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A CRITICAL HISTORY OF ARCHITECTURAL MODERNISM

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Abstract. Future generations deserve and need an honest accounting of architectural Modernism, and its Neo-Modernist and "Post-Modernist" variants, based on scientific analysis and the factual historical record. Reintroducing traditional tectonic culture and focusing on applying fractal and planar symmetries to design critique provides a more revolutionary account of the Modernist concept, its associated "propaganda", and the physical legacy of the movement. The authors seek answers to two questions: (1) whether Modernist architecture justly conquered the world by its claimed "Zeitgeist" – or was its success due to other factors; and (2) to what extent Modernism brings about the originally promised cultural and social benefits today. This essay seeks to clear up the ambiguity of the Modernist architectural doctrine through facts, and includes criticisms regarding its massive detrimental impact on the world's built and natural environments. A growing movement in Europe and elsewhere is challenging the legitimacy of many contemporary architectural designs. These critics attack the persistence of discredited Modernist theory, and the resulting harm to people and our planet. Defenders respond that the members of this movement are ignorant populists who do not understand the legitimate theoretical and cultural foundations of contemporary design. Here we examine this controversy and conclude that a considerable body of scientific evidence supports the critics. By focusing on the choices we do have today, we empower architects to implement drastic changes in new projects.

Keywords: modern architecture, modernism, classic planning, regionalism, 20th century architecture, complexity, symmetry, architectural tectonics, traditional architecture.

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1. Introduction

Architectural Modernism is a movement in architecture and urban planning whose dominant period (which includes contemporary Neo-modernist variants) has spanned from 1910 to the present. The former year is signified by the publication of the Austrian Adolf Loos's infamous lecture and essay, "Ornament and Crime" (Loos, 2019), and the work of Peter Behrens and his colleagues in Berlin. Although the 1972 demolition of the Pruitt-Igoe Modernist tower blocks in St. Louis, Missouri, was identified by some commentators as the end of architectural Modernism (e.g. Jencks, 1984), the period since has seen a perpetuation of many of the same characteristics of buildings (including gigantism, industrial tectonics, and radical artistic novelty). As such, the essence of the Modernist movement continues with merely rebranded names, including Postmodernism, Neomodernism, Deconstructivism, Parametricism, etc. For this reason, we continue to refer to all these variations as persistent expressions of "Architectural Modernism".

This article provides a critical historical review of that Modernist movement in architecture, from its rise to the present day. It dispels the surrounding cultural myths of Modernism as an inevitable historical advancement and presents it instead as an imposed ideology that has continued to prevail by adapting its justifications to changing cultural and economic conditions. Paradoxically to this movement's stated aims of furthering the public good, it ended up being highly detrimental to the well-being of the individual, society and the environment, and has systematically resisted any and every attempt at correcting its course.

Although it was related to Modernist movements in the arts and other fields, architectural Modernism had its own distinct ideas of culture and technology (Le Corbusier, 1931). Like other Modernist movements, architecture sought the liberation of building culture from the constraints of the past, particularly the older European forms of architecture and urbanism. Unlike other Modernist

movements, architectural Modernism explicitly embraced "images" of the machine age with its radically simplified, mass-produced forms, and found an image-based rationale to purify and strip down all the elements of the built environment. This visual association turned out to be a ruse in support of an ideology, as mass production initially produced highly complex, adaptive artifacts and building components–not single-use, minimalist ones.

Although earlier histories tried to argue for Modernism's inexorable rise (Pevsner, 2011), recent scholars of architectural history (Curl, 2018) have documented its advancement through a series of fortuitous moments, strategic opportunities, and highly effective forms of marketing and political persuasion. The success of Modernist building and planning typologies had very little to do with the explanatory shell that provides the standard academic narrative. Biased accounts of Modernism leave out key historical facts that drove design in a direction that ignores how the style affects the health of the users. During the first decades this was done to promote a socio-political ideology. In recent decades this narrative supports a power system generating inhuman environments provided by sizable industrial interests.

Meanwhile, we are experiencing the survival of traditional values in architecture that still influence contemporary praxis the world over, in mostly modestly-scaled projects. These values stem from traditional building cultures supported by phenomenology and science, and seek the spiritual and humane dimension in architecture. Traditional tectonic logic, best described by the nineteenth-century architect and theorist Gottfried Semper, always requires a certain connection between the structure and the cladding–so-called *Bekleidung*–or the frame and the "dress". The latter covers, but also somewhat reprises the former, implying a concept where façades are considered to be autonomous parts of the edifices (which belies Le Corbusier's dictum: "the plan is the generator"). The regeneration of these ideas gave rise to novel studies about the role of scale and details in architecture, as well as numerous new aesthetic-based methods that still seek to understand the complexity of historical composition (Katona, 2023).

What has occurred gradually over the past few decades is the rise of a new connective design philosophy, which strives to satisfy human neurophysiological attachment to buildings through their geometry and color. This complex, adaptive approach to design overturns the formalist and minimalist Modernist dogma. Despite the extreme simplification offered by the construction industry, clients today are realizing the value-added benefits of buildings adapted for the users' health and well-being.

This article is organized into seven sections that critically examine Modernist architecture and its ongoing influence today. Section 2 explores the philosophical and ideological roots of Modernism, particularly its alignment with industrial progressivism and totalitarian approaches to design. Section 3 reviews the failed attempts at counter-movements, including Postmodernism, Deconstruction, and Critical Regionalism, and evaluates their inability to challenge Modernism's core tenets. Section 4 introduces a mathematical perspective, contrasting the structured complexity of traditional architecture with the reductionist geometries of Modernist forms.

Section 5 discusses biophilic design principles, highlighting the disconnect between human neurophysiological needs and Modernist design strategies. Section 6 delves into the intersections of environmentalism and architecture, emphasizing the energy inefficiency of Modernist buildings and the superior potential of traditional building techniques. Section 7 critiques the persistence of Modernist principles in contemporary architecture, exposing logical fallacies and the prioritization of novelty over human and environmental well-being. Finally, Section 8 reflects on the challenges of undoing the legacy of Modernism, and offers insights into how architectural culture can move toward a more adaptive, humane, and sustainable future.

2. Questions about industrial progressivism

2.1. The classical method, the sublime, and industrialization

The classical method is a holistic method of designing the built environment for human use and a pleasing experience. It is executed by means of traditional architectural styles; not only in the Western Greco-Roman language but also in every established traditional language worldwide. Traditional design and building methods emerged in the world's cultures from the same principles of adaptation and for the same purposes. In the West it is founded on the understanding of the unity of truth, goodness, and beauty (Vitruvius Pollio, 1960, I.3.2). Using today's vocabulary that amounts to durability, adaptive reuse, and biological fit.

This architectural approach establishes the fact that there is no good and adaptive urbanism without good and adaptive architecture, that there is no good architecture without good craftsmanship, and that classical and traditional buildings universally make the best and most loved streets and places. Recent neuroscience experiments verify that this design method provides the exact multiple-fractal environment that humans need for their well-being (Brielmann et al., 2022). When a human perceives a classical/traditional building, his/her brain does not know it is not a tree. There is no unpleasant shock as when confronting a non-fractal, minimalist structure for which the brain is not prepared through its evolution. Cognitively, therefore, the entire variety of traditional architectures fit human neurophysiology whereas Modernist design does not. Classic architectural forms (including all traditions from around the world and not only Greco-Roman) are inherently harmonious with human perception, whereas Modernist designs fail to meet these deep-seated cognitive expectations.

From antiquity up to the end of the Enlightenment, architecture was intended to offer a pleasure-based aesthetic experience. However, in an extension of mid-eighteenth-century humanistic exploration, Edmund Burke (1729–1797) and others asked whether there was another type of aesthetic experience, different from beauty but equal in its impact (Burke, 1990). With the opposite of pleasure being pain, they suggested that pain, fear, and terror could provoke aesthetic experiences perhaps even more powerful than the beautiful ones inspired by pleasure. They called this type of aesthetic experience the *sublime*, distinguishing it from the beautiful or pleasure-based aesthetic experience. This differentiated architectural experiences with positive versus negative valences.

Significantly, Burke described sublime architecture as immensely large, of simple geometry, infinitely repeated, and unornamented. Even back then, simple intuition reveals what tectonic geometries frighten us and make us feel uneasy. The futurist and fantastic projects of Étienne-Louis Boullée (1728–1799), Claude-Nicolas Ledoux (1736–1806), and Giovanni Battista Piranesi (1720–1778) illustrated such overscale, endlessly repetitive and grotesque buildings and spaces. However, the suggestion that buildings could project the sublime or the beautiful–or both–prompted a broad exploration, resulting in theories, ideas, and perceptions that stand at the core of architecture and urban design from the nineteenth century through today (Krier, 2014; Krier et al., 2009).

Nineteenth century Romantics assumed that, just as an emotion could be generated by a sculpture, music, or painting, a structure could also arouse a powerful emotion. This assumption was expanded to include the mistaken belief that architectural form expressed and influenced moral behavior, political leanings, and ethical standards; and that visual styles might contain and reflect intrinsic societal values. Along with the origins of social engineering came the temptation to use dictatorial, totalitarian methods "for the common good".

Those who read Hegel's suggestion that history unfolded in a progression analogous to evolution thought that if there was progress in history, there was also progress in culture and the arts, which was led by an avant-garde, in turn led by artistic geniuses–today called "starchitects". Another of today's pathologies–historical change as exclusively positive–entered architectural thought. Coupled with social engineering, the catastrophic notion of erasing past knowledge to guarantee progress began to be implemented.

Romantic rationalists suggested that ornament could be dissociated from architectural fabric as easily as a dress could be removed from a mannequin. Romantic fascination with the distant in time and place yielded Historicist and Orientalist styles. Late nineteenth-century Romantic Expressionism picked up motifs such as glass architecture and various types of "functionalism" and Art Nouveau. Nevertheless, Romantic thinkers and architects failed to combine the intellectual and emotional dimensions of which they were conscious into a unified theory (Kunstler, 2001).

Then came World War I, and the cataclysm of industrialized killing which seems to have broken the back of Western culture. Some survivors felt compelled to jettison the socio-political frameworks that had created the carnage and ironically put their faith in the belief of technological efficiency–that more industrialization would solve the world's ills (ignoring the fact that World War I was the first "industrial" conflict). Relying on Romantic picturesque composition, massing, asymmetry, dynamics, movement, verticality, and so on, Modernists after 1923, mostly German at first, hoped to convey the story-telling aspect of architecture by way of variety, irregularity, novelty, and surprise (Kunstler, 1993). Anticipating the next step in history-as-evolution, they intentionally designed structures in styles never seen before.

The aftermath of the two World Wars therefore provided the social conditions for a movement dedicated to tearing down the past in favor of a bold vision for a better future. Later, the media fed the political conditions for such a movement to infiltrate the academic and architectural system, particularly in the USA.

2.2. Architectural totalitarianism

In his 1910 paper "Ornament and Crime", Adolf Loos argued that ornament was a crime because it was superfluous in an advanced industrial society. He claimed that it diverted resources from other functional needs, making a stripped-down aesthetic not only desirable, but mandatory. Judge for yourself the supremacist nature of his appeal:

> "Are we alone, the people of the nineteenth century, are we no longer capable of doing what any Negro can do, or what people have been able to do before us?... I said, Weep not. Behold! What makes our period as important is that it is incapable of producing new ornament. We have outgrown ornament, we have struggled through to a state without ornament... I preach to the aristocrats, I mean the individuals who stand at the pinnacle of humanity ..." (Loos, 2019).

Radically abandoning biological notions of beauty, Loos presented in *Ornament and Crime* a dense narrative of hyperbole and theatrical gestures. In the typically cynical cherry-picking that accounts for "Modernist history", provocative catchphrases such as those appearing in *Ornament and Crime* quickly became doctrine (Mehaffy & Salingaros, 2013). The essentially racist worldview of Loos's essay has seeped into design culture and remains largely unquestioned, even today. Ironically, Loos was credited with inventing what Modernist architects embraced as "abstraction" and "International Style" (Frampton, 1980). Subsequent generations of Modernists analyzed Loos's work as expressions of his connections with other Viennese innovators, and mined his writings to justify their personal directions in architecture (Anderson, 1987).

Loos avidly self-promoted by publishing outrageous articles flailing against everything, from the Vienna Secessionist movement to institutional targets, from fellow architects to the very bourgeoisie that constituted his clientele (Maciuika, 2000). Loos's aggressive essays carried titles such as *The Superfluous Ones* and *Degenerate Art – Kulturentartung = Cultural Degeneration*, 1908 (this last may have sparked Joseph Goebbels to organize the infamous art exhibition *Entartete Kunst = Degenerate Art* in 1937).

Loos was formative, perhaps even more than Gropius/Jeanneret/Mies, who were of course profoundly influenced by him. Like other modernist pioneers – including Gropius, Le Corbusier, Mies, and Philip Johnson, whose collaborations with the Nazi regime have recently been exposed (Curl, 2018) – Loos had some disturbing skeletons in his closet (Davies, 2013; Long, 2015; Niederhofer, 2015). These points call into question the foundational ethics, aesthetics, and social philosophies of Loos and other modernist leaders.

In the same period, the Berlin architect Peter Behrens rose to prominence for his industrial designs, not only of buildings but also of products, logos, and stationery–accomplishments that led him to become known later as the father of corporate branding. Behrens worked for the industrial giant AEG, and three of his young assistants would go on to fame as pioneers of Modernism: Walter Gropius, Ludwig Mies van der Rohe, and Charles Édouard Jeanneret-Gris (later to call himself Le Corbusier). They saw the power and wealth behind this industrially-progressive approach to architecture. Le Corbusier went into advertising and magazines, where he endlessly promoted sleek new appliances, cars, … and buildings. It worked out well!

If we want to describe another opportunist who read the over-industrializing trends and exploited them so that all subsequent buildings looked like they were designed by machines, we should add Peter Behrens to the list. He was the first to add theming and branding to buildings (as well as to stationery, logos, etc.). Suddenly, architecture was not about place, it was specifically about "the future". And even more specifically, an industrialized and sanitized future, of speed and power and hygiene. Thus began an age of "architectural cleansing".

Gropius and others went on to form the seminal Bauhaus school in Germany, while Le Corbusier and others formed the *Congrès internationaux d'architecture moderne*. Corbusier's enormously influential *Athens Charter* set out principles of Modernist urban design and architecture that would later be widely adopted. Unfortunately, Le Corbusier's dictatorial statements were based on falsehoods, consistent with much of his other propagandistic writing (Almeida, 2013; Birksted, 2015, Chapter 15; Lambert, 2015; McKay, 2017).

These included functional segregation of the city into distinct parts (street types, pedestrians, buildings, uses, etc.) and demolition of all but a few representative examples of older buildings and neighborhoods. Nobody in a position of academic authority questioned these untested ideas founded on pure speculation. Notably, decision-makers and the intelligentsia of the time raised no objections to this program for civic annihilation. Any recapitulation or "revival" of the architectures of the past (which had been a time-honored practice in architectural history up to that time, *e.g.*, the Renaissance) was now strictly forbidden by decree:

> "The practice of using styles of the past on aesthetic pretexts for new structures erected in historic areas has harmful consequences. Neither the continuation of such practices nor the introduction of such initiatives will be tolerated in any form. Such methods are contrary to the great lesson of history. Never has a return to the past been recorded, never has man retraced his own steps" (Congrès Internationaux d'Architecture Moderne [CIAM], 1946, p. 70).

Standard Modernist accounts falsely state that Gropius, Mies, and others were politically opposed to the Nazi party in Germany in the 1930s. More recent scholarship exposed their involvement in Hitler's regime (Ivry, 2009). Le Corbusier himself was a member of a militant French fascist group, and he collaborated with the Vichy government as a planner (Brott, 2017). In private letters, he praised Hitler.

Gropius, the first director of the Staatliches Bauhaus, entered Nazi competitions for lucrative commissions, writing letters to Joseph Goebbels justifying Modernist architecture as genuinely German (Petropoulos, 2014, pp. 63–87). Mies, the last director of the Bauhaus and who shut it down in 1933, stayed in Germany after the National Socialists gained control (Curl, 2018, p. 135).

Gropius was already friendly with influential Americans including the young Philip Johnson, an avowed fan of Hitler and the Nazi government. Johnson, who saw a direct parallel to the aesthetic allure of Modernist architecture, curated the Museum of Modern Art's highly recognized 1932 exhibit, *Modern Architecture: International Exhibition*. As the journalist Marc Wortman put it:

"The aesthetic power and exaltation [Johnson] experienced in viewing modernist architecture found its complete national expression in the Hitler-centered Fascist movement. Here was a way not merely to rebuild cities with a unified and monumental aesthetic vision for the Machine Age but to spur a rebirth of mankind itself" (Wortman, 2016).

The architecture critic Sibyl Moholy-Nagy, who had been a member of the Bauhaus, wrote a scathing critique in 1968 titled "Hitler's Revenge":

> "In 1933, Hitler shook the tree and America picked up the fruit of German genius. In the best of Satanic traditions some of this fruit was poisoned, although it looked at first sight as pure and wholesome as a newborn concept. The lethal harvest was functionalism, and the Johnnies who spread the appleseed were the Bauhaus masters Walter Gropius, Mies van der Rohe, and Marcel Breuer. Recoined by

> eager American converts as 'The International Style', functionalism terminated the most important era in American public architecture" (Stratigakos, 2015).

The supremacist view of a glorified advanced industrialism that animated architectural Modernism continued past World War II. Despite a 1970s–1980s "post-modern" era of evident failures and high-minded reforms, the influence of architectural Modernism persists–perhaps out of ignorance, or a continued marketing power, or perhaps because practitioners have not yet found a new path. Standard histories of modernism whitewash the Bauhaus and Mies in their Nazi dealings and support other propagandistic claims. Other repellent historical facts help understand some of the unsavory aspects of architectural education inherited from the Bauhaus, which sought to self-define as a superior group of humans. By implication authorized to decide for everyone else, Modernism promotes a messianic, supremacist ideology of exceptionalism. Supposedly, Modernist architecture is so superior to any traditional architecture that an architect has a moral duty to erase the latter. Very simply, whatever is not Modernist does not deserve to exist. The knowledge toolkit of the classical knowledge bases was methodically suppressed.

The aftermath of the wars made that an irresistible sales pitch, together with the fateful need to absorb postwar production capacity with a new era of consumerism. Note how this was a historic wave of technological change intersecting with human psychology, including the psychology of consumers. Behrens and Loos were just early exploiters, in the right places at the right times. They made decisions with momentous negative effects, but in this they were far from alone. They just happened to be standing at historical fulcrum points.

3. Reflections on modern architecture and its subsequent evolution

3.1. Parallel movements: Postmodernism, La Tendenza, and Deconstruction

This section overviews the various failed attempts at developing alternatives to the Modernist movement during the 1960s–1990s. One strand included attempts to reintroduce complexity or historical elements to Modernist architecture, which turned out to be only superficial or intellectual. Another strand represented attempts to introduce considerations of locality and authenticity in architectural design, which were gradually diluted to allow only what doesn't interfere with the Modernist stylistic agenda. Ultimately, Modernism resisted all attempts at mitigating its ideology and continued its path of expressing industrial power in producing generic places.

The first impressive appearance of architectural Postmodernism happened in 1966, with the publication of the book *Complexity and Contradiction in Architecture* (Venturi, 1977a). With this naive pursuit for a suppressed understanding, the author Robert Venturi questioned Modernist doctrine. Incapable of comprehending with his Modernist training the Baroque and Classical richness, he promoted paradox and syncretism in his designs. To oppose the "rationalism" of the Modernist design praxis of his time, Venturi turned his attention to the "gray" and "mediocre", seeking inspiration in do-it-yourself architecture of the informal building sector, and to imply "contradiction" in his compositions.

Although the Postmodernists should be recognized for turning against Modernist inhumanity and boredom, their arguments remained on a very superficial level. Instead of resurrecting the living and life-endowing structure of traditional architecture, they focused on almost trivial visual styles. And thus, the deep structure of complex geometries responsible for human neurological wellbeing remained elusive. "Complexity" can mean many things, ranging from cheap visual tricks for show, to deeply evolved forms that help human health in the long term. The Postmodernists were unable to answer the fundamental questions underlying design.

Robert Venturi's deliberately amusing architectural forms were not the only outcomes of his work. His second popular book, *Learning from Las Vegas*, published together with Steven Izenour in 1972 (Venturi, 1977b), and the 1976 Washington, DC exhibition "Signs of Life, a Symbol of the American City"–with Hugh Hardy, William Turnbull, and Robert Stern–advocated for the idea of ornamentation, but again, in an incomplete sense.

Venturi's concept of the "decorated shed" parodied the concept of Modernist space, where, contrary to the heroically sculpturesque early modern monuments, identical building "boxes" could host multiple functions. This critique did not re-enact traditional architecture at all, yet it raised questions about the supremacy of Modernism. Venturi inspired a number of architects, notably Michael Graves, Charles Moore, Aldo Rossi, Arata Isozaki, Paolo Portoghesi, Philip Johnson, and Ricardo Bofill. Some of their buildings have human-scale elements and qualities, but their overall success is decidedly mixed (Buras, 2020, p. 42).

As rival ideas of Postmodernism and classical expression appeared after the dissolution of CIAM, new questions were raised regarding the authenticity of architecture (Younés, 2012, pp. 58–75). In parallel with the North American initiatives, La Tendenza was an architectural and artistic movement that unfolded in Italy between 1965 and 1985. Proponents of this "trend" supported Aldo Rossi's claim for the sprawling "reality" of history versus utopian minimalism (The Editor, 2012), for which it is often referred to as Neorealism. However, this had little to do with realism, where, in philosophy, known things are independent of whether and how anyone perceives them (Hale, 2020). Quite the contrary, Rossi's architectural graphics were elusive collages of designs that were projected into the existing built environment as alternative realities or "collective memories" of a lost tradition (Rossi, 1984).

Active representatives of La Tendenza included Carlo Aymonino, Arduino Cantafora, Manfredo Tafuri, and Paola Chiatante. But the "fragments" of historical reality were best symbolized with Rossi's design for the first Architecture Biennale, *Teatro del Mondo* (World Theater), a speculatively empty space with an archetypal coat that floated on the sea near the shores of Venice in 1979. Disappointingly, the hieratic composition of this stunt did not foster the emancipation of historicism. Because La Tendenza merely dropped the Modernist "function" in favor of "type", this trend can be seen as a Modernist critique of Modernist practices that did not go far enough (Buras, 2020, p. 38).

Manfredo Tafuri brazenly recognized that Rossi's polemical *Teatro* deferred to the Venetian Republic's traditional mask as a primary and everlasting value (Tafuri, 1980). More useless intellectual games foreshadowed and tacitly supported Peter Eisenman's Deconstructivist approach, which denied the *raison d'être* of representation (meaning), reason (truth), and history (timelessness) in architecture (Eisenman, 1984). Unexpectedly and wrongly, Eisenman labelled Modernism as part of the obsolete Classical, since it also endorsed the three simulacra that contribute to the great "fiction" of architecture.

Eisenman's manifesto referred to the French postmodern pseudo-philosopher Jacques Derrida, who took a stand for the semiotic autonomy of the *sign* (Culler, 1982, p. 97). Creating this revolutionary "difference" also in architecture was a self-congratulatory mission of Eisenman's and his followers' work. This led to the gamification of arbitrary and inhuman structures to surmount form and function–whether by a traditional or Modernist understanding. The Deconstructivist narrative claimed a new paradigm that disguised the fact that its enthusiasts chose global industrial reproduction over the vernacular or the authentically historical ways of building. Eisenman influenced Daniel Libeskind, Rem Koolhaas, Zaha Hadid, Frank Gehry and others. The innate chaotic arbitrariness of deconstruction gave rise to multiple formal and methodological updates, like Parametricism, folding (origami), and the so-called "topographic" design. While introducing toxic structures into the built environment, these styles made a group of architects famous and wealthy "starchitects".

3.2. Regionalism, place, and critical regionalism

Indeed, local characteristics and cultural differences–including climate, materials, social practices, religion–were of no interest to the global construction industry. International Modernism implied a collectivist utopia and a political program outside of real time and space, in which national and subnational identities did not play any role. After all, the generic nature of an industrial style impervious to climate, culture, locality, etc. was its main selling-point. Dissenting voices influenced by Martin Heidegger's deep understanding of the existential nature of the work of art as opposed to the Modernist Gestalt (Heidegger, 1971, p. 84), rejected the Modernist idea of "pure space" dominating the real senses of place, region, and character (Heidegger, 1962, p. 147).

Inspired by the ideas of Frank Lloyd Wright, Sigfried Giedion's confusing justification of the Modernist paradigm appeared in his 1954 study, *The New Regionalism* (Canizaro, 2007, pp. 311–320). Giedion's "regional approach" opposed the unifying efforts of the Modernist movement, especially the CIAM, which imposed its tenets on architecture independently of cultural, national, or regional differences; meanwhile he sought traces of local characteristics in the global Modernist arena.

Also noteworthy is the presence of Sri Lankan designer, Minnette de Silva, among the male-dominated CIAM designers. Already in the 1950s, at almost the same time as Giedion, De Silva emphasized the importance of the spirit of the place within Modernist architecture. She defined her own design methodology as "regional Modernism" (Pinto, 2019). Thus began the discussion on Regionalism, which offered hope for a return to local, hence human, and adaptive, techniques and values. Alas, the movement did not proceed in a healthy direction. It became immediately politicized and turned into a camouflaged continuation of placeless Modernism.

Another critical approach of Modernist architecture was based on cultural anthropology. This approach did not take on the regionalist label, but its starting point is more or less the same. Dedicating a book to the spirit of the place (Norberg-Schulz, 1980a), Christian Norberg-Schulz (1980b) added the adjective "authentic" to an architecture that is associated with its *genius loci*.

According to Norberg-Schulz, authenticity depends on the extent to which the new building reflects the spirit of the place, that is, the character traits that the given geographical location, nature, and built environment exhibit. Unfortunately, this abstract talk was detached from actual design guidelines, so that the resulting architecture was just as inhuman and faceless as high Modernism. Despite his intentions to formulate a new architecture based on the phenomenon of place, Norberg-Schulz restricted his discussion to conform with accepted Modernist typologies, and ignored a variety of genuinely vernacular building traditions. In the past, the local geographical features and available raw materials determined the possibilities of architecture, which was consequently regional. The builders could deviate from this genuine regional practice only in exceptional cases and at the cost of great sacrifices.

Liane Lefaivre and Alexander Tzonis first used the phrase "critical regionalism" in 1981 (Lefaivre & Tzonis, 1981). They claimed to have recognized the problem of scale in architecture, that is, the effects of globalization that threatened the survival of *genius loci* worldwide. However, their ideas for implementation did not solve any real-world problems, despite their return to the subject in 2003 (Tzonis & Lefaivre, 2003).

Shortly afterwards, Kenneth Frampton, a professor at Columbia University and great admirer of Loos, continued this idea, referring to the Marxist French philosopher, Paul Ricoeur (1965). Determined to give architects clear

theoretical guidance to resist the unifying tendencies of Modernist architecture (and its co-optation by global construction), Frampton explored how dormant local traditions could again participate in shaping the universal civilization. But the result was the homogenization of local traditions into global Modernism.

Frampton's critical regionalism, where "critical" is a code for partly keeping the Marxist agenda of Modernism, reappeared in 1983 in Hal Foster's popular book on Postmodern culture (Foster, 1983). The implication of this defining framework is that regional building practices are accepted only if they fit within an industrial Modernist rubric; a criterion that tends to exclude most bottom-up building traditions worldwide because they are so far from the accepted Modernist style (Tzonis & Lefaivre, 2003).

Naturally Tzonis, Lefaivre, and Frampton ignored architects working in authentic traditionalist languages around the world, narrowing their focus to majorly Modernist practitioners (Canizaro, 2007). The claim that their buildings captured the local built character and could not be authentically built elsewhere is not convincing. Architectural theorist Stylianos Giamarelos's more thorough volume on critical regionalism explained this contradiction much better (Giamarelos, 2022).

Modernist critical regionalism was directed against the adoption of authentic vernacular architectural elements, the reproduction of local art, and the imitation of historical forms (Frampton, 1983). Its Postmodern stand against 20th century cultural elitism failed because international Modernism alone reserved the right to decide the functional and aesthetic needs of contemporary society (Le Corbusier, 1931). While simultaneously opposing the ideological extremities of nationalism and a global collectivist utopia (Ricoeur, 1965), critical regionalism promoted its own cultural elitism through architectural typologies that were "approved" by the global construction industry and its associated media (Katona, 2018).

Ultimately, the Modernist age mainly paid attention to the spatial expression of industrial power, through which it sought to control social and technological processes. Disregarding the individual, it was all about top-down corporate control, as Mies bluntly but honestly stated (Cardinalis, 2022). Most Modernist structures serve only as crudely and narrowly functional tools, empowered by technological reproduction, making Modernist building practice no longer an art that reflects human sensibilities (Norberg-Schulz, 1971).

Users cannot be expected to engage emotionally with huge abstract art objects (and neuroscience proves that they do not). The effects of this are apparent in the construction industry, which transformed the vocabulary of today's architectural praxis from concepts of home, church, workshop, and market to the functions of apartment, office building, and shopping mall. The former are always unique and tied to the place and culture in a complex manner through their adaptive forms. The latter are independent of place, their generic "typologies" interpreting "function" and so often floating in asphalt parking lots.

4. A mathematical history of modernism

This section provides a mathematical analysis comparing the underlying formal principles of traditional architecture as opposed to the Modernist approach and outlines how these differences affect the brain's ability to read and process a space. Since this analysis is distinct from the usual historical narrative, it inevitably involves a set of critiques against it. We argue that a scientific basis for design has to replace an outdated, and demonstrably wrong approach.

The Modernist movement covered the globe with artificial structures while the world's economies were (and are) in part driven by a massive industrial building effort. The form and shape of those structures has an enormous but paradoxically unexplored effect on the humans who inhabit and use them. Going beyond the expected discussions of functionality and physical fit takes us into psychophysiological effects that the built environment has on human biology.

Design theory on the periphery of the dominant architectural culture has steadily accumulated new and relevant results. A group of topics identify the mathematics that helps to make forms, shapes, and surfaces more adaptive to human sensibilities. That new approach to accommodating human biology includes insights that can be applied to design (Salingaros, 2024).

Mainstream architectural education and practice neither understand nor welcome design tools to create a better environment more in tune with how the body is designed to function. Since human biological preferences favor more traditional architectural typologies, form languages, and materials, the establishment automatically excludes those design tools from being applied in today's practice. This exclusion arises from their old-fashioned "look" and association with a hated past. Architectural education curricula deliberately ignore them, and accreditation agencies keep them out of the schools. Ideologically, anything resembling traditional architecture threatens the establishment's sense of economic and technological progress. The threat of FOMO (fear of missing out) is used to persuade the public into accepting the continuing hegemony of Modernist design.

Architecture that adapts to human biology mimics the organized complexity of natural visual patterns, which in turn define the wiring of the eye-brain system. The human neurological system evolved to guarantee survival in the natural environment. Therefore, higher animal (and human) functions evolved from the perception of environmental information, especially natural geometries. Since the brain privileges visual information, the mathematics of environmental structure helps to define what it means to be human through our instinctive reactions to different geometries.

Visual information must be compressed to be processed faster by the brain (Joye, 2007a). The Gestalt school of psychology introduced notions that help in visual comprehension. This cognitive effect is achieved through geometrical redundancy and similarity, which can now be

expressed in terms of mathematics. Redundancy means duplication of geometrical information and is the opposite of random information. Trying to process uncorrelated (random) bits of information tires the brain by using up valuable processing energy, hence the reduction of information without loss of meaning relevant to life processes is essential to survival.

Two general categories of compressed visual information coming from the shapes of the natural stable and mobile environments via different types of symmetries make it accessible for processing in the brain in a more efficient manner that consumes less energy. There are two general categories of symmetry, ultimately coming from nature. Specifically, animal bodies and faces show bilateral symmetry, and plant shapes show fractal symmetry, which work together to organize the complexity of information in the visual field:

1. Fractals or scaling symmetry. A geometrical shape repeats at different magnifications, either approximately or exactly. This similarity is picked up by the brain and serves to link the different scales cognitively into one geometrical whole containing many distinct scales. This is the principal technique for tying together a larger structure through its smaller components so that it is cognitively perceived as coherent. The clearest fractal repetition occurs at consecutive scales that are related by some definite scaling factor: in architecture, shapes could repeat at decreasing sizes, down to the texture in the materials (Spehar et al., 2003; Taylor, 2006; Hagerhall et al., 2008; Spehar & Taylor, 2013; Taylor, 2021). Researchers argue that a scaling factor around 3 proves to be most successful.
2. Distinct symmetries in the plane create geometrical redundancy, in which a basic unit repeats at its original size according to specified ordering. The eye tries to link all the copies into a larger whole. These symmetries include reflectional symmetry, where a coupled bilaterally symmetric unit joins two mirror images. Translational symmetry repeats the same unit along some line, either straight or curved. Rotational symmetry repeats a unit by going around a circle. Compound symmetries combine basic symmetries into complex but highly ordered shapes.

Complexity and symmetry define a two-dimensional mathematical problem (Salingaros, 2013, 2014a, 2014b, 2020). Complexity increases by adding information; but this can be done either in a disordered or an ordered process. When complexity increases by adding randomness, the ensemble eventually exceeds human cognition because it contains too much information to process easily. Imposing symmetries that organize the additional information as it is being added enables the brain to comprehend it even as the total information increases. This is the reason why both nature and the most appreciated human artifacts and buildings show a high degree of organized complexity. Early researchers into visual complexity noticed a peak preference for complexity but did not realize that it was due to the interaction of the two independent factors: raw complexity versus organization (Kaplan & Kaplan, 1989; Kaplan, 1995).

Modernism's winning trick was to suppress complex symmetries of every kind from artifacts and buildings. Ever since this style took over the design and construction industries, the built environment suffers from an increasing poverty of complex symmetry. Monotonous repetition, a favorite Modernist design tool that eliminates fractal (scaling) symmetries, actually generates headaches (Salingaros, 2011; Penacchio & Wilkins, 2015; Wilkins et al., 2018). Erasing compound symmetries on the intermediate and small scales, Modernism fixated on an overall bilateral symmetry. But the intent is deeply subversive: to eliminate fractals and organized complexity that the brain seeks in the visual environment.

Losing the spectrum of environmental symmetries–which shaped our body and mind and are still necessary to wire an infant's brain–has led to a measurable pathology called "Symmetry-deficit disorder" (Mehaffy & Salingaros, 2021). This syndrome refers to Richard Louv's term "Nature-deficit disorder", which has been shown to be extremely damaging for children (Louv, 2008). The related "Symmetry-deficit disorder" is no less damaging for a child's development (Aresta & Salingaros, 2021; Lavdas & Salingaros, 2021). But the single-minded pursuit of power tied to ideology of the Modernist program has never cared for children.

5. Biophilic design and human response

An overview of the principles of biophilic design describes how the Modernist approach is diametrically opposed to them, remaining so even nowadays when these have already been identified to have a healthy effect on users. The situation is complicated because "biophilia" has become a new buzzword, but, as we explain here, it is misused to cover up a geometry that is itself not biophilic.

Contemporary architectural discourse has discovered biophilic design, a research discipline that developed outside mainstream architectural culture. Today, fashionable architects cherry-pick tools that help someone to design with biophilia in order to enhance their anti-biophilic projects. This dishonest ploy only leads to confusion in the client, who is impressed by the attractive renderings showing exuberant plant life but does not realize their underlying dishonesty, as the total design is usually far from biophilic. The biophilic effect is in large part due to the mathematical symmetries found in nature and in living forms (Joye, 2007b; Joye & Van den Berg, 2011). Organized complexity in buildings triggers the biophilic healing effect, which complements direct contact with nature and living forms.

Ann Sussman suggests that brain and eye damage suffered by the founding fathers of Modernism (never mentioned in the Modernist narrative) triggers anxiety when processing complex mathematical information, which

explains why they invented a universe deprived of meaningful visual patterns (Sussman, 2021; Susman & Chen, 2017). While the action for self-protection is understandable, a messianic drive to impose an unnatural living environment on everybody else is ethically indefensible. Adolf Loos insisted on using frosted glass panes for windows. Blocking any visual connection with outdoor vegetation prevents the biophilic healing effect for occupants. Standard texts of architectural history falsified photographs of his buildings, employing a disinformation strategy that substitutes the translucent windows with nature scenes (Colomina, 1990, 1996).

Difficult as it is to state this openly, the industrial-Modernist universe suppresses human mechanisms for interactions with organized complexity in the built environment. This perversion of natural processes and biological instincts has done enormous damage to several generations of children. The mathematical history of architectural Modernism describes a global design movement that succeeded by suppressing people's empathy and intuition. Its implementation results in a universe with which we cannot engage. This alternative history circumvents the ideological, philosophical, and political narrative in favor of Modernism with a cold, analytic evaluation.

Mathematics uniquely explains how Modernism evolved into several dissimilar subsequent styles. Unable to re-introduce scaling and complex plane symmetries, because those are banned by its defining ideology, the only way forward was through geometrical fragmentation. Hence, we see the sadistic excursions into broken, unbalanced forms. We know that those create alarm in a viewer (Curl, 2018; Taylor, 2006). By carefully avoiding biological fit, Modernism achieved design innovation while continuing to reject traditional forms. This is why every one of these post-modern movements registers as "alien" when measured by medical sensors. Paradoxically, taste-makers misinterpreted this "shock of the new" as being praiseworthy instead of pathological.

The narrative of Modernism recounts the lives and statements of a handful of selected architects who practice within the Modernist architectural canon. This list includes present-day "starchitects" as celebrity heroes in a ritual that promotes a cult of dubious personalities. Architecture schools fill multiple courses with useless information on what this group of persons said and did, representing for the most part publicity relations statements justifying their own projects. Nevertheless, instructors never use the scientific method to check the validity of those declarations. Architecture faculty are not trained to investigate the truth of absurd assertions; they just accept the narrative and pass it onto their students as some religious dogma.

Texts on what is claimed to be architectural theory cavalierly ignore how the built environment impacts the users' health and well-being (Mehaffy & Salingaros, 2020). A genuine theory has to pass the test of predictive value (which so-called architectural theories fail). Students and professionals learn by unconsciously imbuing approved images and slogans of admired Modernist architects (Mitrović, 2022, 2023). Speculations about buildings by famous architects and prominent critics are accepted on faith without experimental validation. Architectural academia rejects a discovered knowledge system–importantly, combining results discovered outside dominant architectural culture–because individuals who go through architectural indoctrination are forced to accept the standard narrative.

6. The alliance of environmentalism and traditional architecture

The rise of the environmentalist movement and its influence on and alliance with architecture has led to positive developments, such as New Urbanism and a renewed appreciation of the work of Christopher Alexander. At the same time, even though the impact of Modernist architecture on global energy consumption is reaching staggering heights, its adoption of energy-saving practices remains only superficial and insubstantial. Changes in global practice are implemented only to the extent that those do not challenge Modernist principles, only adding to a "look" of technological sophistication.

Modernism is founded on synthetic images of imagined futures and is driven by a fear of "regression" to any and all architectural traditions in practice before World War I. Its fundamentalist adherence to crude industrial styles reflective of "our time" is based on a cult-like belief in the "spirit of the age", the Zeitgeist: an idea that continues to dominate academia, practice, and its dependent construction industry. Belief in infinite progress through massive industrial consumption results in the technological and artistic amnesia responsible for the worldwide degradation of the built environment (Curl, 2018, pp. 327–352).

As an indirect consequence, in the early 1980s, a new environmentalist movement began in the United States. Since then, this concern for how buildings degrade nature helped to shape design thinking. New Urbanism implemented a planning and development approach based on the principles of how cities and towns had been built for centuries: walkable blocks and streets, housing and shopping in close proximity, and accessible public spaces. New Urbanism encompasses ten basic principles such as "traditional neighborhood development" and "transit-oriented development", which implies the re-enactment of traditional design in our contemporary culture (Garde, 2020; Buras, 2020, pp. 52–54).

Starting in the 1970s, the official history of Modernism presents several high-ranking architects as practitioners of bioclimatic design. While their buildings may indeed implement energy-saving practices, they are strictly beholden to Modernist typologies. Some of those designs only appear to be adaptive–they all look "technological", yet ugly to ordinary people. Modernist exceptionalism dominates bioclimatic design, because the mainstream narrative ignores more traditional solutions. And this bias

occurs even though tested vernacular climatic adaptations are cheaper, more efficient, and more sustainable. Modernist prejudice against heritage architecture means that the record includes only select new buildings that have an approved "look" while removing most genuinely energy-efficient buildings.

Stemming from the need for a livable city with stimulating aesthetic quality, Christopher Alexander's theory of "pattern languages" has contributed independently to the formulation of an environmental agenda based on timeless, humane design principles either in architecture (Alexander et al., 1977; Alexander, 1979; Mehaffy et al., 2020) or in urban planning (Mehaffy, 2017). However, the confirmation of these principles by the sciences had to wait until recent years (Salingaros, 2020a, 2020b). Contemporary design tools (outside dominant architectural culture) combine pattern languages with traditional typologies, using eye-tracking and neuro-sensors to check the adaptive qualities of the result. Such a negotiation between project and user overturns the top-down Modernist approach and finally breaks out of its stylistic straitjacket.

According to certain clean energy tracking systems (International Energy Agency, 2023), the operations of Modernist constructions account for 30% of global final energy consumption and 26% of global energy-related emissions. While this figure includes not only Modernist buildings, the majority of buildings today are Modernist structures, which are mostly built of concrete, steel, plate glass, and industrialized components. These features, recognized by popular websites (Muddamwar, n.d.), may have different impacts on emissions and energy depending on various factors, such as the location, size, age, and maintenance of the buildings. Yet, indeed, as the voluminous codes and standards indicate, society doubts whether the design methods exposed by hardcore Modernist architecture are able to create built environments that solve pressing ecological issues (Delaqua, 2021). Actual measurements place Modernist curtain-walled buildings at the very bottom of energy efficiency, despite desperate efforts at adding expensive reflective coatings on the plate glass (Mehaffy & Salingaros, 2015).

In contrast, traditional architecture posits that beauty and durability result from building for timeless qualities beyond what crude functionalist thinking can conceive, let alone build for. History confirms that, from the first cities until the late nineteenth century, the beauty and socializing power of architecture were the fruit of conscious intent and civilizing vision predicated on evolutionary adaptations hardwired in humans (Krier, 2014). Based on research and experience, the purpose of the built environment relies upon hardwired human behaviors and instincts to create a legacy of beautiful places. Most importantly, the energy savings obtained from low-tech, traditional building techniques seem to offer the only viable long-term solution to the world's looming energy crisis (Mehaffy & Salingaros, 2015).

Neuroscience today reveals that traditional building and design modes provide aesthetic systems that answer most needs when the geometrical rules of coherence are followed. Furthermore, in contrast to traditional explanations of aesthetics–including those used to justify Modernist design–we now understand the topic in terms of healing environments that are supported by medical data (Brielmann et al., 2022). Traditional styles and forms are easily "read" by the user-viewer, while also addressing key environmental, energy, economic, and human health points. Most significantly, the brain does not in fact identify Modernist structures as buildings, causing stress by way of confounding, intolerable built forms. Factually, it is impossible to create meaningful urban places for people using Modernist styles.

Almost uniquely, traditional architectural methods offer an equitably accessible framework for simultaneously handling urban space, environmental issues, economic viability, and planning politics (Krier, 2014). No other design method addresses as simply the matters of density, codes, public works, and infrastructure. The reason is that local traditional methods evolved through trial-and-error and were not imposed as "visionary solutions" without any social feedback. Virtually no other approach to architecture is as pluralistic, showing us how to comprehend the vast spectrum of human experience without misplacing the thread of humanity.

The forms and contributions of traditional architecture bespeak the skill of citizens working together to adapt structures to human emotions and health. Founded upon centuries of experience in creating backdrops for human activity, this new-old urban design paradigm (Buras, 2020, pp. 63–111) is measured by the individual experience of beauty–and the perambulating human body.

7. The unexamined path to the 21st century

This section attempts to expose the logical fallacies that drove early Modernism, as opposed to the ones that drive it in recent decades. It provides a critique of current architectural trends that ignore all the information about the downsides of Modernist principles while they keep promoting them into the future. The winning formula is to prioritize ever further "innovation" and "progress" despite negative reactions from the wider public.

How architects understand the nature of reality clarifies the history of Modernism and its mutation into Post-modernist and Neo-modernist architectures. Post-structuralist philosophy offers an artistic *carte blanche* that allows architects to make everything up as they go along. The only requirement is that someone generates dazzlingly obscure and pseudo-profound explanations. But this approach denies the basis on which we know about the real world and interact with it intelligently. All that poststructuralists can do is construct a shared narrative about effects, but without responsibility for them, nor any intention to respond to criticisms. Hence the necessary abandonment by the Deconstructivists, and other related Neo-modernists, of any project for the betterment of humanity–being able

only to inflict more shocks to the user through visual novelty. And even the visceral reality of that experience is never acknowledged.

The architect buying into such a philosophy cannot possibly make architecture that improves the quality of people's lives, because there is no common agreement on what that might mean. According to the accepted narrative, such a "meaning" linked to measurable health value would merely represent the preference of some professional elite, a hegemony of one privileged viewpoint over others. According to this deeply flawed logic, ugly architecture cannot possibly be bad for people over time, nor psychologically damaging. An epistemological setting has been fixed so that one cannot even refer to "ugly" architecture. This conviction is so strong that it overrides data from medicine and psychology showing detrimental effects of the built environment on the human body.

There is a difference between the early Modernists and the Neo-modernists (Poststructuralists). The former did not buy into relativism but were driven instead by certitude and messianic zeal. For them, modernist architecture was the only permissible style, not only through mandated choice, but because it supposedly transformed humans into a superior life form that transcended physical reality. In this mind-set, there is no hope of making architecture that is balanced and sustainable, like nature, or like the exquisitely-adapted patterns of traditional human settlements. Rather, we must always start fresh and relentlessly pursue novelty–the *tabula rasa*–but always keeping within Modernist stylistic constraints. We may use bits of historic structure, but only as an ironic referent to be deconstructed.

Valuable structural lessons documented by history inevitably come with unacceptable political baggage, and are judged as offering no useful solutions for today's enlightened society. To achieve "sustainability", specialist engineers, part of the technocracy, must provide some new apparatus that will support more architectural abstractions. Using time-tested vernacular solutions to save energy is simply too backward. Architects accept this narrow technological reality, and hope for some miraculously sustainable gadgets within it as part of some mythic futurist vision. This desperate poststructuralist epistemology is ingrained in global culture and global architecture in the late twentieth and early twenty-first centuries.

The new century brought a succession of architectural monsters into the world (Gustlin & Gustlin, 2020, Chapter 8.4; Masden & Salingaros, 2014; Pearson, 2011). We are referring not only to the gigantic size of iconic buildings, but to their disdain of human emotions, neglecting, for example, a visually inviting approach and comfortable entry. While the standard architectural narrative accepts those buildings as innovative, placing them in a "linear progression" of world architecture that continues the stylistic revolution of Modernism, we do not support this premise. Architectural trends of the past two decades may be followed in the magazines and popular press, but they seem totally detached from human biology hence do not contribute to the users' well-being. One needs to pay attention to the schizophrenic reaction to the iconic new buildings, where delirious praise from architects and conditioned individuals coexists with violent condemnation from many common folks. Something is not right.

8. Continuing challenges (instead of conclusion)

To solve today's environmental problems as caused by industrial global construction, it is necessary to understand the destructive philosophy at the root of the architectural profession. These issues persist because contemporary practice prioritizes industrialized processes over human and ecological needs, but building culture is finally ready to face a needed revision. The choice is no longer between tradition and progress, but between a sustainable future and an untenable *status quo*. A new architectural ethos reclaims the humanity of design and empowers communities to shape environments that reflect their values and needs.

Modernist architecture exposed itself as reductive in form, and its claims for a functionalist and socially sensitive design praxis are disproved. It opposed the application of decoration, ornamentation, and traditional styles for ideological reasons, and advocated the elimination of artificial boundaries between nature and the building interiors. Reversing the ancestral dwelling as a refuge from external dangers undid traditional building culture based upon the human survival instinct. By social (figurative) and material (literal) transparency, Modernism thus erased the cultural legacy that load-bearing walls inherited and preserved throughout the millennia of human history. By promoting an unnecessary transparency and global uniformity, Modernists believed that they improved living conditions and would mitigate social inequities, yet popular Modernist architects themselves continued to live according to controversial moral values.

Perhaps unknowingly, they longed for the totality of the monastic way of life, which was the reason why they promoted a puritan and oversimplified lifestyle (Böhringer, 2006, pp. 30–36, 63–71), but the secularization of ascetic ideas should not have led to a global "cult". This pseudo-religion demystified the human-scaled organic form, and, instead, enlarged the scale of the rectangular world of minerals to set an unquestionable canon for contemporary architecture. However, the mathematical beauty of order continued to exist in nature and traditional construction.

After World War II, Modernist architects self-righteously took upon themselves to be arbiters of destiny, representatives of a technological future. Modernists everywhere convinced academia and engineering practice of the validity of their arguments. With fundamentalist determination, Modernists caused the worldwide construction industry to conform to their stylistic cult. Their ubiquitous concrete, metal, and glass high-rises and freeway-fed sprawl suburbs are associated with well over 50% of energy use,

emissions, and global warming. The real tragedy is in the obsessive reach of early modernists after World War I to dissociate the practice of architecture from anything that came before; and the lemming-like behavior of the architectural establishment after World War II. Architects are beholden to property developers all around the world. This is the universal face of modernism.

We focus on the damage that is done to the readers and their lives still today, and to the world as a whole, irrespective of the intentions of the people involved. Modernist architecture was supposed to express the Zeitgeist, not give people a pleasant experience. This illusive Zeitgeist was imagined as being technologically driven, with buildings themselves conceived as a series of industrialized components, so that in the late 1920s and 30s the phrase "machine for living in" was coined. The "victory" of Modernism is a completely industrialized construction whether it needs to be so or not. This is a disaster because it removes hands, hearts, and minds from the process to the detriment of all involved–except the owners of the large industrial entities. And it detaches architects from the world.

Society has been mismanaging its own technological evolution, thereby severely damaging our humanity and threatening our very future as a species. The real question is, what are the historic forces that enabled those in power to achieve this, and how do we critically examine those forces and make changes today? Why should we change anything, and is it even possible? Our discussion puts the spotlight on choices the Modernist pioneers made back then, versus choices we can make now. When people feel that new projects are negatively impacting their lives, they can find alternatives that people like more, and say, "this is possible today"! Common people can have a say, which is empowering and pushes against the entrenched powers that be.

Starting from the 1950s, contemporary oppositions to mainstream Modernism arose virulently. Among them were the regionalist approaches dating back to Sigfried Giedion, Minnette de Silva, and others. After the dissolution of the CIAM, the mid-1960s brought about the parallel critiques of Postmodernism, La Tendenza, and Deconstructivism. Those trends either caricatured or openly discredited Modernism; however, they did not appeal to the restoration of traditional (vernacular or historical) tectonic culture. Their designs were unwaveringly receptive to Modernist practical norms and the application of industrial structures, even as the tone of their representations was different.

A more strategic opposition arose with the cultural rediscovery of phenomenology. From the 1980s, different shades of true regionalist practices, including critical regionalism, took a stand for local traditions that were considered oppressed by Modernist globalization. Today, vernacular architecture and various environmental and organic trends such as biophilia seem to rediscover classical architectural values and methods that they combine and validate with the latest results of science.

The cultural, environmental, and biological impacts of Modernist constructions are numerous, the most problematic of which are their contribution to climate change. According to climate scientists, standard Modernist construction is one of the largest contributors to what ails the Earth's biosphere. For this reason, anti-Modernist voices have arisen among various groups and organizations, including the Architectural Uprising, the International Network for Traditional Building, Architecture & Urbanism (INTBAU), and the Classic Planning Institute.

In conclusion, solving today's environmental problems that are primarily due to industrialized global construction is contingent upon understanding the destructive philosophy at the roots of the profession. After more than a century of biased and sanitized histories of architectural Modernism, building culture is ready to face the true record, as supported by historical facts.

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