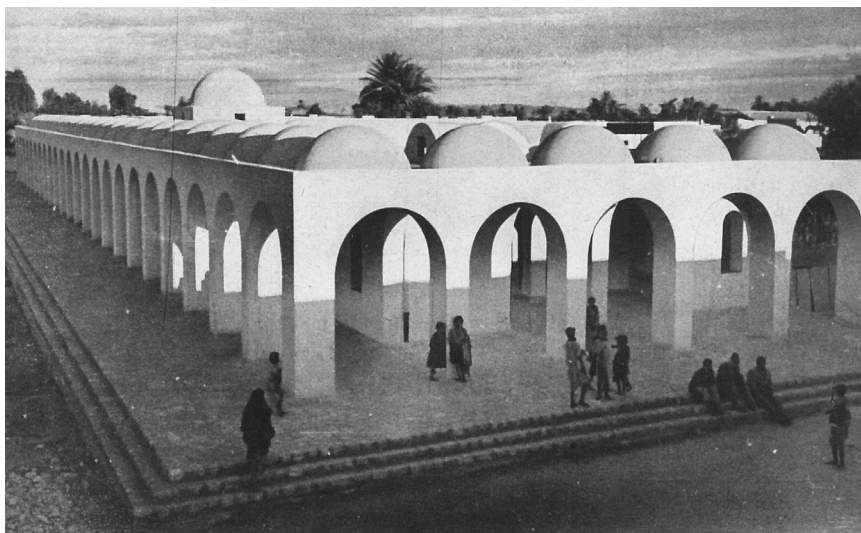


06 Bernard Zehrfuss, Jean Drieu and J. Kyriacopoulos, E. Laingui, Apartments, Moulinville, Sfax, Tunis, 1947.
© *L'Architecture D'Aujourd'hui*, 1948.

were to remain similar to those that were in the individual areas, in order to make the most of the locally available materials. The “minima house” was organized as the traditional one around a central courtyard, but unlike its predecessor allowed the addition of new parts over time to meet the needs of the inhabitants. Thanks to this and certain bureaucratic actions, it was possible to issue around 4,000 building permits between 1944 and 1946.

After 1947 there were political pressures and Bernard Zehrfuss had to leave the department and until 1953, moved to work in Algeria with some of the architects of the old department. In 1955 Habib Bourguiba returned to Tunis and in 1956 the declaration of the country's independence was signed. In this way all the great projects undertaken by the protectorate were blocked for lack of funds, as well by the radical changes that the country was set to face. The important thing that remains in Tunisian architecture from the 1940s, in continuum with a sort of “African modernism” which spread in the 1950s and 1960s (for example the works in Tunisia of architect Olivier Clément Cacoub), can be summarized in these words already written by Jean Cotereau in 1930:

07 Bernard Zehrfuss, Jean Drieu and J. Kyriacopoulos, 1947, Cover Market, Sidi Bou Zid, Tunis.
© *L'Architecture D'Aujourd'hui*, 1948.



08 Bernard Zehrfuss, J. Drieu and J. Kyriacopoulos, 1943, School “type 2 classes”, Nakta, Tunis.
© *L'Architecture D'Aujourd'hui*, 1948.

I settle for drawing lessons from history, in the increasingly deep conviction that there is nothing new under the sun. Perhaps I might throw out some ideas that would be interesting for the architects, remind some at least that wisdom consists neither in ignoring the architects of the past, nor in following them to the letter, to the point of pastiche, but in understanding their spirit so as to borrow from it freely for inspiration⁴.

Following this long and complex history of modern Tunisian architecture, there is a conservation problem today: modern heritage is recognized and preserved with great difficulty, with the risk of losing a part of the country's history that saw the formation of a group of modern architects.

Notes

- 1 Albert Camus, “La Nouvelle Culture Méditerranéenne”, *Jeune Méditerranée*, bulletin mensuel de la Maison de la Culture d'Alger, n. 1, April 1937.
- 2 Jean Mons, “Les Problèmes de Reconstruction en Tunisie”, *L'Architecture d'Aujourd'hui*, Paris, n. 20, October 1948, 2.
- 3 Edward W. Said, “Blind Imperial Arrogance”, *Los Angeles Times*, July 20, 2003.
- 4 Jean Cotereau, “Vers une Architecture Méditerranéenne”, *Chantiers Nord-Africains*, n. 1, February 1930, 19-21.

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Lawn Road Flats (The Isokon) — A New Vision of Urban Living

BY JOHN ALLAN

So much of modern architecture's early history depended on a handful of courageous pioneers. One of the first Modern Movement buildings in England was the achievement of an unlikely trio – a plywood salesman and his psychotherapist wife, and a Canadian part-time journalist turned architect. This article and the accompanying text by Magnus Englund tell the extraordinary story of the Lawn Road Flats in Hampstead, London – their origins and heyday, the linked program of furniture design, their declining postwar fortunes and ruination, and then their recent and remarkable rescue and restoration to become a beacon of modern heritage and the epitome of progressive 21st century urban living.

The pioneering Pritchards

Lawn Road Flats in Hampstead, north London (also known as The Isokon) stood at the cutting edge of modern architecture in Britain when the building was opened in July 1934. The project stemmed from the meeting of Jack and Rosemary (Molly) Pritchard, the clients, with the Canadian architect Wells Coates (1895-1958), to whom they had been attracted on account of his innovative work in show-room design and his inventive use of plywood. Jack Pritchard (1899-1992) had become the British marketing manager for the Estonian plywood company Venesta in 1925 and through Le Corbusier had already engaged Charlotte Perriand to design an exhibition stand for the firm at Olympia, London in 1929.

That same year Jack and Molly acquired the site in Lawn Road and initially considered building a pair of conventional detached houses. But being increasingly interested in the progressive architectural developments on the Continent they soon abandoned this idea in favor of an altogether more radical program based on the *existenzminimum* dwelling experiments in Germany and promoted through the international organization CIAM. In 1930 clients and architect embarked on a European study tour and visited the Weisenhoff housing exhibition in Stuttgart, a summation of the progressive architectural design on the Continent since the war which showcased works by the leading modern architects Mies van der Rohe, Le Corbusier, JJP Oud, Walter Gropius, Bruno Taut and others. At this point, apart from a few single villas in superficially modern style, there was nothing in England to compare with these European developments. As the Russian master Berthold Lubetkin (who arrived in London at this time) would later remark,

“after all the energy and diversity of the Continent, England seemed about 50 years behind, as though lost in a deep provincial sleep”. It is for this reason, in addition to its unusually radical accommodation program and illustrious social associations, that the Isokon – a manifesto of progressive urban living – occupies a unique place in the history of modernism in Britain.

The detailed Lawn Road brief was largely developed by Molly Pritchard (1900-85) with Coates and eventually produced the 4-storey gallery access block we see today. Formed in monolithic reinforced concrete the building contained 22 single flats, 4 double flats, 3 studio flats, staff quarters, kitchens and a large garage. The Pritchards and their children occupied the rooftop penthouses. Services included shoe cleaning, laundry, bed-mak-

ing and meal deliveries from a staff kitchen sent up by a dumb waiter in the core of the building. Wells Coates' parallel interest in boat building and product design is evident in the intricate fitting out of the interiors, which aimed to cater for young professionals with a mobile lifestyle. The studio units are only 25 m² in area but include a kitchen, a dressing room and a bathroom alongside the main living/sleeping space. The importance of the dressing room with its built-in storage was particularly stressed as a key factor that distinguished the Isokon units from the average student bedsitter with clothes and clutter typically strewn over the furniture or crammed into a clumsy wardrobe. The experiment showed that *existenzminimum* could be elegant as well as economical. Advance lettings were stimulated by exhibiting a showflat mock-up in 1933, and the building was successfully occupied soon after completion in 1934. By this time refugees from the political developments in Europe were beginning to arrive in England, distinguished émigrés including Walter Gropius, Marcel Breuer and László Moholy-Nagy all of whom were taken in by Pritchard – Gropius and his wife Ise on a rent-free basis. Traveling light with minimal possessions, such residents proved fortuitously to be the demographic for whom the Isokon was ideally suited.

The Isobar – a social hub

In 1937 the staff kitchen, originally situated on the ground floor but insufficiently used, was

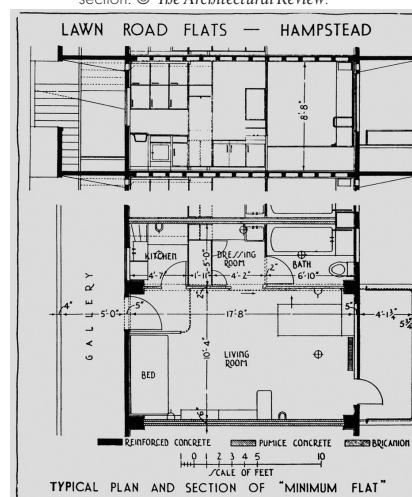


01 Wells Coates, Lawn Road Flats (The Isokon), London, UK, 1933-34. © John Maltby, Pritchard Papers, UEA c. 1960.

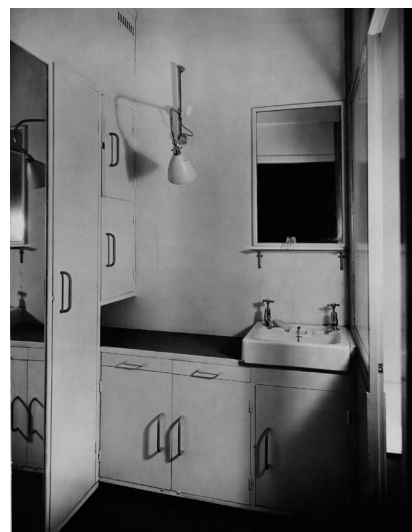
02 Marcel Breuer with Ise and Walter Gropius at the Isokon's 1st birthday party, 1935.
© Pritchard Papers, UEA.



04 Wells Coates, Lawn Road Flats (The Isokon), London, UK, 1933-34. Typical Studio plan and section. © The Architectural Review.



03 Wells Coates, Lawn Road Flats (The Isokon), London, UK, 1933-34. Typical Studio interior, 1934. © Pritchard Papers, UEA.



05 Isokon Typical Dressing Room, 1934.
© Pritchard Papers, UEA.

reconfigured as a restaurant and bar, designed by Marcel Breuer with F.R.S. Yorke and named the Isobar with a decked outdoor area at the rear of the building. Its manager was Philip Harben, who after WWII became the BBC's first TV celebrity chef. The building and its club became a magnet for intellectual life in north London. Famous residents included novelist Agatha Christie and her husband, the archaeologist Max Mallowan, the Soviet NKVD spy Arnold Deutsch who was controller of the Cambridge Spy Ring, the German-born economist and Soviet spy Jürgen Kuczynski, author Nicholas Monserrat, textile designers Jacques and Jacqueline Groag, architects Egon Riss, Arthur Korn and later James Stirling. Regulars at the Isobar also included sculptors Henry Moore and Barbara Hepworth, painter Ben Nicholson, whose studios were nearby, and Sir Julian Huxley, secretary of the Zoological Society of London. Indeed, if Hampstead was the center of 1930s intellectual life in London, then the Isobar was the epicenter.

Wartime and after

Gropius, whose time in England was frustrated by constant lack of sufficient work, was to leave for Harvard in 1937, with Breuer following shortly afterwards. But Jack Pritchard stayed in London during WWII while Molly Pritchard and their two sons Jonathan and Jeremy left for the United States and later Canada. Being made of reinforced concrete the Isokon building remained popular and despite several bombs in the near vicinity, survived the Blitz. It was repainted brown as it was feared its distinctive form could serve as a navigation aid for German bombers. Although the 1930s would prove to be the Isokon's "golden years", normal life (albeit with rationing) resumed after the war and in 1955 the Pritchards staged a 21st-birthday party for the building at which the architectural writer Nikolaus Pevsner (who would later be instrumental in the listing of the building) made a speech, and letters from Walter Gro-

pius and Marcel Breuer were read out. Wells Coates, as well as many pre-war residents, attended the event.

Finding the responsibilities for its upkeep increasingly onerous the Pritchards sold the building in 1969 to the *New Statesman* magazine, who converted the Isobar into flats. They proved to be less than ideal owners and in turn sold it on to Camden Council in 1972. It was listed Grade II by English Heritage in 1974 and raised to Grade I in 1999. Despite this statutory protection it was poorly maintained and began to deteriorate badly. Had the building not been listed it would almost certainly have been demolished and the site redeveloped. However, after a dedicated campaign to save the building (in which **docomomo UK** was a key participant) it was sold to the Notting Hill Housing Group, a progressive London-based social landlord, who undertook the major restoration project with Avanti Architects which is described in the next part of this essay.

06 Wells Coates, Lawn Road Flats (The Isokon), London, UK, 1933-34.
Condition before restoration work began. © Avanti Architects, 2000.



07 Wells Coates, Lawn Road Flats (The Isokon), London, UK, 1933-34.
Restoration completed by Avanti Architects. © Nicholas Kane, courtesy Avanti Architects, 2005.



Ruin and rescue

By the early years of this century the Isokon was emptied of its remaining residents and became uninhabitable. The block was boarded up and services cut off. Pre-contract survey work by Avanti indicated that every aspect of the building inside and out would require considerable repair and upgrade. However, the guiding principle of the project was that the original layout and character of the building should be honored and restored as authentically as possible. Thus, whilst the minimal size of the studio units might otherwise have suggested they be conjoined to form larger 1-bedroom flats, it was deemed essential to retain the original plan form developed by Coates and the Pritchards as an element of intrinsic heritage significance. Only the penthouse plan was altered by the removal of a non-original partition that had been introduced after the Pritchards' departure to form an additional bedroom. This unique unit has thus now been restored to its original form.

The scope of repair and upgrade work throughout the building was comprehensive but was all undertaken within the protocols of Grade I listing and in close collaboration with English Heritage. Such projects invariably begin with the roof, and the Isokon was no exception. The defective original coverings were all removed and local repairs carried out to the concrete slab. New tapered cellular glass insulation was laid on the structural deck and new asphalt layers installed with enhanced drainage channels, re-formed rainwater outlets and curb upstands. The galleries and balconies were relaid in paving quality asphalt, while the penthouse terrace was finished with promenade pavings.

Inevitably the concrete envelope was in need of major renovation. The original structure consisted of 10 cm monolithic reinforced concrete walls supported on a 3.25 m internal column grid with tee beams supporting hollow pot floors. These features were all expressed internally in order to maintain the streamlined exterior image. The external façades were cast against standardized metal panels, whilst internally a lining of 2.5 cm compressed cork insulation was used as permanent shuttering and plastered. This build-up fell woefully short of current thermal insulation standards and had also been damaged by a combination of weather ingress, trapped moisture behind the many external layers of non-vapor-permeable coatings, and condensation occurring between the cork and the internal concrete wall-face. All surfaces needed to be stripped back to the concrete substrate, followed by local repairs in areas of spalling and damaged rebar, re-facing with fairing mortar and finishing with elastomeric anti-carbonation coatings. Cracks in several locations were re-formed as joints, using scrim "bandages" and elastomeric pointing materials. A small area showing the successive layers of overcoating during the building's lifetime was retained and protected below the escape staircase as a historic record. An aspect of particular interest to local observers and Modern Movement historians was the restoration of the authentic façade color – which was not white as many had assumed from pre-war black-and-white photography and subsequent over-coating, but a subtle shade of pink. The interior was re-lined with a high-performance thermal laminate board, then skimmed and decorated, achieving an insulation value consistent with current regulations.

The original windows had already been replaced in 1979 with poor quality aluminum

substitutes, all of which in our project were replaced again with steel framed low E, argon-filled double-glazed units to the original fenestration pattern. These were polyester powder-coated to the original color, this being discovered by taking paint scrapes from the matching steel door frames which had survived (albeit damaged and overpainted) on account of having been cast in with the monolithic concrete walls.

To achieve the requisite standard of fire separation and acoustic insulation required removal and rebuilding of the party walls. These had comprised thin skins of pumice blockwork, but were replaced on the same gridlines with twinned walls of metal stud fireproof plasterboard partition. Other internal linings had been formed in an expanded metal lathe material called Bricanion, which had deteriorated and also required replacement with metal studwork and plasterboard. The extensive interior joinery and cabinetry work was in various states of disrepair. Wherever found in a salvageable condition it was retained and refurbished; elsewhere it was replaced to identical details and profiles. Minute plan adjustments were made to accommodate standard-sized fridges and washing machines within the kitchens and dressing rooms respectively.

All the building services required renewal. A particular challenge was the heating and hot water system. The original central heating system had long since been dismantled and clumsily replaced by an array of externally mounted heating distribution pipes – removal of which had been an insistent stipulation of English Heritage. Eventually after detailed consideration of electric and gas alternatives we settled on a system of individual gas-fired combination boilers mounted within new casings above the bathroom toilets, thereby

enabling each resident to control and monitor their own energy consumption. This solution also avoided the cost of a new sub-station, which would have been required to meet the additional load of an electric based system and severely challenged our budget. A small but satisfying detail was the bespoke flue terminal to each boiler devised with the approval of the gas supply authority. This avoided the conspicuous protrusions of conventional balanced flue fittings and enabled reuse of the original ventilation apertures in the rear wall. Other features such as Wells Coates' sliding doors and original D handles, or the characteristic Best & Lloyd dressing room wall lights, were either retained and refurbished or, in the case of the lights, re-sourced from the original manufacturers.

The Pritchards' penthouse had been fitted out with extensive use of plywood to further Venesta's promotional agenda. Wall and floor paneling was employed in the main rooms, with an elaborate array of fitted cupboards in the bedroom incorporating ingenious retractable pull-out ply flaps to bring items in deep storage to the front. These installations were in various states of repair, but where salvageable were all restored to a viable condition, with missing fragments being matched and pieced in. This work was carried out by Nick Goldfinger (grandson of the architect Ernő Goldfinger) an expert restorer and cabinet-maker, further enriching the Isokon story. Ernő Goldfinger's own house, 2 Willow Road, now owned by the National Trust and also restored by Avanti Architects, is a short walk away in Hampstead.

A key factor in the winning bid had been the retention of the majority of units for social housing, a proposal that aligned closely with Camden Council's planning policies and also reflected the ethos of the Pritchards' original vision. Re-opened in 2004 the Isokon thus now contains 36 flats, 24 of which (the studios) are occupied on a shared equity basis by key workers such as nurses and teachers, who otherwise could not hope to live in this area of London. The remaining units were marketed for sale to help balance the project budget. In the 14 years since the Isokon was re-opened

it has remained fully occupied with minimal turnover in the resident community and any vacancies being filled instantly – such is the attraction of the block in its restored state.

The Isokon Gallery

The original Avanti Architects' scheme, and a part of the Planning and Listed Building Consent, had included a proposal to convert the garage into a small museum. This was motivated by the desire to secure a communal element in compensation for the lost Isobar, which it had been impossible to reinstate in the main rescue project – partly for financial and partly for regulatory reasons. A new vehicle was created for this purpose, the Isokon Gallery Trust (Chairman John Allan, Director Magnus Englund, Treasurer Fiona Lamb) and in July 2014 on the 80th anniversary of the original building launch the Isokon Gallery opened with an exhibition that tells in detail the story of the building, its residents, its rescue, the plywood connection and the Isokon Furniture Company. It is staffed by volunteers with free entry 11 am to 4 pm every Saturday and Sunday from March through October each year.

The permanent exhibition is supplemented by a changing seasonal display reflecting some aspect of, or anniversary in, the building's history. In 2015 Marcel Breuer was featured to mark the 80th anniversary of his arrival at the Isokon in 1935. The following year the theme was penguins – the international publishing house founded by Allen Lane, the celebrated pool designed by Lubetkin at London Zoo, and the Penguin Donkey – one of the classic pieces in the Isokon furniture program designed by Egon Riss to carry up to 80 volumes of the new paperback books. In 2017 the display featured Walter Gropius whose stay at the Isokon ended 80 years earlier when he emigrated to the USA. In the four seasons since it opened the Gallery has received over 10,000 visitors from all corners of the world. All are welcome and members of **docomomo** International are particularly encouraged to visit the Gallery when they are in London.

Lessons of Lawn Road

The rescue of Lawn Road Flats demonstrates that even early Modern Movement icons in extremities of dereliction are capable of rehabilitation to become viable 21st century properties that can satisfy current expectations of amenity and comfort while at the same time honoring the heritage significance for which they are celebrated. This building, sometimes referred to as London's Narkomfin, was like Ginzburg's Moscow icon, a beacon of modern design that has now become modern again.

But beyond the technical proofs, Lawn Road/The Isokon also has other lessons. In the current housing crisis that is poisoning London, as many other major cities, one cannot but reflect on its significance as a brave example of what can be achieved when altruism and commitment combine with progressive design ideas about urban living. The empty promises of successive UK governments reveal the utter failure of political will or imagination to address the demand for genuinely affordable social housing. Meanwhile, private developers and volume house-builders, profiting from perpetual shortage, have neither the interest nor the incentive to solve the problem, and most local authorities are either politically indisposed or economically too weak to pursue any meaningful social housing programs. The Isokon's contribution may be numerically modest, but its enduring integrity and optimism stand as a shaming rebuke to today's urban planners and politicians – a challenge to do better.

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John Allan

(b. UK, 1945). MA, University of Edinburgh. Honorary doctorate, University of Sheffield. As Director of Avanti Architects (1983-2011) – he is now consultant to the practice – John Allan has led all Avanti's Modern Movement conservation projects and studies. He was the first Chair of **docomomo** UK (1989-1991) and is currently the Chair of The Isokon Gallery Trust. Author of the award-winning *Bertold Lubetkin – Architecture and the Tradition of Progress* (RIBA Publications, 1992; Artifice, 2012).



08 Wells Coates, Lawn Road Flats (The Isokon), London, UK, 1933-34. Restoration by Avanti Architects. © Tom de Gay, courtesy Avanti Architects, 2014.

Isokon Furniture – Modernist Dreams in Plywood

BY MAGNUS ENGLUND

The Isokon Furniture Company was never commercially successful, yet its legacy has stubbornly refused to die and disappear. Even today, this radical collection of plywood furniture is manufactured and used. The main reason is of course the names associated with it: Jack Pritchard, Wells Coates, Marcel Breuer, Walter Gropius, László Moholy-Nagy and – more recently – Edward Barber & Jay Osgerby. The genius little Isokon Penguin Donkey, first designed by the Austrian émigré architect Egon Riss in 1939 and marketed by publisher Allen Lane's then new imprint Penguin Books, is particularly popular with younger generations of design students.

Jack Pritchard (1899-1992) was an upper middle-class Brit whose father had briefly been the Mayor of the London suburb of Hampstead around the time of Queen Victoria's death (1901). After his education at Pembroke College in Cambridge, he ended up in 1925 as the marketing manager of Venesta (short for Veneer Estonia), the British subsidiary of A. M. Luther, based in Tallinn. The company had been formed in the 1880s by two Luther brothers, hailing from German immigrants to Estonia, who claimed to be direct descendants of Martin Luther, the religious reformer. The firm was possibly the biggest manufacturer of items made from plywood in the interwar years, and had offices in London, Paris, Berlin, Milan and Madrid as well as Calcutta, India. Their plywood tea chests made Britain their biggest export market, having invented a glue that made the chest waterproof, which kept the tea leaves shipped from India to Britain dry. Besides an office in London, Venesta also had its own wharf and factory at Silvertown, located by the river Thames in East London. The company made furniture, hatboxes, suitcases and even food containers for the British army, all in plywood. A. M. Luther had manufacturing sites in Finland, Estonia and Lithuania, and the preferred wood was Baltic birch, even though it also used other, more exotic woods from around the world.

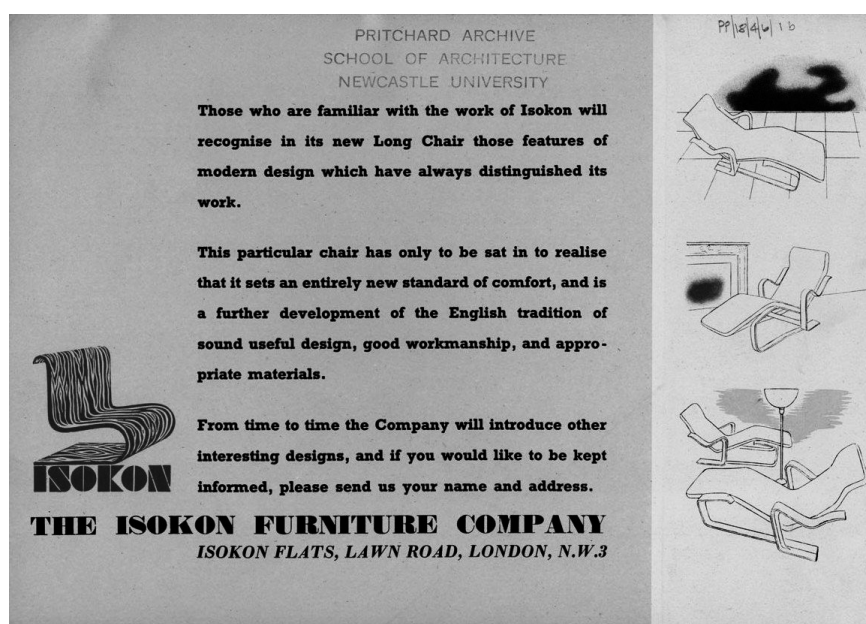
Jack Pritchard first came into contact with Wells Coates (1895-1958) when the self-taught architect worked on the new BBC head office in Portland Place in central London. Wells Coates used Venesta plywood both for furniture and wall coverings, including the radio recording studios. He had visited the *Paris World Fair* of 1925 as a journalist and seen the groundbreaking pavilion by Le Corbusier (1887-1965). Another visitor to Paris was Philip Morton-Shand (1888-1960), food and wine critic as well as writer for the

Architectural Review. Philip Morton-Shand later went to visit the *Stockholm Exhibition* of 1930, where he met the Finnish architect Alvar Aalto (1898-1976), who after designing some tubular steel furniture had turned to birch plywood as his preferred material. Philip Morton-Shand decided to set up a company to import and distribute Alvar Aalto furniture in Britain and around the British Empire and named it Finmar (short for Finnish Marketing). The breakthrough came with an exhibition in November 1933 at Fortnum & Mason, a London department store that is nowadays solely known for its fine food, but then also sold clothing and furniture. Jack Pritchard, who was a decade younger than Philip Morton-Shand, was impressed by the *bon viveur* with his knowledge of fine French wines and food, as well as modern design,

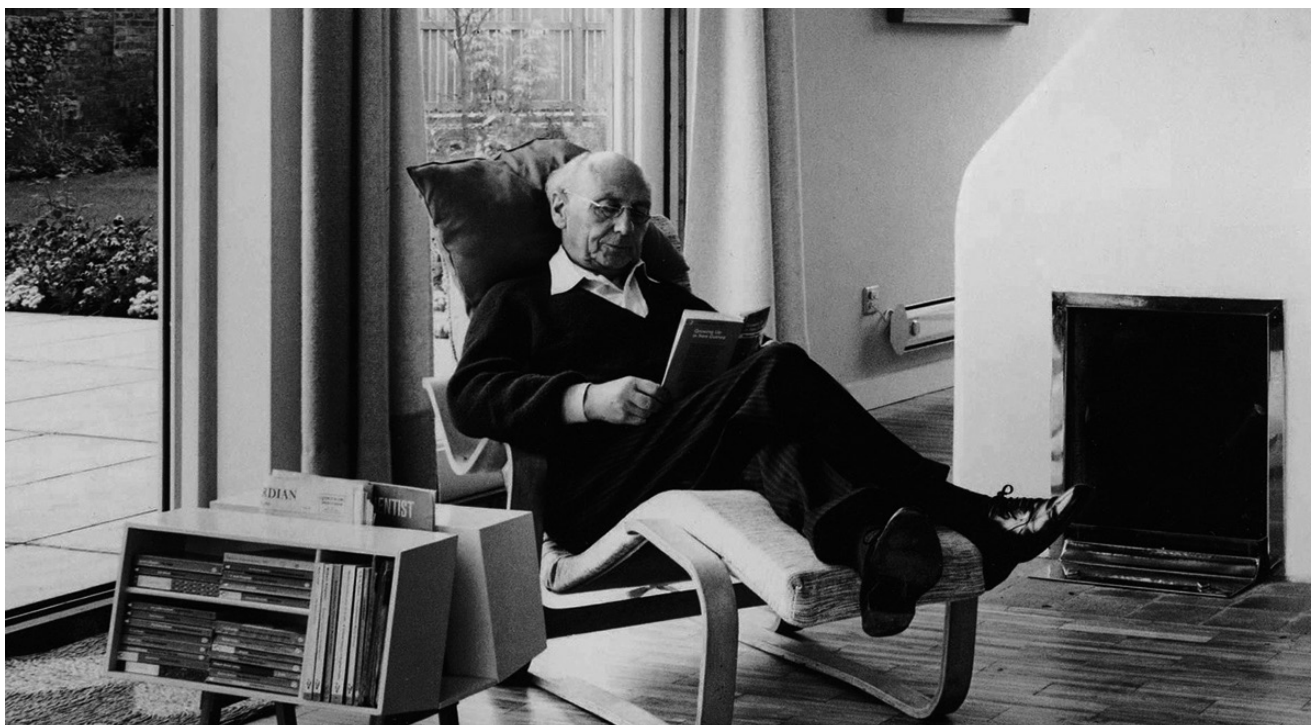
and later went on to employ Philip Morton-Shand's fourth wife Sybil Mary Sissons as his private secretary.

Jack Pritchard and Wells Coates had formed a joint company in the early 1930s, first called Wells Coates & Partners but later named the Isokon Furniture Company. The name was Wells Coates' idea and was short for Isometric Construction. By replacing the C with a K, it also alluded to Russian Constructivism. The first products were basic desks and shelving by Wells Coates, as well as a stool made and designed at A. M. Luther but sold under the Isokon name. Wells Coates was not new to furniture design; he had already made tubular steel furniture for PEL, a British company inspired by Thonet in Germany and its designs by Marcel Breuer (1902-1981) and Mart Stam (1899-1986). There was also a small bookshelf with wooden shelves and metal uprights, which was made in Germany but sold by Isokon in Britain.

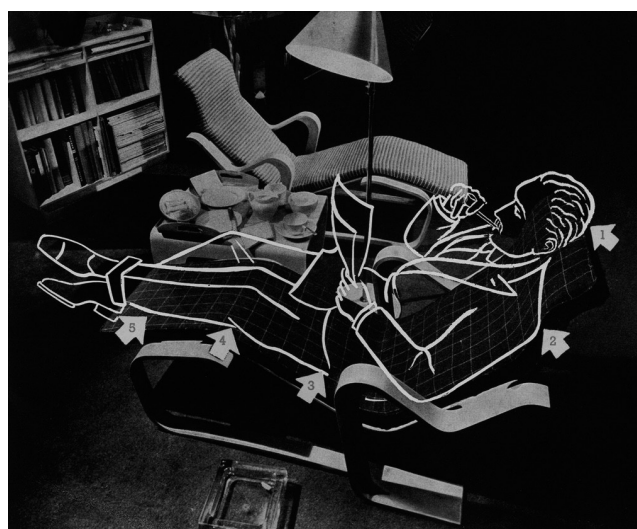
With the building of Lawn Road Flats in 1933-34, Jack Pritchard and Wells Coates gradually fell out. The main reason was not Wells Coates' romance with Jack Pritchard's wife Molly, as one might think, but chiefly Jack Pritchard's inability to secure enough money to finish the building to the high standard that Wells Coates had been promised. The idea had been that Wells Coates would work with a reduced architect fee against being able to use the project for marketing, "a sort of back-scratching operation" as Jack Pritchard would later call it. By the time the



01 Isokon Long Chair advertisement designed by Moholy-Nagy, 1937. © Pritchard Papers, University of East Anglia.



03 Isokon Long Chair advertisement. © Pritchard Papers, University of East Anglia.



04 Isokon Long Chair advertisement. © Pritchard Papers, University of East Anglia.

building was officially opened on 9 July 1934, Wells Coates was only referred to as “our architect” in the opening speech by Molly Pritchard. Wells Coates felt betrayed and arguments followed about who was to be credited for the idea of Lawn Road Flats.

It was here that Philip Morton-Shand invited Jack Pritchard for lunch at the then-fashionable Trocadero (Walter Gropius (1883-1969) would later hold his farewell dinner at the same location) and suggested that the founder of the Bauhaus was in danger in

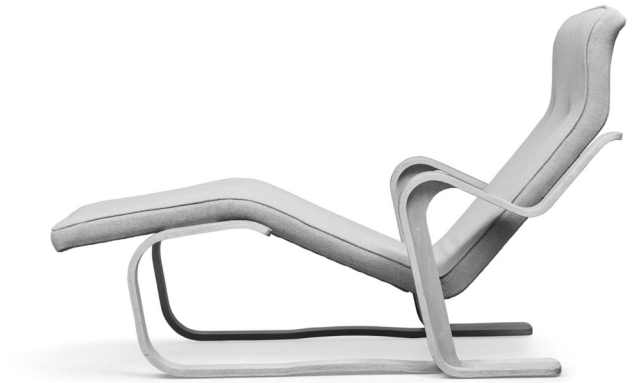
Nazi Germany and needed a home in Britain. Philip Morton-Shand knew that the letting of the Lawn Road Flats had not been entirely successful due to delays in their completion, so he suggested to Jack Pritchard that they offer a flat to Walter Gropius. For Gropius to work in Britain, he needed to partner with a British architect, and Maxwell Fry (1899-1987) eagerly volunteered. After lengthy correspondence between Walter Gropius, Maxwell Fry, Philip Morton-Shand and Jack Pritchard, Walter and Ise Gropius (1897-1983)

finally arrived in London on 18 October 1934 and moved into flat 15 at Lawn Road Flats. In 1935, both Marcel Breuer and László Moholy-Nagy (1895-1946) also fled to London, staying briefly at Lawn Road Flats.

Besides the architectural work that Jack Pritchard tried to secure for the trio, he also made Walter Gropius “Controller of Design” for the Isokon Furniture Company (the title today would be Creative Director) and Walter Gropius in turn appointed Marcel Breuer as head designer, while László Moholy-Nagy



05 Marcel Breuer, Chair, 1936. © Isokon Plus.



06 Marcel Breuer, Long Chair, 1936. © John Allen Designs, 1970s.



07 Marcel Breuer, Nesting Tables, 1936. © Isokon Plus.



08 Egon Riss, Isokon Penguin Donkey Mk I, 1939. © Isokon Plus.



09 Left to right: Shin and Tomoko Azumi, Isokon Penguin Donkey Mk III, 2003; Egon Riss, Isokon Penguin Donkey Mk I, 1939; Ernest Race, Isokon Penguin Donkey Mk II, 1963. © Isokon Plus.



10 Edward Barber and Jay Osgerby, Loop coffee table, 1996. © Isokon Plus.

was commissioned to create a logotype and sales material. Suddenly, Jack Pritchard had arguably the best modern designers in the world working for him.

It was obvious from the start that the new collection had to be made out of plywood; not only were the British not keen on cold tubular steel furniture, which was already mocked in the press, but also it was the manufacturing through Venesta that Jack Pritchard had access to. The first design by Marcel Breuer was therefore a reworked version of an aluminum chair that he had designed in Switzerland before arriving in Britain, now named the Isokon Long Chair. The chair later proved controversial when Alvar Aalto's newly formed company Artek claimed it was a copy of Alvar Aalto's lounge chair n. 43, forcing Finnmar to pursue the claim against Isokon, but it is a claim without merit as Marcel Breuer's original in aluminum is quite different. There was also a more up-right version of the chair – the Isokon Short Chair – as well as nesting coffee tables and dining tables. The attempt to make a dining chair was less successful; while it went into production the design had to be reworked several times, and few survive as the back had a tendency to snap. It was only with the works by Arne Jacobsen (1902-1971) and Ray (1907-1978) & Charles Eames (1912-1988) in the 1950s that the design of sturdy dining chairs in plywood was finally solved.

The furniture was sold both directly by Isokon and through retailers interested in modernism, such as Heal's on Tottenham Court Road, Dunn's in Bromley, Gordon Russell on Wigmore Street and John Lewis on Oxford Street. The department store Peter Jones on Sloane Square even commissioned Walter Gropius and Marcel Breuer to design settings for the furniture. Marcel Breuer also made plywood furniture for other companies while in Britain; Crofton Gane in Bristol both asked him to redesign and fill his home, and Marcel Breuer also made a temporary exhibition pavilion for Gane Furniture, which Marcel Breuer many years later claimed to be his best building ever besides the UNESCO building in Paris. Marcel Breuer also did the interiors and furniture for a flat in Berthold Lubetkin's (1901-1990) Highpoint building in Highgate for Dora Ventris and participated in an exhibition at Heal's with furniture designed by seven modern architects. Walter Gropius himself did some less successful designs for the Isokon Furniture Company: a plywood coffee table with a black laminate top, an aluminum wastepaper basket, and attempts to rework the Venesta stool. All of this was clearly below Walter Gropius' talent as an architect and educator, so when Harvard University offered him the position

as Professor of Architecture, he happily left Britain for the USA. Both Marcel Breuer and László Moholy-Nagy soon followed him across the Atlantic.

Jack Pritchard was again left without designers for his fledgling furniture company, but in 1939 he commissioned the Austrian Jewish émigré architect Egon Riss (1901-1964) to make a small floor standing bookshelf for his friend Allen Lane (1902-1970) of Penguin Books. Egon Riss had recently moved into Lawn Road Flats, and as always Jack Pritchard desperately tried to find work for continental European émigrés; Egon Riss was tasked with looking after the boiler at the Wells Coates building. The correspondence between Jack Pritchard and Allen Lane is dramatic; by the summer of 1939 they must have known that the outbreak of war was inevitable, yet they discuss how many units to make and how to sell the new design. What they did not know was that as part of the Molotov Ribbentrop pact of August 1939, Nazi Germany and Soviet Russia had divided up Eastern Europe in spheres of interest, and that Estonia would be invaded by the Soviet Union. The A. M. Luther factory in Tallinn was confiscated and the Luther family fled to Poland, and then to Germany. The production of Isokon furniture was no more.

After peace in 1945, Britain had a severe shortage of furniture and restrictions on sales and manufacturing, which had started during the war as the Utility Furniture Scheme and continued for several years. Jack Pritchard worked in various governmental bodies involved with raising the standard of British furniture manufacturing, but it was not until his retirement in 1963 that he revived the Isokon Furniture Company, this time with manufacturing in Britain. Marcel Breuer's Long Chair and nesting coffee tables were brought back, and Jack Pritchard also commissioned the British designer Ernest Race to design a new version of the Isokon Penguin Donkey, quite different from its 1939 incarnation. Allen Lane was still at Penguin Books and again agreed to help with marketing. Against a check for six pounds, the little bookshelf was sent out semi flat-packed, with a screwdriver included. This was the most successful Isokon furniture piece ever, and several thousands were made, but by the mid-1970s, Jack Pritchard had fallen out with the manufacturer.

Walter Gropius had passed away in 1969 and Marcel Breuer in 1981, and Jack Pritchard spent his retirement years touring the world, lecturing on the legacy of the Bauhaus, a lonely voice in a world where 1930s modernism had become increas-

ingly unfashionable. It was a meeting with furniture maker Chris McCourt of the London based company Windmill Furniture in 1982 that saved the legacy of Isokon. Jack Pritchard was by then 84 years old, but still determined to see his furniture made. Jack Pritchard passed away in 1992, but Windmill Furniture continued, eventually changing its name to Isokon Plus, the "plus" indicating that they had added more recent designs. In 2003, they commissioned the London based Japanese design couple Shin (1965-) and Tomoko Azumi (1966-) to design the Isokon Penguin Donkey Mk III, while also making the two previous versions. In 2006, two recent graduates from the Royal College of Art, Edward Barber (1969-) and Jay Osgerby (1969-), suggested the Loop coffee table, which became the start of perhaps Britain's now most successful design studio, BarberOsgerby. The Loop coffee table is now in the permanent collection of both MoMA and the Victoria and Albert Museum. After many years in an old Victorian workshop in Chiswick, Isokon Plus is nowadays based in Hackney Wick, East London. Besides relaunching virtually all of the original 1930s Isokon furniture, the company recently won the competition for a new chair for the Bodleian library in Oxford, opened in 1602 and the second largest library in Britain. Again, designed by Edward Barber and Jay Osgerby, the Bodleian chair is an achievement that Jack Pritchard would have been proud of. The Isokon furniture legacy continues.

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Magnus Englund

Co-founder of the London-based furniture retailer Skandium and the Director of the Isokon Gallery Trust. He has written several books on Scandinavian design. He currently lives in the former home of Jack & Molly Pritchard in the Isokon Building.

Conservation or Change for Works of the Modern Movement

BY JAMES DUNNETT

The Modern Movement in architecture, in so far as any such movement can be defined, was predicated on the idea that architecture had to change to reflect the radical technological advances that had occurred during the century preceding its formulation, and also to reflect the changing social needs that those advances had generated. Architecture, it was felt, had ossified and lost vitality as a result of not recognizing those changes. A century has now passed since the Modern Movement first formulated this program, and technical advances and the social changes they induce have of course by no means ceased, rather they have accelerated. So, it seems legitimate to say that a technological – and socially – determined architecture should reflect these further advances and changes. The evolution continues. But does that mean that each Modern Movement building created at a particular point in that evolution has in itself to continue to change in order to “catch up” with the evolution subsequent to its creation? It is a question that has importance when it comes to considering the conservation of Modern Movement architecture. It is an assertion that would ignore the formal element in architecture.

In each generation there are a number of buildings created that we seek to conserve, for various reasons but most frequently because they embody high architectural values. Their creators have managed to bring together the functional demands of the brief and the technology available at that time to create something that resonates in our minds, something in which the form and detail and material cohere as an expressive unity, embody a sense of harmony, and evoke in us a powerful reaction. They have created a work of art.

It is arguable that in a building of the Classical or Renaissance style, where there is a powerful formal architectural language superimposed on the structure, functional details, such as window frames for example, are not a significant contributor to the architectural expression and could be changed without harm to its status as a work of art. The Banqueting House in Whitehall in London, for example, designed by Inigo

Jones in 1619, originally had leaded casement windows, but these were changed at an early stage to the technologically more advanced sliding sash windows that we still see and take for granted. The published engraved elevations of classical buildings from the 18th century generally show the windows just as dark rectangles, omitting any detail of the window joinery, which was evidently considered unimportant. Yet conservators today would be very keen to conserve the original joinery in such buildings if it survived. Similarly, the importance would be recognized of conserving the joinery in a cottage of the same period, where there is no superimposed classical order and details such as window joinery become more prominent.

A building of the Modern Movement, generally without an emphatic superimposed architectural language, is more in the position of the cottage described. The details of the windows can become the dominant design element of the façade and, from an internal viewpoint, they mold the relationship between the interior and exterior that was so important a part of Modern Movement spatial aspiration. The very blankness of the windows of an early house by Adolf Loos, for example, is evidently an important part

of the thematic suppression of detail in the design as a whole. In the case of Frank Lloyd Wright's Falling Water the steel windows are clearly critical to the character of the building, to allowing the architectural planes to float free – including the points where the glass is set straight into the masonry without any frame at all. In the case of Mies van der Rohe's Farnsworth House the windows almost are the architecture, and in Le Corbusier's *Maisons Jaoul* the inventive design of the window joinery contributes very importantly to their architectural expression. In the case of the *Unité d'Habitation* at Marseilles Le Corbusier was so distressed by the design of the window joinery produced by his office while he was away in New York dealing with the United Nations Headquarters that, by his own account, he was forced to impose on the façades their powerful polychromy to distract the eyes of onlookers from noticing the windows.

Of course, some might argue that in all these cases “time must move on” – the original windows were inefficient in terms of minimizing heat loss and use of energy, and the original architect would certainly have used some other technology now available had he had that choice, so we should change these windows accordingly now. Few would agree in the case in the very iconic modern buildings mentioned – it would be recognized by most that any such change would seriously detract from the architectural value of the building concerned. But it is an argument that is influential in the case of many other valuable elements in our Modern Movement heritage.



01 Ernő Goldfinger, Balfron Tower, London, UK, 1965. © James Dunnett and Gavin Stamp, *Erno Goldfinger*, London, Architectural Association Publications, 1983.

02 Ernő Goldfinger, Balfron Tower, London, UK, 1965. © James Dunnett and Gavin Stamp, Erno Goldfinger, London, Architectural Association Publications, 1983.



04 Ernő Goldfinger, Balfron Tower, London, UK, 1965. © James Dunnett.

Take Balfron Tower, for example, designed by Ernő Goldfinger in 1965, a 26-story social housing block in east London, which is now listed Grade 2*, placing it within the top 6% of all listed buildings in the UK assessed in terms of importance. This did not prevent Historic England, the agency charged with assessing works to listed buildings on behalf of the Government, from approving in 2016 the removal of all the surviving original timber windows designed by Ernő Goldfinger and their replacement to a different design in a different color and material, as well as the complete re-planning of all the apartments – as part of the conversion of the block from social housing to private for-sale housing. Indeed, this change of appearance may be intended by its promoters to dissociate the privatized housing visually from the remaining social housing around it, some of it also

designed by Ernő Goldfinger. A year earlier, I had a conversation with the then Mayor of this part of London who had enthused about how, when the block was renovated, it would be possible to install all those modern features that the original architect would have used if they had then been available. I replied that, while Ernő Goldfinger certainly used the most up-to-date materials and technologies in general, we could not know what he would have done with them now, and that the purpose of listing was to preserve what the original designer had actually created (in this case the original windows were double glazed from the start, but those on one façade had since been replaced in plastic, albeit following the original design). But the following year Historic England evidently held the same opinion as the Mayor – even though it is certain they would not have done so in the

03 Ernő Goldfinger, Balfron Tower, London, UK, 1965. © James Dunnett.



case of an 18th century palace, for example.

The contribution of original components of the façade of this kind is vital to the cultural significance of such buildings. This was recognized clearly, for example, by Professor Wessel de Jonge when he carried out his highly-regarded conversion of the Van Nelle Factory in Rotterdam from industrial use to use by small offices and studios: he was careful to conserve the whole of the external curtain walling including the original glass with its industrial imperfections. The whole conversion strategy – and enhancement of energy performance – recognized the need for that. The Van Nelle Factory was very “advanced” for its time – but that did not mean that the conversion had to recognize or adopt changes that had occurred in curtain walling technologies since its time. In this case it recognized rightly that considerations of conservation had to take precedence. So, they should have done in the case of Balfron Tower. The rhetoric of *docomomo* should be careful not to encourage unnecessary change where it is destructive of cultural value.

James Dunnett

Architect, who worked for Ernő Goldfinger (1973-5) and for the London Borough of Camden. In 1983 he set up his own practice, James Dunnett Architects. He mounted a comprehensive exhibition at the Architectural Association of the work of Ernő Goldfinger, while collaborating on a publication about him with the late Professor Gavin Stamp: *Ernő Goldfinger* (London, Architectural Association Publications, 1983). He is the former chair of *docomomo* UK. He has taught and lectured at a number of universities and continues to practice architecture.

David B. Brownlee Interviewed by Ana Tostões

In February 2018, Ana Tostões interviewed David Brownlee, pioneer researcher on Louis I. Kahn and an historian of modern architecture and professor of the history of art at the University of Pennsylvania, in order to debate Kahn's realm of ideas and their contemporary significance.

David Brownlee was guest curator of the exhibition *Louis I. Kahn: In the Realm of Architecture* (Museum of Modern Art, New York, 1992), and is co-author of the homonymous book (with David G. De Long, New York, 1991, translated into four other languages) that stands as the first worldwide comprehensive publication on Louis I. Kahn

Ana Tostões What have moved you to approach Louis I. Kahn and to edit, with David De Long, the book *Louis I. Kahn: In the Realm of Architecture* (1991)?

David Brownlee I was interested in Kahn for three converging reasons: 1) Having been born and grown up in Philadelphia, I was always acutely aware of that distinctive and relatively underappreciated architectural character, 2) when I graduated from college, in 1973, Kahn was still alive and he was the great hero of the time, representing a new future for modern architecture, representing a change. We had to sort of look ahead of the text book to see beyond Le Corbusier which is where my first teacher in modern architecture tended to stop, 3) in 1980, when I finished my PhD, I got a job at the University of Pennsylvania. The university had just recently received the deposit there all the papers from the office of Kahn. They were uncatalogued and not ready to study. So, suddenly I was there, 29 years-old, with this great mountain of material from Kahn, arguably the most important architect in the world after WWII. The former Dean of the School of Design at Penn, G. Holmes Perkins, mostly known as Dean Perkins, hired Julia Moore Converse to be the curator of the architectural archives – which was a hypothetical one, because there was no archive: there was a pile of boxes, the Friedrich Weinbrenner drawings and a scattering of other things that Holmes had purchased. Julia and I recognized that our moral responsibility was to undertake the study of the Kahn papers. When we were beginning, there was no institutional establishment for this, so the first thing we decided to do was a small project which could earn credibility for the architectural archives so we could do something bigger. That's why we chose to work on Friedrich Weinbrenner, and we managed, in fact, to win a National Endowment for the Humanities grant, establishing the architectural archives as a professional organization. Then David De Long came to Penn, from Columbia University, to be the head of the historic preservation program, and we quickly became friends. Soon we decided that we needed to work with Julia Converse to organize the papers of Kahn and try to understand this most important American architect. Even if, up

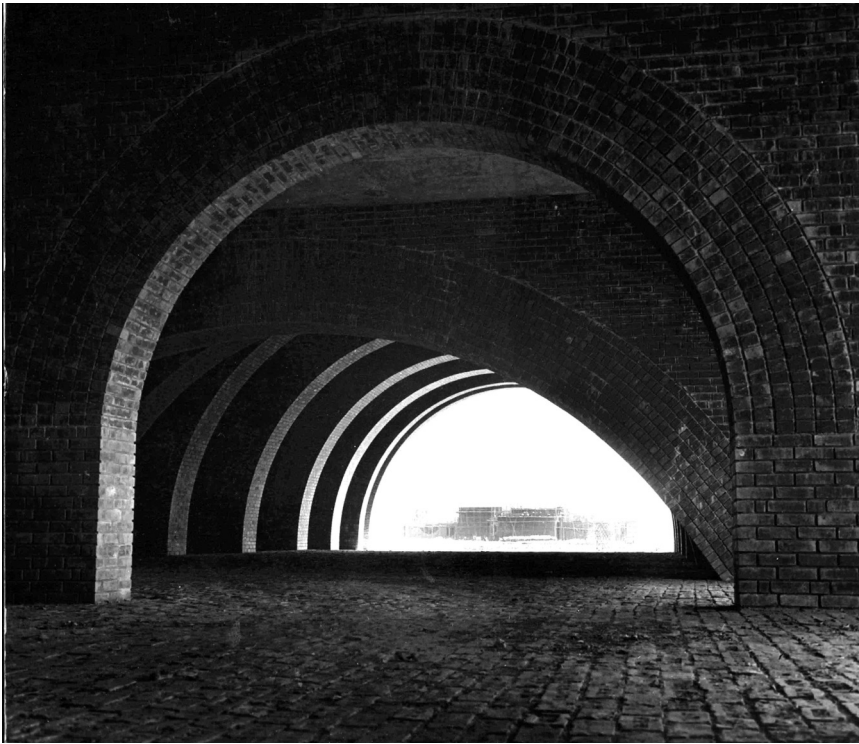
until this time, I had worked mostly in the 19th century and on European architecture, being a Philadelphian in Philadelphia, I recognized almost a moral importance of accepting this responsibility. Then, David and I started holding, for a number of years, seminars in which our students began to look at the materials. We spent several years teaching and trying to begin establishing, with the students, a timeline and a chronology. This was fundamental, because no one knew him before the Yale Art Gallery. Like the invisible man, Kahn suddenly became apparent in 1951. Then, there was also the myth of him as being a hopelessly mystical, impossibly impractical man, whose greatest achievements were in seducing a lot of women. We were determined to be as objective and scholarly as we could possibly be. Recognizing the vastness of the work, we realized that we needed to work with a team of other scholars, now graduated students in Historic Preservation and in Art History, some of them extremely important. Julia Converse, along the way, got Garland Press interested in joining the team, as they believed it would be valuable to publish all the drawings of Kahn. And they did it. This enormous series of volumes was created from all the tiny little, faint drawings of Kahn. Then Richard Koshalek, the director of the Museum of Contemporary Art in Los Angeles, who was very interested in architecture, conceived the idea of a Kahn exhibition. Like David and me, he recognized the great opportunity for a complete presentation on Kahn at that time, so he and his assistant director, Sherri Geldin, started to work on it. To work on Kahn, they naturally had to come to Penn, where they found David and me, who became the guest curators of the exhibition. The exhibition offered the opportunity to create the book that became "the" book you were speaking of. It has essays by David, me, and by our students who went on to be now well-established and quite famous architecture historians in their own right. That book was produced for the exhibition that Richard Koshalek agreed to open in Philadelphia, even though it was organized in Los Angeles. It was an exhibition designed by the architect Arato Isozaki with an attention to detail that I had never seen. Every wall had an elevation drawing showing where every object and

every label would. All new color photography was commissioned from a Californian photographer, Grant Mumford, and we experimented with things like having video in the exhibition: amazing, moving objects!

AT There were videos with films of Kahn?

DB No. In a sense we were trying to depersonalize it a little bit because of the myth and the cult around his personality. We were trying to be objective art historians, which means, at first, to look at the objects and to analyze the data. Besides, we were also trying to deconstruct the dogma at that time, which was that Kahn had been the father of Postmodernism. There were people who literally said "Kahn was great, if he'd just gone all the way and put a real temple portico on his buildings, if he'd just gotten over his inhibitions and really made a building that looked genuinely Romanesque", that he was timid, and "it took brave younger architects like Robert Venturi and Bob Stern to go all the way to classical architecture". It's certainly the case that Kahn embraced history and, in that respect, he was, I guess we could say, a sort of forefather of the Postmodernism. But one of the results of our frankness was that, when we put the show up, it was not very popular. When we mounted the show in the early 1990s, Kahn was sort of out of fashion and there was a prevailing notion that "well, what is really happening now is Postmodernism, and Kahn just really didn't get all the way there. And so, there was this global kind of criticism, perceptible in a lot of reviews. Kahn's importance is recognized more today than it was then. In a way, I think we could say that at the time, the historical narrative was that the future was Postmodernism, that Modernism was dead, and that Kahn was still a modernist. This is sort of interesting, but it is an historical dead-end, and what I think we've seen on the last 30 years is that Modernism has had enormous staying power, an enormous vitality and an ability to reinvent itself, and I think Kahn was really among the first to do this, to see that within Modernism there were ideas that could be continuously refreshed – probably because in some respects they were not really modern: they were ancient ideas about timeless things.

AT I was not aware of the debate on Kahn being considered a post-modern architect here. I always understood his importance within the Modern Movement as a work in progress through 20th century and even 21st century. Contrary to some other modern architects, understanding architecture within a global scope, he was able to make the link with memory, with no prejudice. But he was certainly not in the postmodern line.



01 Louis Kahn, National Assembly Building of Bangladesh, Dhaka, 1964-1982. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.

DB Kahn didn't accept the degradation that happened to Modernism in the 1940s and the 1950s, after the Bauhaus people came to America; it was a sort of commercialized Modernism, with its sincerity and artistic content reduced. It was like a new "style". Other kinds of Modernism were happening, but in America we sort of clunked into the International Style that became a corporate style, where the lightweight transparent box became the norm. There was a famous cartoon of a young architect taking a sheet of graph paper, gridded paper, and simply cutting it out and taping it to his drawing as the façade of the building. What Kahn managed to do was, in some respects, take Modernism back to its moral and philosophical roots, conceiving architecture as a project serving human beings. That architecture was about honesty, with a moral dimension with respect for people, and the responsibility of integrity and respect to materials. And architecture, that is great architecture, was conceived with history in mind.

Le Corbusier was not afraid of history either...

AT Not at all. He followed history. He went to the places he thought could be challenging and inspirational. To Turkey, Greece, Italy. Aalto came to Italy and to the North Africa too.

DB Absolutely. I think that Kahn revived that tradition.

AT We are talking about coming back to the roots of the Modern Movement and to the concept of honesty, putting people together,

with simplicity, but also by calling the meaning of the symbol. I think the symbol is one of the main keys on Kahn.

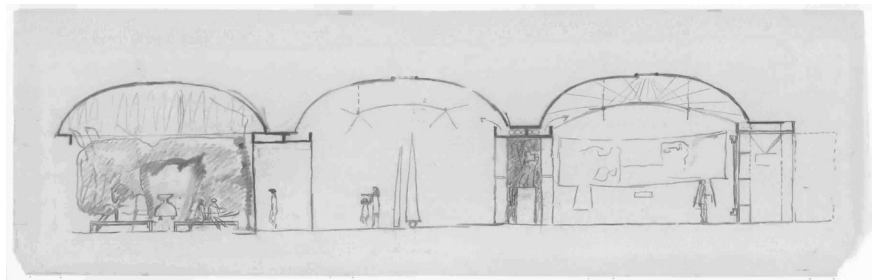
DB I think it is, too. A very important thing he did was rejecting the idea that the Modern Movement was just a bunch of abstractions, a group of geometrical forms, that it was just a matter of composition. He did deeply believe in society, and this is something that was neglected for a period in appreciating him. He believed in a social project for architecture. He is known by that famous phrase that architecture begins with "form", and we think of form as being physical shape, but he didn't think that way at all. Form was the human institution that was to occupy the building, and it began with an understanding of how human beings interacted and used that particular building. If I did myself one thing in the book that I am very proud of, it was to emphasize Kahn's own political formation in the 1930s-1940s as a socially progressive architect. As a man who was actually the

chairman of the American Institute of Architects committee on the desegregation of the profession. He was that kind of politically-engaged person. And the fact that he talks so much about art and abstraction in his latter career tended to obscure the fact that there was, at the heart of his architecture, this deep commitment to architecture as a human and social project. I think that is also related to the grand tradition of modern architecture, where abstract forms are used for higher social purposes.

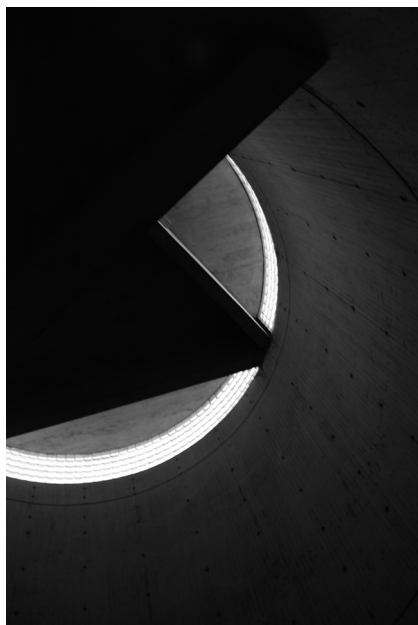
Kahn work was intensely humanist, both embracing the individual and the society. The sense of individual is present in that Kahn phrase "a great city is a place where a small boy, as he walks through it, will find what he wants to do for the rest of his life". Then, there is so much in his work that talks about architecture and people as communities: he says that a plan is a community of rooms and that the street is a room by agreement: the agreement of buildings that surround the street to come together and create a place. The deep underlying humanism in his work flies in the face of two things: one, already mentioned, is the commercialization of the International Style and its development as a corporate style, as a brand for the American international imperialism of the period, and the other thing is his rejection of the sterile formalism into which modern art had descended. There is a very strong tradition in American criticism of painting that exalts abstraction, that asserts the absolute pre-eminence of form and shape. Even if Kahn's works sort of look like that sometimes, he rejects it philosophically, he rejects its disconnection from the human, and that notion of autonomy.

Getting back to your question about symbolism, I think the degree to which Kahn buildings evoke, stir in our memories, and draw on the feelings we have established in previous experiences, is very powerful.

Kahn buildings have two kinds of weight: one is their physical weight (and that is somehow a rejection of the physical character of the glass box), and the weight of "serious purpose" – the moral weight. It is there where the fundamental, universal symbolism of architecture becomes foundational. It's not



02 Louis Kahn, Kimbell Art Museum, Fort Worth, Texas, USA, 1966-1972. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.



03 Louis Kahn, Yale University Art Gallery, New Haven, Connecticut, USA, 1953.
© Ana Tostões, 2018.

about that kind of specific symbolism like “this looks like it’s Christian” or “this looks like it’s French” – even though people do argue about it, and I think that there is something to be said about the buildings in Bangladesh and in Ahmedabad in relation to Mughal architecture and to the indigenous architecture of Muslim South Asia – but I do think that it is about a more open-ended evocation of memory. His buildings do not primarily invite you to imagine the future but invite you to recognize how the present is connected to and strengthened by tradition. I believe the great achievement of Kahn was his effort to create buildings that were not romantic and retrospective but drew on the great powerful tradition of human accomplishment to give us the confidence to move forward. In the end, these are buildings that are not about the past, they are very much about the present and the contemporaneity.

AT And about the future.

DB And about the future, but it is a present and a future that can draw confidence from the great things that human beings have accomplished in the past.

AT How do you connect the “simplest” program, which is the house – with its close relationship with the family and the domestic program – with the great buildings with social committed programs, also considering that Kahn first 20 years of practice as an architect were spent on designing houses?

DB Yes, it is very important to remember that Kahn in the 1930s and in the 1940s was mainly an architect of houses and that during the WWII he wrote, working with Oscar Stonorov, two wonderful little booklets

about city planning, which were basically about housing and cities. In that respect, he was really part of the Modern Movement’s commitment to social housing. I do think that he thought of most large public buildings as essentially large houses, as his conception of served and servant spaces is, in many respects, fundamentally a domestic conception composed by a large room and an encircling group of smaller rooms that surrounded it, with the idea that everyone would come together in the middle room, that would be the family gathering place. We can identify these principles in the Erdman Dormitory at the Bryn Mawr college, where each one of the three diamonds has a perimeter of student rooms and a gathering place in the middle; in the Rochester Church, with the sanctuary in the middle; in the Assembly building in Bangladesh, Dhaka, with the central assembly hall. And these are reciprocal things because there is, in a sense, the domestication of public architecture, but there is also the heroic monumentalization of domestic architecture. I believe he really thought that individual life was heroic, and that collective life was somehow domestic.

Philadelphia’s “little streets” are those kinds of spaces: they are like outdoor rooms with the conception of a common central space, and a surrounding periphery of smaller spaces; it is like the urban planning enlargement of that idea of a building, where the street, as a communal space, may act as a served space, bringing that sense of community. Philadelphians live in houses, in their connection to the community, and that is really important to Kahn’s conception of the house; it is rooted in Philadelphia thinking. My favorite buildings by Kahn are the faculty houses in Ahmedabad at the Indian Institute of Management. It is a row of rowhouses turned 30°, so that each of them has a little private front yard and a little private backyard; it is the lesson of Philadelphia rowhouse energized by a bit of abstract geometry.

AT In the *Realm of Architecture*’s chapter on transcendence, we may understand the light question in connection to a kind of desire for transcendence. I believe it was through a common denominator to those two spheres – private and public – that Kahn looked to achieve that transcendence, giving people emotion. And even knowing very well how to use modules and having a draconian discipline on construction systems, within his commitment to people and society, he never repeated projects.

DB I think you’re right to emphasize the striving, dynamic relationship of what he calls silence and light, in an abstract sense. He says that light is the real in the material, and silence is the realm of ideas, defining that the role of the architect is to transport abstractions from silence and bring them into

the light of day. I think that idea in the realm of art and architecture has its parallel in his vision of society which is an understanding that individual has certain demands and desires, rather materialistic and mechanical, but that the individual is energized by a desire to join with others to create something more than physical and material. That project is completed in the creation of those institutions of assembly, whether they are churches or national parliament buildings or world fairs; those places where people come together and become more than just the little physical entities they are. They add up to something greater than they would be if they were standing just side by side.

Both in architecture and in society, there is the understanding that the great designer or the great social planner will be the one who is able to build a bridge between the material and the ideal, between the individual and the collective good, between the solution of mechanical problems and the achievement of artistic ideals. In Kahn’s later discussions of the role of the architect, he says the architect works at the threshold between silence and light, between the real and the ideal; he says that that intermediary position means to basically to be there at the doorstep, to help things move from the material to the ideal, from the selfishly individualistic to the communitarian. That’s the architect’s position; that’s the architect’s job. It’s to be there, at the door.

David Brownlee

(b. 1951, Philadelphia, USA). Architectural historian, PhD, professor of the history of art at the University of Pennsylvania.

He has won several fellowships, and his work has earned major publication prizes from the British and American Societies of Architectural Historians and from the American Institute of Architects. He has been elected a Fellow of the Society of Architectural Historians and is a recipient of the University of Pennsylvania’s Lindback Award for Distinguished Teaching. He was the chair of the committees that proposed the reshaping of the University of Pennsylvania’s undergraduate residences in 1997 and directed the implementation of a comprehensive system of College Houses, serving as Director of the Office of College Houses and Academic Services for four years.

Amongst his most important publications are *Louis I. Kahn: In the Realm of Architecture* (with David G. De Long, 1991, translated into four other languages), *Making a Modern Classic: The Architecture of the Philadelphia Museum of Art* (1997), *Building America’s First University: An Historical and Architectural Guide to the University of Pennsylvania* (with George Thomas, 2000), *Out of the Ordinary: Robert Venturi, Denise Scott Brown and Associates: Architecture, Urbanism, Design* (with David De Long and Kathryn Hiesinger, 2001), and *The Barnes Foundation: Two Buildings, One Mission* (2012).

He was guest curator of the exhibition *Louis I. Kahn: In the Realm of Architecture* (1992) that took place at the Museum of Contemporary Art, Los Angeles, and other venues, and was co-author of the homonymous book (1991), the first worldwide comprehensive publication on Kahn.

William Whitaker interviewed by Ana Tostões

In February 2018, Ana Tostões interviewed William Whitaker, curator and collections manager of the Architectural Archives of the University of Pennsylvania School of Design, where the Louis I. Kahn Collection is hosted, in order to debate the importance of documentation for the preservation of Kahn's legacy. William Whitaker was curatorial consultant of the exhibition *Louis Kahn: The Power of Architecture* (Vitra Design Museum, 2012) and is the co-author of *The Houses of Louis I. Kahn* (with George Marcus, 2013), the first comprehensive publication on the architect's house designs. The management of the Louis I. Kahn Collection has been having a fundamental role, not only in the documentation and interpretation of Kahn's life and work, but also in the success of the contemporary rehabilitation projects undertaken in his buildings.

Ana Tostões We are in the Kroiz Gallery at the Architectural Archives of the University of Pennsylvania. These archives are the driving force for supporting the preservation of the unique legacy of Louis I. Kahn. Bill, you have done fantastic work here, not just in the conservation of the papers in literal terms, but also in connecting people. This is an incredible positive sign for the future.

William Whitaker Yes. This is an archive that is valuable beyond the academy and museum. It is integral with maintaining built heritage and to understanding Kahn's ideas and intent. And that's inspiring. It's exciting to understand the level of thinking that went into his work and, later, to witnessing the thoughtful engagement of those responsible for conserving these buildings with his legacy. We've seen that demonstrated at places like the Yale Center for British Art, the Salk Institute for Biological Studies, and the Toby and Steven Korman House, among others. Great art demands a high level of thinking and understanding for its endurance. We can testify to that and recognize our role in it.

AT Congratulations for that, Bill. The Archives have quite a diverse collection, is that correct?

WW Absolutely. We are more than the Louis I. Kahn Collection. The Architectural Archives were established in 1978 and quickly grew to more than 100 collections. Our holdings range from models and drawings – some tiny and others as large as a trestle table – to papers, photographs, material samples and fragments, as well as film and video. One of our largest objects is an ornamental screen designed by Robert Venturi for the Philadelphia Museum of Art. Today, our collections include the vast archive of Venturi and Denise Scott Brown, and a range of over 400 others dating from the 17th century to the present. We are particularly proud of the many collections that add depth to our core holdings; those of Kahn's in particular.

AT So, when you acquired the Kahn collection in 1978, we may say that the Archives got more value in a way, because it was a "round collection", including drawings, writings, and all kinds of different sources.

WW It is a "rounded" archive in the sense that it contains everything that was in Kahn's office at the time he died – from business

records and correspondence from his day-to-day practice to the over 36,000 drawings covering the full development of many of his greatest works, but not all of them. Somehow, not everything was saved or preserved. It has been said that Kahn did not realize or appreciate the value of his drawings until Arthur Drexler put them on view at MoMA in 1961. Other records were kept by clients. Fortunately, many of his clients have seen the value in donating their holdings to the Architectural Archives.

AT In your daily work, you are in contact with people close to Kahn's work, collecting stories and other elements necessary to understand and enrich the Archives.

WW Yes, that's true. We started with the idea of beginning a collection – that will, obviously, never be truly complete – and then seeking out the many layers that can add meaning and depth to the collection. The network of people is fundamental: there are collaborators who run projects (and payroll too) who have material in the personal possession; there are those who were working out in the field overseeing construction (and who bring you the story of living in Bangladesh while sorting out how to actually build the Capital complex at Dhaka and their interactions with that country's culture and climate); there are the collaborators outside the office, specifically engineers or landscape architects, who worked as consultants and played important roles (such as August Komendant or Harriet Pattison. Both worked closely with Kahn on several major works and donated their collections to the Archives). We recognized that the collections of clients are important. The houses are a central part of Kahn's built legacy in the Philadelphia region. Clients have knowledge and insight into Kahn's working process and, because of the relatively small scale of a house commission, allow a closer understanding of his creativity.

AT So, your work at the Archives is not just to organize things, it is done through creative and interpretive research. Your book, *The Houses of Louis Kahn* (with George Marcus, Yale, 2013), seems to me to act as the fulfillment of your research and contact with Kahn's clients, staff, etc.

WW The organizing part is incredibly important.

AT Of course! But when you are organizing, you are studying, and then you start your process of interpretation.

WW Sure. It is fundamentally a process to gain intellectual control of a group of items of historical significance. The discipline of that is incredibly important so that others can get to it too. But implicit to that is the sense of why you are saving this material, why it is of value, why it matters, and how it can engage with audiences today.

AT And you connect that with a kind of social or educational mission too.

WW Yes, because we are talking about the artist's imagination. This is what we have as evidence of a vital thinking process that occurred, that played out and resulted in buildings like the Kimbell Art Museum. To have the chance of understanding even a fragment of what happened is inspiring and an incredible learning tool.

AT To be able to understand how the vaults of the Kimbell were done, and how that light was achieved, might be something absolutely extraordinary.

WW Or simply to understand the way that nature reveals itself in a building. Archives can reveal insights into this in wonderful ways. Architects get paid to do a particular commission, but they also do a lot of things they don't get paid for: they collect books, they travel and record their experiences in sketchbooks and journals, they take photographs, they "waste" their time and money in many different ways and places, because they can't stop themselves from doing so! This is something at the very heart of creativity, a glimpse into what the artist needs to fuel the spirit. Take for example the architect's notebooks. It is common to find a name and address written in the front of the book along with the line, "if found please return to" – a kind of confirmation that it is a thing of value. Kahn, however, never put his name in his sketchbooks. He misplaced some and "borrowed" volumes from others (their handwriting sometimes mistaken by some



01 Louis Kahn, Korman House, Whittemarsh Township, Pennsylvania, USA, 1971–1973.
© Ana Tostões, 2018.

for Kahn's). He tore pages out, he sent these pages as letters or notes to others. They are a total disaster, with no sense of continuity. The only reason why Kahn carried a notebook was to have a piece of paper handy, something to draw out his ideas on. But once he had done so, once the realization was fixed, he moved on. He didn't need to return. Every creative architect is different and that is one of the lessons you can take from an archive.

AT Through the material you have in the archive, the collaboration with Luis Barragan and Kahn's references to the monastery of Assisi, are you able to tell us how, in the Salk Institute, he proceeded to arrive at the decision of have the courtyard open to the sea and sky, with no trees?

WW That happened very late in the project. In 1965, Jonas Salk and other key colleagues at the Institute had moved into the North building and were overlooking the court space which had always been intended to be a cloistered garden, filled with trees crisscrossed by small water courses. The idea of the monastic experience with its ritual, retreat, and dedication, was a defining characteristic of the project up until that moment. Kahn spoke of such things and one finds little sketches on the margins of his Salk studies that refer to the great monastery at Assisi, among other sites in Italy. Salk's son Jonathan recently recalled to me witnessing his father meeting with Kahn at their lake house in West Virginia during the summer of 1960, and how Jonas took time to explain to his child the importance of Assisi and how it spoke to the aspirations he and his architect had for the project. This all happened five years before Kahn's call to Barragan. From the moment when the Mexican architect walked out onto the plateau overlooking the Pacific and uttered – "but it's a plaza" – the power of the void space, what would become the courtyard, took hold of the creative imagination. To reconstruct the story, we can look

to the letters exchanged between Kahn and Barragan, between Kahn and Larry Halprin (who was also consulted at the time – and whose collection is among those held by the archives), we can speak to two men who translated over the phone or on site in La Jolla, and we can pour over drawings (both at Penn and in the Barragan Collection in Basel). To reconstruct the story takes many, many layers of information, not only from primary source materials, which are essential as a framework, but, as we are dealing with the recent past, we can also learn from the actors and participants who were part of the action and provide us a range of viewpoints into a defining moment. The end result is having a world of creativity opened up for you.

AT It is amazing to realize that Kahn was so flexible with his clients and how important lessons can be taken from studying how the drawings change over time.

WW Building a collection like this leads one to other places, to seek out other points of view. John Nicolais, an architect trained at Penn and a very talented photographer, took over 800 photographs of the Salk over the course of 15 years – from 1964 to 1979 when he tragically died at age 40. His images, beautiful as they are, also were particularly useful for the recent work to restore the teak windows (a project led by Susan MacDonald at the Getty Conservation Institute). These images documented the kind of change over time that was occurring at the Salk and shaped attitudes about maintenance that went against Kahn's design intent. The photos helped to reset those expectations.

AT What do you think about the possibilities of the Archives – with its resources in drawings, photos, models, sketches, etc. – has for the education of architects? I imagine students coming to the Archives just to study, to research buildings and how they were made. I remember during my studies, the time we spent understanding just

one drawing, discussing a sketch, and how we discovered more things each year. This is an important part of the education of an architect. I've always admired the last sentence of the **docomomo** constitution because it is about learning from good examples, for the sake of doing better architecture.

WW I couldn't agree more. We have many students who engage with the collections through tours and talks (over 1,000 last year). Sometimes they are intimidated by the real thing. They don't know if they can engage with it. So, one of our key roles is opening up this heritage, to help students among others to understand that it is accessible to them and that there are narratives in the materials which they can discover for themselves. It's like creating a path and making a door. Sometimes students come in and they know what they are looking for, but often they do not. It is our job to help build the skills in research, visual literacy, and – frankly – creativity. It helps to be an architect myself in this pursuit. We are also able to link the experience of the collection at the Archive with the experience of visiting Kahn's built work – particularly his houses. That opens the door in a different and powerful way.

AT It's a great richness for students.

WW I think they get a lesson of lasting value.

AT Can you please share your thoughts on the future of Kahn's heritage?

WW There was a recent crisis at the Kimbell Art Museum involving the construction of a 12 story, glass-clad hotel, directly on axis with the magnificent garden court that would have irrevocably transformed the relationship of the building and its garden landscape. It was a big project, involving tax incentives, a new arena, the city council, and many stakeholders. It caught everyone at the Kimbell and the neighboring museums by surprise. Fortunately, the decision to allow the development to proceed was reversed. Kimbell staff and trustees now understand how sudden changes can occur and how those changes can be beyond their control.

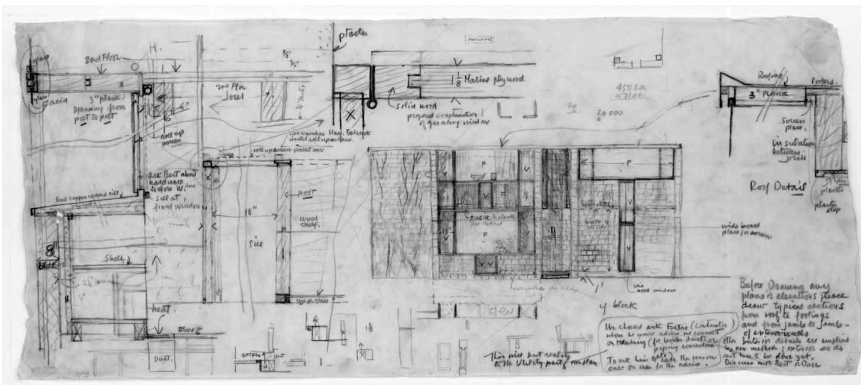
In many ways, Kahn's buildings are about more than just bricks and mortar. They are about a larger sense of character that the structure – building and landscape together – prepares you for as you arrive at the site. The sense of calm repose at the Kimbell, with its garden groves, graveled walks and animated fountains prepare you for and enhance the experience of the art within. Kahn's vaults, of course, add to that magic. The pressures of expansion, of development, that encroach upon a historic resource, remains a vexing concern, Kahn's legacy or otherwise.

If we look at the success of the Salk Institute, an incredible institution and place to work, where pressure to provide the best,



02 Louis Kahn, National Assembly Building of Bangladesh, Dhaka, 1964-1982. © Harry Palmbaum Collection, The Architectural Archives, University of Pennsylvania.

03 Louis Kahn, Esherick House, Philadelphia, USA, 1959–1961. © Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission.



04 Louis Kahn, Indian Institute of Management in Ahmedabad, India, 1962–1974. © Anant Raje Collection, The Architectural Archives, University of Pennsylvania.

and most up-to-date facilities is a constant or to Dhaka, Bangladesh, where terrorist attacks and security concerns have cut off access to the site by the people of that country. The people cannot get close to the building anymore. And that was never anticipated in Kahn's work or his ideas for the building.

So that's the larger sense of encroachment. Returning to the Kimbell. It was a wake-up call for the community of Fort Worth: in resisting the hotel development, the neighboring museums – the Amon Carter (Philip Johnson) and the Museum of Fine Arts (Tadao Ando) came together and recognized they could no longer take a passive view.

AT It means the success of a cultural district, with an incredible architectural heritage!

WW Yes, and there are people who want to live in the area for that very reason. They are building new residential areas with restaurants and exciting nightlife. And this is great. It is just sad when it gets to a point

where it is too much. And this hotel was an example of that.

AT Regarding Kahn's work in India, the Indian Institute of Management in Ahmedabad, what are your concerns for the coming times?

WW Well, there encroachment is very real concern. It is the most complete campus in Kahn's work: the embodiment of his notion of "school" where places beyond the classroom – where students live and where the informal aspect of education happens – is beautifully expressed in the landscape, in the buildings, and in the relationships in between.

The city of Ahmedabad has grown tremendously and what was an outlying area with a village like atmosphere is now quite urban. There is now no space for the campus to expand and the pressure to do so is becoming acute. Kahn integrated an area for faculty housing that encompasses about $\frac{2}{3}$ of his site plan. These are modest structures of brick with deep porches, with provisions in the site

plan allowing for privacy and garden spaces. There is an attitude that these structures no longer fulfill the expectations of faculty and should be replaced by high-rise tower structures. That would be a shame. Positive steps have been taken by the administration at IIM towards heritage conservation. They've designated the central court area as Louis Kahn Plaza and begun to invest in restoration of areas in the campus's central area, including classrooms, administration, library and dormitories. But their approach has been piecemeal. No assessment has been made of the significance of the whole and their process lacks transparency.

In the days before his death on March 17, 1974, Kahn made sketches for two buildings for the IIM – a management development center (MDC) and a dining hall. Those sketches were the basis for the work that his close collaborator Anant Raje completed, transforming initial ideas into wonderful structures very much in keeping with Kahn's spirit. There were few people Kahn trusted as much as Raje. The MDC, in particular, is threatened by ignorance of Kahn's role in its design.

Understanding the history, how the buildings have changed over time, and establishing policies that protect heritage values, can be a positive framework for the future. Kahn's buildings are tough, they are beautifully built, even robust, but they are fragile too. That's part of their magic. Educating stakeholders about this fragility is something the Archives is very committed to supporting.

William Whitaker

(b. 1970, USA). Architect and architectural historian, curator of the Architectural Archives, University of Pennsylvania School of Design. He has lectured on a broad range of subjects related to 20th century architecture, landscape, and community design in the greater Philadelphia region, to audiences in the United States, Canada, Germany and India.

He has organized and co-curated over 30 exhibitions, including retrospectives on Antonin and Noemi Raymond (2006), Wharton Esherick (2008), and Anne Griswold Tyng (2011) and served as the director of research for the landmark retrospective, *Out of the Ordinary: The Architecture and Design of Robert Venturi, Denise Scott Brown & Associates*, organized by the Philadelphia Museum of Art in 2001, and as the curatorial consultant for *Louis Kahn: The Power of Architecture*, a major exhibition of the architect's work organized by the Vitra Design Museum in 2012, currently on world tour with venues in Rotterdam, Oslo, London, Taipei and San Diego. Most recently he co-curated *Experiments in Environment: The Halprin Workshops, 1966–71* (with Sarah Herda and Ellen Alderman, 2014) for the Graham Foundation for Advanced Studies in the Fine Arts, as well as *Venturi's Grandmother: Patterns for Production* for the Fabric Workshop and Museum in Philadelphia (with Kathryn Heisinger & others, 2014). He is co-editor of *Crafting a Modern World: The Architecture and Design of Antonin and Noemi Raymond* (with Kurt Helfrich, 2006), and co-author of *The Houses of Louis I. Kahn* (with George Marcus, 2013), the first comprehensive study of the architect's house designs.

NEWS

Louis Kahn: The Power of Architecture

Exhibition at London Design Museum
London, UK, 9 July - 12 October 2014

Louis Kahn: The Power of Architecture is a consequent review and historic summary of Louis I. Kahn's life, 20 years after the last exhibition about him¹. This exhibition, compiling the main works and research projects of Kahn, is a full experience that allows the public to get to know the life of one of the most important American architects of the 20th century².

The starting point of the exhibition is a chronological list of projects (1926-1974) of Kahn, entailing his works as a design consultant, unbuilt and constructed projects as well as urban plans, publications and exhibition material, that reveal a professional life full of ups and downs.

The core of the exhibition is divided into six different topics: "City. Philadelphia as urban laboratory", "House. Regional planning", "Science. The world as structure", "Eternal present. Ruins and archetypes", "Grounding. Earth, water, wind, light" and "Group form. The logic of assembly". The first one, "City. Philadelphia as urban laboratory", is dedicated to the urban plans of the city where Kahn lived, studied and maintained his office. He was a pioneer with radical and visionary concepts for the reconstruction of the inner city of Philadelphia, with reasonable success in the construction of his ideas. Showing plans, perspective drawings and conceptual schemes, this part of the exhibition shows the dedication of Kahn to his own city's future.

Followed by "House. Regional planning", the public enter into a differently scaled realm of Kahn's architecture in Philadelphia, since all of his houses were constructed in and around the city. Study drawings with colors, schemes and annotations are revealed in this section, demonstrating the importance of the house for Kahn, and how he always has envisioned it as an institution. The exhibition also offers a unique opportunity to appreciate a partial true scale replica of the window ledge with a bench of the Norman and Doris Fisher House (1960-1967, Hatboro, USA).

From the houses, the exhibition continues to "Science. The world as structure" where one can assist to the Kahn's analogy between architecture and natural sciences. The public can find drawings of geometric

studies relating the structure of the building to science, with the ultimate result being the project (unbuilt) of the City Tower (designed in collaboration with Anne Tyng, 1952-1957, Philadelphia, USA) whose structure directly evokes the DNA formula. This part ends with the comparison between drawings and the timber models of the Alfred Newton Richards Medical Research and Biology Buildings (1957-1965, Philadelphia, USA), the Library and Dining Hall at Phillips Exeter Academy (1965-1972, New Hampshire, USA) and the Yale Center for British Art (1969-1977, New Haven, USA), where one can see the development of Kahn's new alternative ways of building with concrete.

Controlling concrete and receiving major commissions for significant projects promoted Kahn to the "Eternal present. Ruins and archetypes". With influence from Rome and its solid and timeless constructions, Kahn was able to endorse the meaningful mass and weight of architectural buildings such as Sher-e-Bangla Nagar (1962-1983, Dhaka, Bangladesh), Hurva Synagogue (1967-1974, Jerusalem, Israel), Indian Institute Management (1962-1974, Ahmedabad, India), Memorial to the Six Million Jewish Martyrs (1966-1972, New York, USA, unbuilt) or the Mikveh Israel

Synagogue (1961-1972, unbuilt, Philadelphia, USA). Kahn's clever use of concrete in each of his projects is well represented in this section through the use of different materials in models and drawings.

Apart from the aesthetics of the building, Kahn was also concerned with the elements that surround every construction, which led us to the "Grounding. Earth, water, wind, light" part, where we can find the best representative projects designed by him, related to nature. This is seen through his utilization of colorful expressive sketches of projects: The General Motors Exhibit at the 1964 World's Fair (1960-1961), the Salk Institute for Biological Studies (1959-1965, La Jolla, USA) and the Kimbell Art Museum (1966-1972, Fort Worth, USA).

The final segment, "Group form. The logic of assembly", closes the travelling around of Kahn's professional life with the understanding of the logic behind each building. Besides the factors already discussed, Kahn conceived space in various ways compared to the Modern Movement ideas, which created hierarchy within the overall form, distinguishing "servant" and "served" spaces, turning each building into a unique and varying experience for the individual. Taking into consideration the surrounding environment, timelessness and people, it results in the creation of exclusive ambiances whereby Kahn exposes the true materiality of concrete, timber and glass construction. The First Unitarian Church and School building (1959-1969, Rochester, USA), Fine Arts Center (1961-

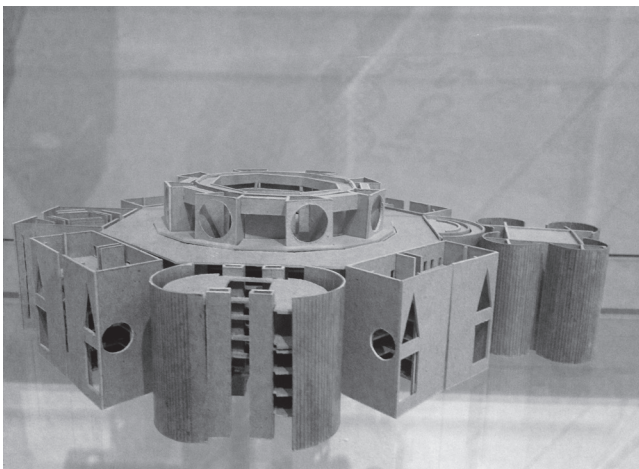


01 *Louis Kahn: The Power of Architecture*, London Design Museum, London, UK.

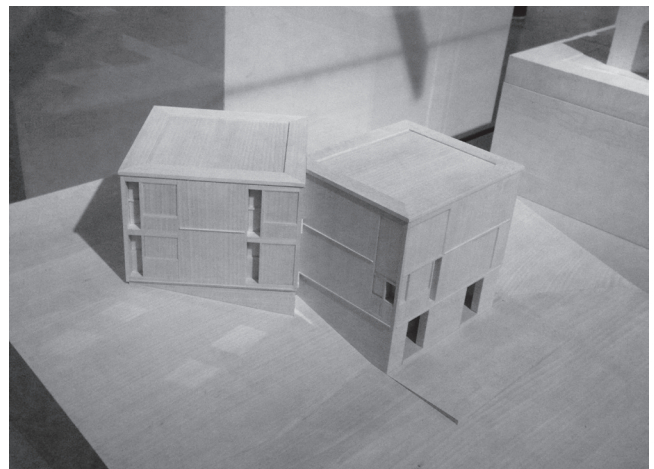
02 *Louis Kahn: The Power of Architecture*, London Design Museum, London, UK.



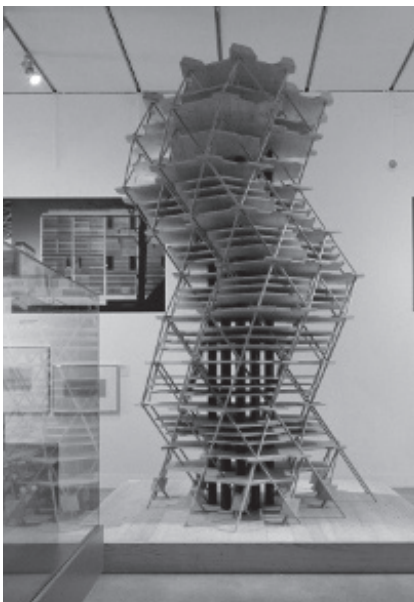
03 *Louis Kahn: The Power of Architecture* London Design Museum, London, UK.



04 *Louis Kahn: The Power of Architecture*, London Design Museum, London, UK.
© Catarina Andrade, 2014.



05 *Louis Kahn: The Power of Architecture*, London Design Museum, London, UK.
© Catarina Andrade, 2014.



06 *Louis Kahn: The Power of Architecture*, London Design Museum, London, UK.

1973, Fort Wayne, USA), Eleanor Donnelley Erdman Hall (1960-1965, Bryn Mawr, USA) and Jewish Community Center (1954-1959, New Jersey, USA) prove this.

The exhibition *Louis Kahn: The Power of Architecture* allows the public to understand each dimension of Kahn's work, concluding that each concern is connected to and belongs to a whole. The elements presented in the exhibition are able to give a general view of his method of designing, as well as an understanding of the powerful influence of each building without seeing them in person. All of this is complemented by a catalog³ that goes deeper into these themes, with essays justifying the importance of Kahn's work – the perfect complement to an inspiring and powerful exhibition.

Catarina Andrade

Notes

- 1 *Louis I. Kahn: In the Realm of Architecture*. Curators: David B. Brownlee and David G. DeLong. Between 20 October 1991 and 1 February 1994, the exhibition was featured in the Philadelphia Museum of Art, the Centre Georges Pompidou (Paris), the Museum of Modern Art (New York), the Museum of Modern Art (Gunma), the Los Angeles County Museum of Art, the Kimbell Art Museum and the Wexner Center for the Arts (Ohio).
- 2 The exhibition is a cooperation between the Vitra Design Museum, the Architectural Archives of the University of Pennsylvania, Philadelphia, and the NAI part of The New Institute, Rotterdam. Between 7 September 2012 and 5 November 2017, the exhibition was at the NAI, the Vitra Design Museum, the Oslo National Museum, the London Design Museum, the Taipei Museum of Fine Art, the Bellevue Arts Museum, the San Diego Museum of Art, the Kimbell Art Museum and The Fabric Workshop and Museum in Philadelphia.
- 3 Mateo Kries, Jochen Eisenbrand, Stanislaus von Moos (ed.), *Louis Kahn – The Power of Architecture*, Weil am Rhein, Vitra Design Museum, 2013. See the Book Review section of this issue.

Plastic Components in Modern Buildings. Researchers and Practitioners Discussed History and Conservation at TU Delft

isc/Technology Seminar
TU Delft, the Netherlands, 23 October 2017

The degradation of plastic building components — and claddings in particular — is an increasing challenge in heritage buildings. Research and the development of appropriate strategies for the architectural conservation, restoration and replacement of synthetic building components is still in its infancy. This was reason enough to stage a one-day international seminar, *Plastics in Modern Movement Buildings. Conservation and (Re-)design of Synthetic Building Components* focusing on the exterior applications in the building envelope and as prefabricated elements. The seminar took place on October 23rd, 2017, at the Faculty of Architecture and the Built Environment at TU Delft, the Netherlands.

The event was organized in collaboration between the docomomo International Specialist Committee on Technology (isc/T), docomomo Netherlands and the Section of Heritage & Architecture of TU Delft. The seminar brought together material scientists, art conservators, architectural historians, heritage specialists, designers, consultants and students. Wido Quist, hosting Chair of docomomo Netherlands, welcomed participants from ten different countries, and particularly the attending experts from the plastics industry, before introducing a range of Dutch

examples. He proposed the results of the meeting be published as the 14th **docomomo Preservation Technology Dossier**.

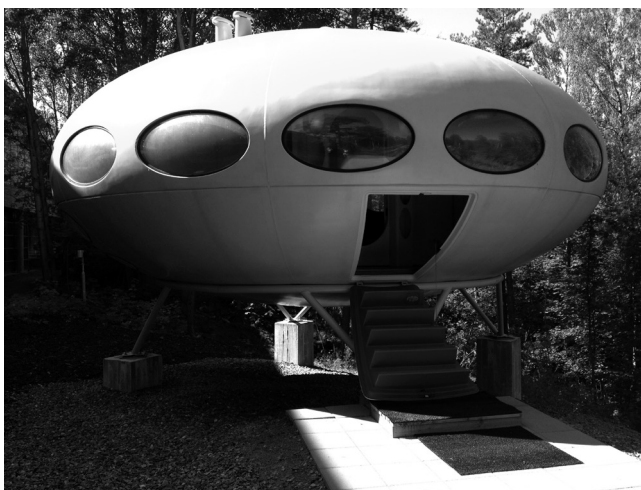
The morning session “Exploring the Field” was moderated by Uta Pottgiesser (UAntwerp), Chair of the isc/T. She gave an overview of the aspects for consideration in the conservation and (re-)design of synthetic materials: “We will highlight the history and the impacts of petroleum-based materials: architecturally in aesthetic and constructive terms, globally and locally related to urban and economic development, and technically taking into account the chemistry, manufacturing and sustainability. It is important to develop strategies as an interdisciplinary approach.”

The architect Wessel de Jonge, TU Delft Chair of Heritage & Design, kicked off with an overview of synthetic building components since the early 20th century, referring to Anthony Walker’s seminal research of the 1990s. He explained how early thermoset and thermoplastic building materials were primarily fit for interior use. In order to promote the use of plastics several producers developed prototypes of single family houses, such as the Monsanto “House of the Future” in 1957.

In her talk on “Petroleumsapes”, Carola Hein, TU Delft Chair of History of Architecture and Urban Planning, showed how the international petroleum industry has been instrumental in the promotion of synthetic building materials in their search for new markets. Pointing at various social parameters such as the implications of the employment of women in the war industry, requiring efficiency in housekeeping and easy-to-clean materials, she claimed that the introduction of plastics was driven by stakeholders from the industry rather than by consumers and designers.

The conservation of plastics in art works was presented by Thea van Oosten, who has worked as a senior conservation scientist with the Dutch National Heritage Agency RCE. She has been involved in the conservation of many plastic art objects coping with various material configurations. She underlined the importance for the conservationist to have detailed information about the original manufacturing of the object, as this has a key impact on the material properties and specifications. Minor components such as gaskets and sealants can pose particular conservation challenges.

In the afternoon a series of case studies presented various conservation approaches, new synthetic components and work methods, mostly dealing with glassfiber reinforced polyester (GRP). Sami Supply, conservator in Helsinki, presented the preservation of two “Futuro” holiday homes of the 1960s, one preserved as an outdoor object and the other as an artefact for a museum in Rotterdam¹. The company Poly Products of Werkendam (NL)



01 The restored Futuro featuring serial number 001 resides in the outdoor collection of the WeeGee Museum in Espoo, close to Helsinki, Finland.
© Wessel de Jonge.



02 Poly Products' director Jan Schrama show how it's made during the factory visit that was part of the seminar program. © Wessel de Jonge.

- 03** Benthem Crouwel Architecten, Stedelijk Museum extension, Amsterdam, The Netherlands, 2014. It features an innovative synthetic skin that is almost seamless. © Janne Linders.



- 05** Nio Architects, bus station, Hoofddorp, The Netherlands, 2003. The polyester skin was made on site by Poly Products. © Wessel de Jonge.

- 04** Architect Mels Crouwel during the seminar excursion, explaining the design challenges related to the 2014 extension of the Stedelijk Museum in Amsterdam. © Wessel de Jonge.



has been involved in the preservation of the latter, which is actually the first prototype. The firm's director Jan Schrama explained the manufacturing of plastics in practice and gave insights into the production processes in the factory that was visited the next day².

The conservation of the GRP façade panels of the Herman Miller Factory in Bath was the focus of research for Elyse Howell-Price of Nicholas Grimshaw architects (UK). Introducing a methodology for mapping anomalies and defects in the GPR components she underlined the importance of the orientation towards the sun and the impact of shading by neighboring buildings and trees. The project is aimed at the preservation of the panels rather than the replacement thereof³.

Pamela Voigt, conservation consultant with BAKU – *Bauen mit Kunststoffen* – in Germany, advocated her approach of "Saving Yesterday's Dreams". As a practicing architect in Leipzig she engaged herself with the refurbishment of some remaining copies of the Feierbach House, another late 1960s prototype of which five were actually produced. Her inspiring talk offered an insight in the careful way in which these structures have been repaired and polished by hand and brought back to life⁴.

The innovative synthetic building skin for the recent extension of the Amsterdam Stedelijk Museum was discussed by Mels Crouwel of Benthem Crouwel Architects. In the design phase much attention has been given to the future maintenance and preservation of the material qualities over time. A particular challenge has been how to deal with thermal expansion while the skin was designed to feature few dilatation joints⁵.

"The conference covered quite well how the rise and fall of plastics in modern buildings can be explained", concluded Wessel de Jonge after moderating the afternoon sessions. "After the mid-1970s oil crisis, plastics became expensive and most demonstration houses were taken off the market, while the use of plastics in buildings in general dropped as well. This explains why few such buildings survived and there is little experience with their preservation. The seminar covered a variety of aspects addressing 'resilience' both globally and in terms of urban, local and cultural development, as well as the technical and economical aspects. It was good to see how intensively designers, researchers and students exchanged knowledge and experiences on the topic."

The next day's excursion included a factory-visit to Poly Products at Werkendam; the

Hoofddorp bus station by Nio Architects, made by Poly Products (2003); Aldo van Eyck's 1960 Orphanage, restored by Wessel de Jonge Architects (2017); and the Amsterdam Stedelijk Museum Extension by Benthem Crouwel Architects for which Holland Composites supplied the synthetic finish (2014).

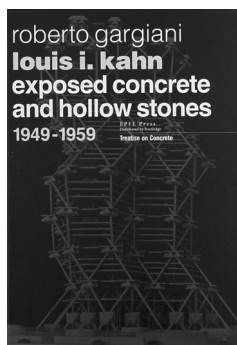
A second seminar on plastics in 20th century architecture will be organized on March 5th, 2018 at the University of Antwerp, Belgium, focusing on interior applications. Entitled *Plastics in Modern Movement Interiors. Conservation and (Re-)design of Synthetic Finishes, Furniture and Products*, it is a collaboration between **docomomo** Belgium and the **docomomo** ISCs on Interiors (ISC/I) and Technology (ISC/T).

Uta Pottgiesser and Wessel de Jonge

Notes

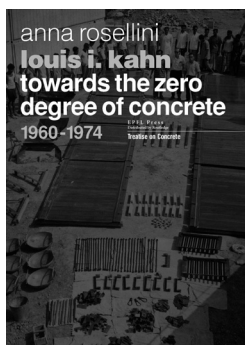
- 1 <https://www.kultuurpoo.fi/en/node/906>.
- 2 www.polyproducts.nl.
- 3 <https://grimshaw.global/projects/herman-miller-factory>.
- 4 <http://kunststoffbauten.de/de>.
- 5 <http://benthemcrouwel.com>.

BOOK REVIEWS



Louis I. Kahn: Exposed Concrete and Hollow Stones 1949–1959

Author: Roberto Gargiani
 Publisher: EPFL Press. Distributed by Routledge.
 ISBN: 978-2-940222-76-6
 Language: English
 Year: 2014



Louis I. Kahn: Towards the Zero Degree of Concrete 1960-1974

Author: Anna Rosellini
 Publisher: EPFL Press. Distributed by Routledge.
 ISBN: 978-2-940222-77-3
 Language: English
 Year: 2014

Through sheer determination and courage, Kahn has researched the nature of concrete in the form of precast, cast in place or blocks. Each of his renowned works in exposed concrete, such as the Yale Art Gallery, the Richards Laboratories, the Bath House, the Salk Institute, the National Assembly, the Kimbell Museum, the Exeter Library and the Yale Center of British Art, is an important chapter in the history of architecture for the exploration into concrete's formal expression, beyond the lesson of Le Corbusier.

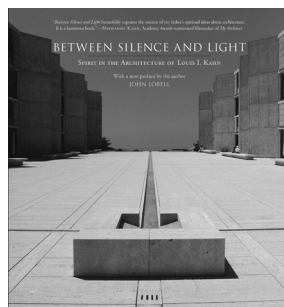
Kahn's obsession with concrete fabrication processes, on the formwork and the mix-design, is systematically examined in two volumes. They illustrate Kahn's vision with documents that have never been revealed in other essays, drawing heavily from original sketches, plans, specifications, worksite photographs, and

correspondences with collaborators, engineers, technicians and contractors.

The first volume *Exposed Concrete and Hollow Stones* focuses on the first 10-year period of Kahn's research on concrete. Moving through the many construction systems experienced by Kahn, from the discovery of exposed concrete in the form of *béton brut* at the Yale Art Gallery, to the precast and poured-in-place techniques, to the values of joint, growth and ornament, the essay culminates in the reconstruction of the artistic and technical characteristics of two great worksites, the Richards Laboratories and the First Unitarian Church and School.

The second volume *Towards the Zero Degree of Concrete* covers the following 14 years and leads the reader along Kahn's path to the true "nature of concrete", focusing on his main techniques and poetic discoveries such as the "liquid stone" of the Salk Institute, the "smooth finish" at Bryn Mawr, the expression of "growth" at the Dhaka Parliament and the concept of the "monolithic" at the Yale Center for British Art.

From the Publisher.



Between Silence and Light: Spirit in the Architecture of Louis I. Kahn

Author: John Lobell
 Publisher: Shambala Publications
 ISBN: 978-1-59030-604-8
 Language: English
 Year: 2008 [1979]

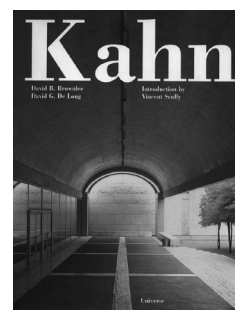
While a plethora of books is now available on Kahn, this volume published just five years after his death still offers a unique perspective. Author John Lobell focuses on the manifestation, in Kahn's buildings and teachings, of the architect's belief "that there are realms that transcend our material lives, and that we can have access to these realms through architecture".

In the first part of the book, we hear from the great man himself on such matters as materials — "You say to Brick, 'What do you want, Brick?'" —, wonder — "the closest intouchness with your intuitive" — and of course, silence and light — "inspiration is the feeling of

beginning at the threshold where Silence and Light meet". In the second part, Lobell discusses Kahn's words in an essay entitled "Architecture as Spirit", while in the third, we see through photographs and plans how Kahn's spirituality was embodied in masterpieces such as the Salk Institute, Exeter Library, and Yale Study Center. The author concludes with a short biography.

Between Silence and Light is an accessible introduction to Kahn's wisdom and oeuvre, and the 2008 edition benefits from a new preface from Lobell as well as a list of additional resources. In a sea of publications arising in the 40 years since Kahn's passing, this "dialogue" between the modern master and his student Lobell remains a definitive work.

Laura Phelps



Louis I. Kahn: In the Realm of Architecture

Authors: David B. Brownlee
 and David G. De Long
 Publisher: Universe Publishing
 ISBN: 978-0-7893-0099-7
 Language: English
 Year: 1997 [1991]

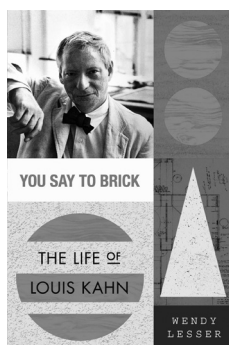
This condensed edition of *Louis I. Kahn: In the Realm of Architecture* is a definitive and richly illustrated volume that presents the oeuvre of one of this century's most influential practitioners, teachers, and thinkers in architecture. Here is the detailed account of the architecture and philosophy of Louis Kahn, whose buildings have become the very signature of the modernist aesthetic and whose vision permanently changed the direction of American architecture.

Kahn's career is documented here with meticulous attention to all aspects of his work—from his own fascinating biography to the unique philosophy that underlies his buildings to the structures themselves. The stunning range of Kahn's architectural vision becomes fully apparent: his structures are at once solemn and resonant, elemental and musical. Extraordinary, exclusively commissioned color photographs of his masterworks—the Yale Center for British Art, the National Assembly complex at Dhaka,

Bangladesh, the Kimbell Art Museum, the Indian Institute of Management, the Salk Institute – exquisitely demonstrate how Kahn’s architecture wholly reinvents space and light. In all, more than two hundred illustrations, including numerous drawings and floor plans, accompany the painstakingly researched text.

This volume – published in association with the Museum of Contemporary Art in Los Angeles and with the exclusive participation of the Louis I. Kahn Collection – contains six principal essays that critically address different dimensions and periods of Kahn’s architecture. The essays and photography are accompanied by succinct notes and captions, as well as a complete list of buildings and projects and an index, making this book the preeminent scholarly and illustrative source for Kahn’s architecture.

From the Publisher.



You Say to Brick: The Life of Louis Kahn

Author: Wendy Lesser
Publisher: Farrar, Strauss and Giroux
ISBN: 978-0-374-27997-4
Language: English
Year: 2017

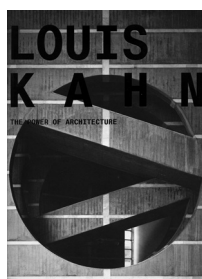
Wendy Lesser’s acclaimed biography of Kahn, published last year, has achieved a near-impossible feat: bringing serious writing on an architect and their work to a mass audience. Although there is much in *You Say to Brick* to appeal to those in the field, Lesser writes about the man and his masterpieces with universal appeal, avoiding a chronological account and allowing the recurrent themes of his personal and professional lives naturally to emerge.

The author conducted extensive original research, including interviewing Kahn’s descendants, colleagues and students, to produce an account of his life that still has the capacity to surprise. This is interwoven with shorter essays on the buildings considered to be Kahn’s “big five”: the Salk Institute, Kimbell Art Museum, Phillips Exeter Library,

the National Assembly of Bangladesh and Indian Institute of Management in Ahmedabad. Lesser made visits to each and presents not their specifications but their stories. It is made clear, through her engaging prose that highlights visual and human details, that they could only have come from the incomparable mind of Kahn.

Though *You Say to Brick* is portable, affordable, and emphasis Kahn’s humanity – he famously anthropomorphized the material by asking how it would like to be used – the book also adds to a growing body of scholarly work on the beauty, but also the “contradictions and paradoxes” of the architect’s feted structures. More of its ilk would be welcome.

Laura Phelps



Louis Kahn The Power of Architecture

Editors: Mateo Kries, Jochen Eisenbrand, Stanislaus von Moos
Publisher: Vitra Design Museum
ISBN: 978-3-931936-92-1; 978-3-931936-91-4
Language: English; German
Year: 2013

This catalogue was published on the occasion of *Louis Kahn – The Power of Architecture*, an exhibition of the Vitra Design Museum, Weil am Rhein, in cooperation with the Architectural Archives of The University of Pennsylvania, Philadelphia, and the Netherlands Architectural Institute, Rotterdam.

The American architect Louis Kahn (1901–1974) is regarded as one of the great master builders of the twentieth century. With complex spatial compositions, an elemental formal vocabulary and a choreographic mastery of light, Kahn created buildings of archaic beauty.

As the first comprehensive publication on this architect in 20 years, the book *Louis Kahn – The Power of Architecture* presents all of his important projects. It includes essays by prominent Kahn experts and an expansive illustrated biography with many new facts and insights about Kahn’s life and work. In a number of interviews, leading architects such as Frank Gehry, Renzo Piano, Peter Zumthor and Sou Fujimoto underline Kahn’s signifi-

cance in today’s architectural discourse. An extensive catalogue of works features original drawings and architectural models from the Kahn archive. The compendium is further augmented by a portfolio of Kahn’s travel drawings as well as photographs by Thomas Florschuetz, which offer completely new views of the Salk Institute and the Indian Institute of Management.

From the Publisher.

To know more about the exhibition, read the news section of this issue.



Louis Kahn Drawing to Find Out: The Dominican Motherhouse and the Patient Search for Architecture

Author: Michael Merrill
Publisher: Lars Müller Publishers
ISBN: 978-3-03778-221-7
Language: English
Year: 2010

Drawing to Find Out is a treasure trove of more than 200 documents and drawings produced by Kahn in the late 1960s, as he worked on his designs for the Dominican Motherhouse in Philadelphia. Although the convent was never built, his sketches – laid out chronologically, and summarized diagrammatically at the end of the text – offer a profound insight into Kahn’s preoccupations and methods. While they are arranged here to provide a narrative, with commentary from author Michael Merrill alongside each, in many cases the illustrations are also objects of beauty in their own right.

The book recounts a four-year journey, beginning with the architect’s first meetings with the sisters and ending with their rejection of his final scheme on financial and other grounds. En route we see the individual elements of Kahn’s convent, delicately drawn and collaged, combine in iteration after iteration as Kahn scales back plans to meet the sisters’ needs. The result is a fascinating glimpse into the mind of a man at the peak of his creative powers, or as Merrill calls it, “an intimate biography of an architectural idea”.

Laura Phelps

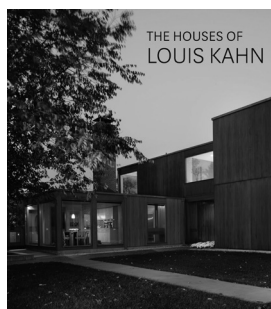


Louis I. Kahn and the Yale Center for British Art: A Conservation Plan

Authors: Peter Inskip, Stephen Gee and Constance Clement
 Publisher: Yale Center for British Art
 ISBN: 978-0-300-17164-8
 Language: English
 Year: 2011

The standing of the Yale Center for British Art as one of the world's great museums and study centers finds expression in its remarkable building, designed by Louis I. Kahn (1901–1974). In this important and innovative volume, two architects offer a plan to ensure the proper stewardship of the building in order to preserve its essence as a great architectural structure. Peter Inskip and Stephen Gee describe the design, construction, and subsequent renovation of the building; assess its cultural significance; analyze the materials that comprise it (steel, concrete, glass, white oak, and travertine); and shed light on its evolution over the four decades since it was built. Drawing on their extensive experience developing conservation plans for both historic sites and modern buildings, they propose a series of policies for the Center's conservation into the future.

From the Publisher.



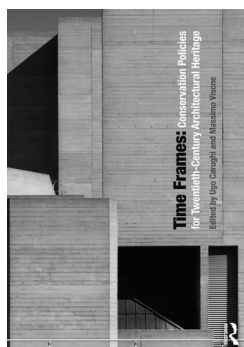
The Houses of Louis Kahn

Authors: George H. Marcus and William Whitaker
 Publisher: Yale University Press
 ISBN: 9780300171181
 Language: English
 Year: 2013

Louis Kahn (1901–1974), one of the most important architects of the postwar period, is widely admired for his great monumental works, including the Kimbell Art Museum, the Salk Institute, and the National Assembly Complex in Bangladesh. However, the importance of his houses has been largely overlooked. This beautiful book is the first to look at Kahn's nine major private houses. Beginning with his earliest encounters with Modernism in the late 1920s and continuing through his iconic work of the 1960s and 1970s, the authors trace the evolution of the architect's thinking, which began and matured through his design of houses and their interiors, a process inspired by his interactions with clients and his admiration for vernacular building traditions.

Richly illustrated with new and period photographs and original drawings, as well as previously unpublished materials from personal interviews, archives, and Kahn's own writings, *The Houses of Louis Kahn* shows how his ideas about domestic spaces challenged conventions, much like his major public commissions, and were developed into one of the most remarkable expressions of the American house.

From the Publisher.



Time Frames: Conservation Policies for Twentieth-Century Architectural Heritage

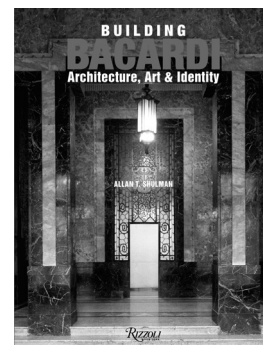
Editors: Massimo Visone and Ugo Carughi
 Publisher: Routledge
 ISBN: 978-1-47-248929-6
 Language: English
 Year: 2017

Time Frames provides a reconnaissance on the conservation rules and current protection policies of more than 100 countries, with particular attention to the emerging nations and twentieth-century architecture. The contributions illustrate the critical issues related to architectural listings, with a brief history of national approaches, a linkography and a short bibliography. The book also provides a short critical lexicography, with 12 papers

written by scholars and experts including topics on identities, heritages, conservation, memories and the economy. By examining the methods used to designate building as heritage sites across the continents, this book provides a comprehensive overview of current protection policies of twentieth-century architecture as well as the role of architectural history.

From the Publisher.

This publication has the institutional support of **docomomo** International, including a preface from the chair, Ana Tostões.



Building Bacardi: Architecture, Art & Identity

Author: Allan T. Shulman
 Publisher: Rizzoli
 ISBN: 978-0-8478-4748-8
 Language: English
 Year: 2016

Founded in 1862, the family-owned spirits company, Bacardi Limited, is best known for its trademark rum and the renowned red and black bat logo: "Any way you drink it... Bacardi rum is the mixable one". Parallel to the development of the spirits and the company's corporate identity, it was also a force in the development of avant-garde art and architecture.

Exceptionally illustrated, *Bacardi: Architecture, Art & Identity* is the first book exploring the 20th century architectural legacy of the company. Collecting a full range of vintage, diverse? and glamorous images, it tells the story of the iconic brand's interest in high design and how it was used to assert its corporate identity through buildings designed by the most varied renowned architects, from Mies van der Rohe and Philip Johnson to Caribbean and Mexican architects.

The story of Bacardi can't possibly be dissociated from the story of modern architecture, Cuban and Latin American history,

Pan-Americanism, and the role of marketing and branding in crafting identity.

Luísa Fernandes



100 Buildings

Project Manager: Eui-Sung Yi

Publisher: Rizzoli

ISBN: 978-0-8478-5950-4

Language: English

Year: 2017

An accessible primer to the most important architectural touchstones of our time by today's leading architects and teachers of architecture.

For this volume, over forty internationally renowned architects and educators – from Peter Eisenman and the late Zaha Hadid to Rafael Moneo and Cesar Pelli – were asked to list the top 100 twentieth-century architectural projects they would teach to students. The contributors were encouraged to select built projects where formal, spatial, technological, and organizational concepts responded to dynamic historical, cultural, social, and political circumstances. The capacity of these buildings to resist, adapt, and invent new typologies solidifies their timeless relevance to future challenges.

The result is presented here in this unique volume: a master list of the top 100 “must-know” built works of architecture designed and completed between 1900 and 2000. Ranging from houses and apartment buildings to museums and buildings for education and government, the book offers a wealth of

extraordinary works of design and construction and is an essential edition for anyone with an interest in architecture and design.

From the Publisher.

This publication has the institutional support of **docomomo** International and the participation of the Chair, Ana Tostões, on the selection of 100 20th-century buildings.

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Balancing improvements in energy conservation and thermal comfort with the conservation of modern buildings

Learn more about the Conserving Modern Architecture Initiative:
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Image: National Theatre, London