The Modern Movement and Sustainability: Yesterday, Today and in the Future

By Theodore Prudon

CONCERN for the environment and a focus on the conservation of our natural resources have in general over the last couple of decades, entered into the dialogue around architecture and preservation.[1] In the last decade this focused more specifically on the more recent architecture. In some instances, the discussion about sustainability has begun to overshadow the preservation issues. Many countries have developed elaborate rating systems for buildings, whether new or old, that take into account a large number of factors to gauge and assess their impact. While these systems are intended to assist in deciding what actions can and should be undertaken, the discussion has remained quite limited and largely focused on the operational aspects of buildings and on new construction. The purpose of this issue of the Journal is not only to broaden the dialogue and the discussion about sustainability, but to include a much broader array of intrinsic values, and also to bring attention to the fact that there is much early research on building envelop performance.

The terminology surrounding our concerns for the natural and built environments is itself fraught with complications and, moreover, has changed over the last three decades as interests and concerns evolved. Sustainability is the term most commonly used in the English language today and describes an attitude as well as an approach to design, construction and operational issues. However, in the context of preservation, it is important to expand the meaning of the term to include not just the narrow operational concerns but also what it takes to sustain ourselves on more than just the physical level.[2] The slogan "the most sustainable building is one that exists" is often used in the US—echoed in this issue in Ivo Hammer's article—and is a valid but too limited argument.

In this global and often confusing discussion on the sustainability of Modern Movement architecture and particularly Modernist architecture—in many people's minds epitomized by the modern curtain wall—is seen as bad environmental design. While it is argued that many of these buildings were created when energy was cheap and abundant, it is equally important to recognize that energy use was then only a fraction of what is needed or desired today.[3] The greater demand is partially the result of changes in perceptions of comfort, but also as a result of the explosion in the use and application of all sorts of equipment and electrical devices that—presumably—make our lives more comfortable or enjoyable.

Focusing entirely on those early curtain walls is neither doing justice to the level of awareness and concern that existed in the design and construction profession at the time, nor the efforts that were being made to achieve efficient and effective solutions. No self-respecting architect in the immediate postwar period would not take into account such basic considerations as orientation or exposure. Many drawings of that era, particular for tropical or subtropical climates, would not only show on its plans the orientation and the direction of the prevailing winds but also adapt the plans and elevations accordingly. The popularity and architectural use of the *brise-soleil*, large pivoted doors or large overhangs, to give just a few examples, were by no means accidental or mere stylistic accessories.

Before discussing the articles presented in this journal it is necessary to reflect on some of the fundamental dilemmas that exist. Materiality and permanence have played important roles in preservation theory, particularly in the context of material authenticity as well as durability as it pertains to the sustainability discourse. Permanence

and thus durability of buildings and building construction is not always encountered in these Modern structures, where functional specificity and experimentation with materials are seen as integral to their concepts. This leads to arguments that these structures are fundamentally temporal and were not intended to remain. This is in many instances a gross simplification and the very fact that they remain would seem to indicate their relative durability.

The other issue often raised—although not within this journal—in the discussion about preserving Modern architecture, concerns the idea of functional obsolescence. In other words, buildings that are tailor-made for particular functions become easily and quickly operationally, technically and economically redundant when those functions change. By being in turn tied into return on investment, permanence and durability are not necessarily promoted beyond the investment term unless the building can be recycled, which requires reinvestment.[4] It is there that by comparing the existing structure with a new building the argument often made is that building new is more efficient and sustainable. The idea that buildings have limited functional life spans is not new and is something that appears early in the preservation related literature.[5] This perceived obsolescence, which may have been predicted or desired, provides an impetus to build new, but would seem to be contradictory to the sustainability concept. However, given that so much of our economies are based on consumption and turn-over—representing as much as seventy percent of GDP in the US—durability may not be considered that desirable. Also with the strong emphasis on operational and performance efficiencies for both the interior and the exterior the intrinsic value of the original fabric is frequently discounted.

The articles in this Journal address sustainability not in the currently conventional sense, but rather address different issues that have to do with performance and retention of buildings as a functioning part of the built environment. It also seeks to acknowledge the skills and thoughtfulness of those early architects paying attention to what is called here *building physics* or the science and technology seeking to optimize the performance of the building and its exterior envelop.

Carl Stein titles his article, somewhat provocatively, "Greening Modernism." He argues that the pioneers of the Modern Movement provided us with all the tools or design processes, as he calls them, for resolving the issues in the search for sustainability. In his book with the eponymous title, he states:

> *While Modernism does not, in itself, offer new design tools for buildings reuse and historic preservation, it does provide a very clear framework for the appropriate application of these tools.*[6]

Using examples and quotations from various authors ranging from Gropius to Ada-Louise Huxtable, a well-known architectural critic for the *New York Times,* he seeks to establish that intellectual framework.

In many ways the article by João Vieira Caldas "Design with Climate in Africa: the world of galleries, *brise-soleil* and *Beta* windows" proves that point. Focusing on a series of schools built in Angola and Mozambique he describes the work of young Portuguese architects in these former Portuguese colonies. Orientation, massing, the use of overhangs, galleries and *brise-soleils* are the design tools and vocabulary used to achieve climatically the most effective solutions. Not only shading but particularly cross ventilation (presumably to the prevailing wind directions although the article does not specifically refers to it) are the most important features. The *Beta* window is a commercial louvered window type that provided both the opportunity for shading and cross ventilation. The description of the school buildings is reminiscent of the work of other architects of the period in the Caribbean,[7] Africa or, for instance, Richard Neutra's schools in Puerto Rico.[8] The author, somewhat rightfully, bemoans the fact of how the addition of mechanical ventilation systems in a few of the buildings has not only affected the appearance but, more importantly, made the original design concept entirely ineffective. The practice of either installing so-called package units in all sorts of individual locations or introducing a more centralized system by creating a 'box within a box' eliminating entirely the advantages of the original cross ventilation [figure 1]. Individual cooling units have become ubiquitous in many of the early modernist buildings.

The contribution "Building Physics and its performance in Modern Movement Architecture" by Jos Tomlow presents the other part of the early design puzzle. In many ways, early modern architects anticipated and sought to address scientifically the building performance problems, which are the same issues discussed so prominently today in the literature.[9] Because so many of these early proponents worked in northern Europe, the emphasis was on heating and thus insulation. However, Tomlow also points out correctly that this represents the emergence of what the Europeans called Building Physics, not only as a discipline and a serious academic science, but also as the beginning of formulating standards (the full implication of the German word *Normalisierung* is not easily translated into English). His focus is primarily on the European continent but parallels in other countries could probably be found [figures 2, 3].

"Modern and Green: heritage, energy and economy" by Franz Graf and Giulia Marino reports on a pilot project in a satellite precinct of Geneva built in the

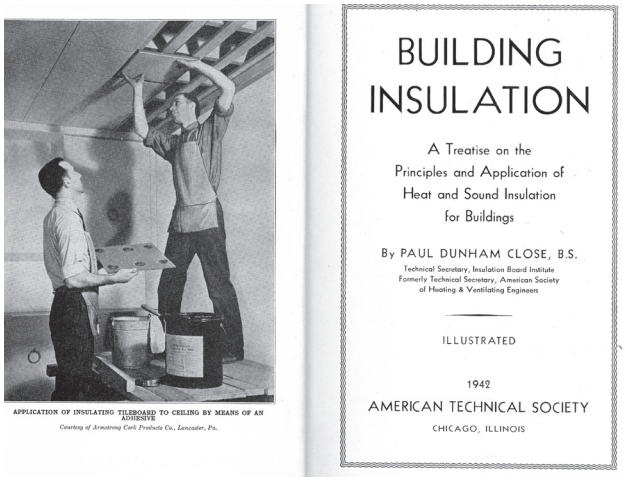

Figure 1. Student Services Building, University of Puerto Rice, Rio Piedras Campus, designed by **Henry Klumb** (1905–1984) and completed 1959. Designed to allow the "prevailing breeze" to pass through, modern requirements for air conditioning resulted in the insertion of enclosed box in an otherwise open space plan. Photo by the Author, c. 1998.

Figure 2. This 'treatise' is an American example of a comprehensive publication that provides formulas, methods of calculation and transmission coefficients and tables as well as materials and application methods of application. Author's Collection.

Figure 3. Gropius House, Lincoln, MA, designed by **Walter Gropius**, 1938. The floors are insulated with natural fiber wrapped in paper, which was marketed under the name Cabot's Quilt. Photo by the Author, 2007.

1960s in response to the postwar growth in population is a more contemporary example of the same discipline that Tomlow identified. The Laboratory for Techniques and Preservation of Modern Architecture, located in the *École Polytechnique Fédérale* in Lausanne, looked at the problem of the performance of the 1960s outer skin. Appropriate interventions were developed in the context of the Swiss initiative of the "2000 Watts Society" referring to a goal of energy use of 2000 Watts only by 2050 (for comparison the current average in Western Europe is 6000 Watts, while the US uses some 12,000 Watts). The project itself was guided by a Swiss Federal policy document titled: "Recommendations on Improving Energy Consumption in Historic Monuments" from which the authors quote an important sentence that is worth repeating:

> *...heritage and energy are both legitimate issues; they share essentially the same concerns and seek the same outcomes: supporting sustainable development by preserving non–replaceable natural and cultural resources...*[10]

The study of remedial options for the curtain walls with their operable windows shows a number of strategies aimed at maintaining as much of the original as possible, not only for historic and cultural reasons, but because the payback for more intrusive or far reaching interventions would be very far out in the future.

The Lignon project aims at reducing energy consumption through visually minimal interventions. The projects of the students in the 3rd year architecture graduate studio of Cornell University seek to employ all modern tools in studying the energy use and impact on well–being in all aspects of a building. Not limiting it to wall studies but also addressing noise, light, glare and comfort levels that make interior and exterior spaces more comfortable and contribute to our overall sense of well–being. While the level of interventions may be well beyond what preservationists would deem appropriate, it is an interesting and innovative way of approaching the performance of architectural icons such as the Seagram Building or the Ford Foundation Building in New York City.

Although most of the articles in this issue have focused on systems, it is not the only factor to be considered. The last two articles return to the beginning of this introduction and its discussion of materials. Ivo Hammer's "The

Tugendhat House: between artisan tradition and technological innovation. Preservation as sustainable building policy" focuses initially on the pre–modern craft and the quality of its finishes in this modernist building. He argues at the end of his article that not only the materials but also the craft is worth preserving because they reflect a different type of sustainability: the authenticity of the original material, the craft it represents and being the most sustainable simply because it already exists.

Over the years we have used many different materials with great optimism for their durability and applicability, only to discover their deleterious effects years or even centuries later. Lead, lead paint or asbestos are the examples with a long use but serious impact that are best known to us. Asbestos as a material in building manuals or lead paint were in most instances not abandoned till the 1970s. Once their impact on health was recognized these materials were replaced without much concern from a preservation or authenticity point of view. However, these may not be the only examples that we will have to face with modern architecture and construction introducing many different and new materials. As an example one of the more traditional and well–respected materials that has become the subject of some scrutiny and regulatory action in Europe and California is copper. Copper does not directly affect humans but may have a negative effect on aquatic life. In the last contribution, Amy Swift looks at the copper cladding of Frank Lloyd Wright's Price Tower in Bartlesville, Oklahoma. Because the building is freestanding its run–off into the ground could easily be monitored. While the case study may not necessarily identify copper as a source of great concern, the study does pose two important questions that may be applicable to many other situations. First, at what point does the general well being or quality of life trump the authenticity of the material, particularly when the impact is not immediate but long term and is not easily quantified. Secondly how many other materials should we be concerned about and how much do we consider this even today, when we design or specify new materials for either old or new buildings.

The authors of the articles (in this issue) highlight each in their own way significant issues. They all illustrate how nuanced and broad the concept of sustainability is and must be. It is not just about carbon or trees but it must be integral to all the decisions we make. Moreover, architects, preservationists, conservators and others involved in the preservation of the built environment, with their much more extensive knowledge about buildings, materials and their use, have an important role to play. Hopefully this issue and its articles help in leading the way.

Notes

1. See, for instance, "Positioning Preservation in a Green World", *Forum Journal* (National Trust for Historic Preservation), Vol. 23, No.3 (Spring 2009).
2. See, for instance, Erica Avrami, "Sustainability and the Built Environment: Forging a Role for Heritage Conservation", *Conservation Perspectives, The GCI Newsletter* (Spring 2011), 4–9. She discusses not only the usual aspects of conservation but also emphasizes the social and more intangible values. This issue of the newsletter of the Getty Conservation Center includes other articles on environmental and sustainability issues related to conservation and preservation.
3. The initiative "2000 Watts Society", established in Switzerland, seeks to reduce consumption to 2000 Watts per capita by 2050. Ironically that was the common consumption in the 1960s, the period when many of these buildings were constructed.
4. For a discussion on the issues of functional and economic obsolescence, see Theodore Prudon's book, *Preservation of Modern Architecture,* New York, John Wiley & Sons, 2008, 30–34 and by the same author, "The 'Modern' Challenge to Preservation", *Forum Journal* (The National Trust for Historic Preservation), Vol. 24, No. 4 (Summer 2010), 9–14.
5. For a discussion of this issue with regards to a particular building, see Hubert–Jan Henket and Wessel de Jonge, "A restoration concept for Modern Movement architecture", Paul Meurs and Marie–Thérèse van Thoor (eds.), *Sanatorium Zonnestraal: the history and restoration of a modern monument* (Rotterdam, NAi Publishers, 2010): 98–101.
6. Carl Stein, *Greening Modernism: Preservation, Sustainability, and the Modern Movement* (New York, W.W. Norton & Co, 2010), 81.
7. A review of the buildings highlighted in the **docomomo** Journal *33* (September 2005) titled "The Modern Movement in the Caribbean Islands" or the **docomomo** Journal 28 titled "Modern Heritage in Africa" illustrates that very well.
8. Thomas S. Hines *Richard Neutra and the Search for Modern Architecture* (New York, Rizzoli, 2005), 212–215.
9. A more detailed discussion of this subject and including other countries may be found in Jos Tomlow, editor, and Ola Wedebrunn, co–editor, *Climate and Building Physics in the Modern Movement, Proceedings of the 9th International* **docomomo** *Technology Seminar, June 24 and 25, 2005 Wissenschaftliche Berichte der Hochschule* Zittau/Görlitz (FH) and **docomomo** Dossier *No. 9,* September 2006.
10. The translation from the original documents, as quoted in the text here, is found in the Graf/Marino article and is, presumably, by the authors.

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