

Autopoietic Architecture

Introduction

The aim is a comprehensive theoretical *system* that offers itself to architecture as its comprehensive self-description describing architecture from within architecture, in its internal constitution, and in its relationship to its societal environment. The premise here is that architecture has always already constituted itself self-referentially, via its own autonomous, disciplinary discourse.

The theory proposed here, the theory of architectural autopoiesis, focuses on architectural communications and “observes” these communications to detect its typical patterns. The theory analyses how individual communications depend upon *and* reproduce communication structures like the key distinctions, concepts, values, styles, methods and media of the discipline.

Definition

The introduction of the concept of *autopoiesis* reflects the premise that the discipline of architecture can be theorized as a distinct *system of communications*. Autopoiesis means self-production. The concept was first introduced within biology to describe the essential characteristic of life as a circular organization that reproduces all its most specific necessary components out of its own life-process. This idea of living systems as self-making autonomous unities was transposed into the theory of social systems understood as systems of communications that build up and reproduce all their necessary, specific communication structures within their own self-referentially closed process. It is this total network of architectural communications, a gigantic, self-referentially closed parallel process.

The communications of architecture comprise drawings, texts and built works. The built works of architecture constitute a special set of reference points within the overall network of architectural communications, and serve society as communicative frames for social interaction.

This new approach offers an arsenal of general comparative concepts that allow architecture - understood as distinct communicative subsystem of society - to be analysed in elaborate detail while at the same time offering comparisons with other communicative subsystems of society like art, science and political discourse.

Reviewing the book " The Autopoiesis of Architecture"

Patrik Schumacher has the potential to be one of the most influential figures working in architecture today. As a partner at Zaha Hadid Architects he is at the very forefront of

contemporary architecture, and as director of the Architectural Association Design Research Laboratory (AADRL) he is one of the most prominent pedagogues in the field. The *Autopoiesis of Architecture (AoA)* is the first volume of his attempt to provide a comprehensive theory of world architecture as he sees it.

Architects seem curiously drawn to theoretical reflection. From Vitruvius in antiquity, Alberti in the Renaissance, up to the manifestos of modernists such as Le Corbusier, and the more recent work of Peter Eisenman and others, architects have considered it vital to explain themselves in textual form. Schumacher explicitly claims lineage from these architect-theorists, and suggests that *AoA* is a "solution" to the puzzle of contemporary architecture.

Schumacher has certainly not built his theory from scratch, however. Over the last 30 years it has been fashionable for architects to borrow liberally from philosophical terminology in order to justify their own work. In *AoA*, Schumacher has attempted something far more exacting: applying the sprawling "social systems theory" of Niklas Luhmann to architecture. Luhmann, a German sociologist, explained that modern society could be understood by identifying its unique functions and their systems, such as politics, the economy, or science, each of which emerges spontaneously from the complexity of society, while simultaneously helping to maintain this complexity. The word *autopoiesis* (in Greek, "self-making") is used to describe this process.

Schumacher asserts that architecture should be added to the list of functions, and *AoA* is mostly concerned with explicating the idea that the purpose of architecture is to "organise and articulate increasing social complexity". It's a dense text, with arguments derived from architecture, philosophy, sociology, corporate literature, computing and science, and as such needs to be engaged with on a rather rigorous level, perhaps beyond that which many architects have patience for.

AoA is at its most powerful when it analyses what makes architecture what it is, as opposed to art or science. The section on form and function is excellent, understanding it as a necessary binary logic that structures all architectural communications. Schumacher does well to relate new developments in architectural media to historical periods, with some fascinating passages on the design process and the concept of the drawing. He is, of course, an acknowledged leader in the world of digital design and he theorises it convincingly in terms of its ability to add reversibility to the design process, thus vastly increasing the potential complexity of a design.

Where *AoA* begins to falter is when Schumacher attempts to explain what architects ought to be doing. He proposes a rehabilitation of the idea of "style", claiming that the extravagant architecture of Zaha Hadid is leading a new "epochal style" of architecture called "parametricism", which will take over from modernism as the dominant form of the 21st century. Schumacher claims that only parametricism can cope with the complexity of 21st-century spatial requirements, but then fails to give any convincing examples. Considering that social complexity exists in ever more physically intangible ways (such as the internet), and

that parametric software is just as capable of making ordinary buildings cheaper as it is of making large, formally exuberant museums, these claims are left as metaphors.

Schumacher believes that radical architecture need only provide innovative spatial formations into which new social formations will miraculously form. As well as this, throughout the book "architecture" is vaguely defined, sometimes encompassing all the architects in the world, sometimes shrinking until it refers only to Hadid and the AADRL. These and other moves permit Schumacher to completely banish politics and ethics from his architectural horizon, leaving his theory remarkably conservative for someone so keen to be considered avant-garde and radical. The rather pompous attempt to claim hegemony for Schumacher's own personal interests, along with a pressing need for an edit, somewhat mar what is a genuinely accomplished attempt to provide a grand theory of architecture.

In the autopoiesis of architecture, Patrik Schumacher introduces a new unifying theory of architecture. Peter Buchanan decodes, dissects and weighs up Schumacher's arguments

Patrik Schumacher combines teaching and theorising with practice. A PhD who studied philosophy as well as architecture, he is a director of the Architectural Association's (AA's) Design Research Laboratory, which is a hothouse of computer-generated design exploration that he co-founded. He is also a key partner at Zaha Hadid Architects (ZHA), now a large and busy international practice (which according to a recent report almost tripled its profits last year). Yet besides these two demanding roles he still finds time for visiting professorships and writing articles. Now he has published this tome (478 pages and 18 illustrations), the first of two volumes. He is clearly a man of formidable energy and drive, as well as intelligence.

The book is the product of considerable work and hubristic ambition, as is demanded by the confused state of architectural culture and education, and our changing and challenging times. Launching the book at the AA, Schumacher speculated that its impact would eclipse anything since Le Corbusier's *Vers Une Architecture*. Basically, it applies to architecture the concepts and methods of German sociologist Niklas Luhmann (1927-1998) in its attempt to present an all-embracing, unified theory of architecture. Driving this theorising is the notion that 'Parametricism' (a style of curving biomorphic or angular crystalline forms computer-generated with parametric software - as exemplified in the work of ZHA) is the inevitable long-term stylistic successor to modern architecture.

Luhmann's many books analyse modern society as a set of autonomous functional systems, including law, economics and politics. This horizontal differentiation into functional systems distinguishes modern society from the previous era of vertical stratification into social classes, the vestiges of which persist. Each functional system constitutes a separate system of communications and is autopoietic in nature. Autopoiesis, still a somewhat controversial concept, is a term coined by Chilean evolutionary biologists Humberto Maturana and Francisco Varela in 1972, and means self-generating. Here it refers to the evolving dynamic of these functional systems, the autonomy of each of which, in line with the concept of autopoiesis, helps keep them evolving.

Architecture for Luhmann was part of a functional system: the arts system. Schumacher rightly insists that architecture is an independent functional system, while acknowledging that it was only in the 1920s that it fully disengaged with visual art (sculpture and painting), from which the abstract language of modern architecture was derived. Following Luhmann's systems approach, he defines architecture as a system of communications. This has the major advantage of bringing all aspects of architecture under a single umbrella, not only physical buildings and their construction, but also practice along with design and dealing with clients and consultants. Furthermore, it includes the reception of architecture by critics and media, along with other aspects of architectural culture, discourse and education. Yet there are downsides to this definition: it is a sociologist's view, and so is partial and reductionist, not least in omitting the cultural dimensions that would concern anthropologists. Among the many other crucial dimensions of architecture it neglects is the physicality of buildings, their materiality and presence, and structural and constructional logic.

Much of the book thus explicates Luhmann's conceptual system while applying it to architecture. Although the book is clearly written and easily understood, these parts are repetitive, making the same points countless times. Yet in a few places elsewhere the opposite pertains: untenable assumptions appear in a single sentence, without the full explanation they demand. 'The theory of architectural autopoiesis is trying to think through the implications that follow when all the above mentioned options are rejected in order to embark upon a consistently anti-humanist, systemic and radically Constructivist re-description and forward projection of architecture,' writes Schumacher. (Bold italics are in the original text.) Huh? Where does that come from?

In other sections, particularly when discussing avant-garde and parametric approaches, terms are used that only a few initiates would understand. Much of what is asserted in these parts would be more convincing if illustrated with examples, as should perhaps be included in Volume 2. As it is, the impression given is that the author knows he is skating on thin ice and cannot put his case with the surety of his paraphrases of Luhmann. These contrasts make for an unbalanced book, as if the theory of autopoiesis is for even dim architects and other parts for only an inner circle. Why do so many books today seem to lack the guiding attention of an informed editor?

Nevertheless parts of the book, for instance those filling in historic background, are written with admirable clarity and conciseness. Good too is the convincing discussion of the virtues of style, which runs contrary to much current dogma, and, when it arrives after 370 pages, that of the purpose of architecture as the framing of social interaction (drawing on the work of social psychologist Erwin Goffman). Yet until then readers, or at least this one was, may well be asking themselves: how can a theory of architecture omit discussing its purpose? And how can the long-term successor to modern architecture be asserted so confidently without a prior critique of its predecessor's shortcomings? To equate modernism with homogenising Fordism and later styles, climaxing in Parametricism, with the increasing heterogeneity of Post-Fordism, contains more than a germ of truth, but is also quite inadequate as an explanation.

Key to Luhmann's system is the identification of binary pairs whose interaction defines and drives each functional system. For architecture, Schumacher selects as the key binary pair, the lead distinction, what he terms through much of the book as 'form versus function', which closely relates to another key pair, 'utility and beauty'. This expression of form and function as oppositional is confusing to architects for whom they are mutually dependent; what is meant is later clarified by analogy with theory and evidence in science, or price and

value in economics. Yet this is still reductionist and even more so is defining beauty merely in terms of well-resolved form.

Probably most ludicrous to architects is the assertion that the medium of architecture is the drawing. This idea has been around awhile among the avant-garde, for some of whom the drawing is the real work of architecture and the building its clumsy, compromised copy - an excuse for the unresolved dog's breakfast that results when some of them build. Later in the book this is acceptably revised to the medium of design being the drawing. But the medium of architecture is axiomatically the physical building, with all its complexities of space and atmosphere, materials and construction. It is the mastery of a difficult and relatively intractable medium that results in works that transcend novelty and whizzy form-making to speak deeply to us.

For Schumacher, an important binary pair is avant-garde versus mainstream, the former driving the evolution of architecture through its formal researches and theorising. Responding to external 'irritations' (Luhmann's term adopted by Schumacher) or 'peturbations' (Maturana and Varela) in the form of social change, its role in biological terms is to create mutations. At the heart not the margins of architecture, the avant-garde often anticipates and is active participant in social change. Its ideas are then tested, selected and consolidated by the mainstream that depends passively on the avant-garde for innovation and to retain functional relevance. Such ideas are simply delusional: architects look to accomplished architects dealing with all the complexities and constraints of architecture for ideas and inspiration, not to a self-indulgent avant-garde.

Many will be startled by Schumacher's claim that architecture started in the Renaissance. Discounting everything before as mere building may seem crazy, but it is consistent with his understanding of architecture as dependent on written theory and constant innovation. Although the Gothic had its own theory and innovated, this does start with Alberti in what is now ascribed as the early modern era. Modernity was born of a series of crucial shifts, including from prioritising reason over faith (Medievalism) and positing an objective reality independent of us and understood through measurement and detached observation. Important too was the discovery of perspective, resulting (so art historians tell us) in objects separating out from their backgrounds, and so a loss of unity.

Another rupture in a previously organic unity was the division of a world view commonly referred to as the Great Chain (or Nest) of Being for the three separate realms of the good (ethics and culture), the true (science and nature) and the beautiful (psyche and art). This distinction had been made before, but it was the differentiation and then progressive dissociation of these three realms that gave modernity its power to analyse and develop the world (along with its illusions of control). These three progressively fragmented into the array of modern functional systems charted by Luhmann.

This fragmentation has now brought us to the brink of catastrophe, as these autonomous functional systems fail to respond quickly and adequately to tsunamis of 'irritation' and 'peturbation'. Of these, global warming, to which the products of architects and planners are the greatest contributors, is only the symptomatic fever of more extensive systemic collapse. This includes that of our voraciously destructive corporatist economic system originating in the royal charters first issued in the early 1400s at the birth of modernity.

To offer, as this book does, a supposedly comprehensive architectural theory to supplant modernism without a single mention of sustainability, the challenge of our times, beggars

belief. Sustainability is the ‘overarching discourse’ Schumacher claims contemporary society lacks. Yet even architects tackling sustainability have not fully grasped the challenges it raises. Their approach is objective, technological and ecological, ignoring the cultural and psychological dimensions, thus exemplifying modernity’s limiting paradigm. Yet, as Einstein commented, a problem cannot be solved with the same level of thinking as created it. Unsustainability is utterly endemic to modernity for reasons too numerous, pervasive and obvious to be elaborated on here.

To provide some perspective ask yourself: what is our uniquely human attribute? Consciousness? Language? Culture? Use of tools? Equivalents of all these and others are found in other creatures. Perhaps our unique attribute is harnessing energy to power things other than our own bodies. But this power has expanded unchecked by an equivalent development of consciousness and culture. We use more energy and other resources, such as water, than ever before, but with little awareness. The hearth, the fountain and the well were all foci of social and spiritual life, and symbolic too. Modernity’s denial of consciousness in the non-human world has rendered us unconscious too - or at least dimmed our consciousness. Sustainability can only be achieved through reassessment and rebirth of a radically transformed culture and the reversal of millennia of seemingly inevitable developments, in what will be a major pivotal reorientation.

Among modernity’s most damaging features is the trivialising of culture. Discarding the iconography and fripperies of culture (columns and porticoes, architraves and ornament) at first seemed to liberate us from mumbo jumbo and the clogingly obsolete. A modern building was a functional device, a machine for living in, setting us free by adopting a subservient role. By contrast, historic architecture had shaped cultural artefacts that, instead of being subservient, mediated between us and the much larger world encompassed by culture, which even included our relationship to nature. Furthermore, as cultural artefacts they gave us cues as to how to conduct ourselves in our multiple webs of relationship that modernity downplayed or severed.

Modern buildings hold value in the moment and lose this when rendered functionally obsolete, as is consistent with modernity’s destructive short-termism. Buildings as cultural artefacts root us in the long-term, connecting us back to history and our ancestors, and projecting us forwards to the future and our descendants. This is another reason that sustainability calls for the recovery and rethinking of culture, one of the many vital issues any contemporary architectural theory must deal with that goes unmentioned in this book. Such issues would be raised by an anthropological approach, say, not that this would be better than a sociological one. But to be relevant to our times, any comprehensive architectural theory would need to include this wider range of ways of thinking.

Curiously and unexpectedly, reading this book brought to mind various expressions and ideas of Marshall McLuhan. To explain our unawareness of how media of communication shape us, he would say, ‘whoever discovered water it wasn’t the fish’. Something similar applies to architecture, so that, as this book demonstrates, even architects grasp or focus on only limited aspects of it. The view offered by this book is as if looking at water, the habitat of the fish, from above the surface - once again a detached, modern and limiting perspective. Any relevant theory now has to enter the water as well as perceive what is around, as if through the eyes of a highly aware fish.

Another McLuhan aphorism was ‘we see life in the rear-view mirror’, so perceiving where we had been rather than where we are. Thus the Industrial Revolution made an art form of the

pastoral in landscape gardening and painting. Luhmann and Schumacher exemplify and describe the modern age that it is not only urgent we transcend, but is in any case waning, not least due to the impact of the computer. With Luhmann, this is apt for his sociological analysis; with Schumacher it limits the relevance of anything he says about the future.

The fragmentation into autonomous functional systems, which Luhmann describes at what may be its passing peak, corresponds to the fragmenting ‘explosion’ of knowledge and disciplines that McLuhan attributed to the impact of Gutenberg’s printing press - a key factor in launching the Renaissance and the modern era. But long before the internet and Wikipedia, McLuhan had already foreseen electronic communications as creating a global nervous system, bringing about an ‘implosion’ of specialist fields of knowledge and disciplines melding and interacting. The urgent quest for sustainability immeasurably compounds the implosive pressures.

McLuhan also described sunset effects, his resonant term for last fling flare-ups as caricatured exaggerations of now obsolete characteristics of a passing age. Parametricism, like all other products of the avant-garde (a quintessentially modernist notion), is a sunset effect, an exaggeration of the pathologies of modernity. The book includes a table showing the transitional styles between the epochal styles of Historicism and Modernism as Art Nouveau and Expressionism. The combination of these results in something resembling Parametricism - this point is made only half in jest.

As a correlate of modernity’s core defining notion of an external objective reality (a weird idea to pre-moderns and now again Post-Quantum Mechanics), modern architecture was typically designed as isolated objects. Often these were shaped only around their internal anatomy of spaces and circulation, structural skeleton and enveloping skin. But even when not, and particularly in the early phases, modern buildings related to little in their surroundings, not to climate and culture, nor to other buildings and us humans (through, for instance, forms shaped so we recognised ourselves in them, such as columns and vertical windows). As a result, people found many of these works to be, if not outright alienating, at least difficult to relate to. Compare in your mind’s eye a street of traditional buildings with one of modern slick-skinned buildings: if empty, the former remains companionable and full of life, whereas the latter is a lifeless husk that largely defies relationship.

Parametricism may produce novel, whizzy and momentarily exciting forms, but it also compounds the pathologies of modern architecture. The style can neither adequately frame nor address public space, with facades whose composition and elements allow us to identify and relate to them. Nor do parametric buildings relate to each other (beyond establishing superficial formal contiguities), nor to other architecture. Yet a fundamental purpose of architecture, yet again not mentioned in this book, is to aggregate into good urban fabric. Perhaps most profoundly problematic is that modernity’s marginalisation of the human, reducing such psychologically resonant notions as dwelling or inhabitation to function (human agency understood only from the outside, as in Behaviourism) is taken yet further. This is also clearly reflected by this book’s complete aversion to the subjective. Rather than regenerating all the webs of connection and relationship severed by modernity, as essential to achieving sustainability, these are yet further denied.

Rejecting Parametricism, the transient sunset-effect style, does not imply a rejection of parametric modelling. This is now an immensely useful and powerful part of any architect’s repertoire - not least in facilitating the manipulation and synthesis of many more variables than were previously possible. But, apart from their other limitations in suppressing

relationships, the sculptural and scale-less forms typical of Parametricism are not necessarily implied in parametric modelling, but rather reflect the personal aesthetic preferences of the designer. Perhaps the most intelligent use of parametric modelling is to explore new formal disciplines to bring a wide range of increased efficiencies, in terms of structure, energy, constructional assembly, shaping of flows of people, air and so on.

For instance, the Swiss Re building - although still a glacially forbidding, stand-alone modernist work - was designed using parametric modelling to achieve new levels of efficiency in structure (20 per cent less steel than an equivalent tower) and energy use. As Spanish critic Luis Fernández-Galiano reminds us in *Fire and Memory*, architecture involves construction and combustion: buildings have energy-consuming metabolisms that heat, cool and ventilate them, and their materials are manufactured in various other metabolic processes.

Other computer-dependent techniques were used to design Swiss Re. These include Computational Fluid Dynamics to model climatic conditions inside and out, and Space Syntax axial analysis to check whether the square would be used. Yet none of these contemporary concerns, let alone the core discipline of construction, are discussed in Schumacher's supposedly comprehensive and ultimately anachronistic theory of architecture.

Swiss Re also draws attention to more of its weaknesses, not least the exaggeration of the degree to which, in becoming a progressively more autonomous functional system, architecture has diverged from engineering. In practices at the leading edge of architecture (something very different to the avant-garde), engineers play a key role in the design team. This includes not only structural engineers but also, with the quest for sustainability, services engineers. In the near future, it will involve production engineers, who will be redesigning the manufacturing processes of materials and components to make them less energy-intensive and polluting. As contemporary parlance puts it, we have moved from the Age of Genius (of the solitary master creator) to the Age of Scenius. Creation now happens in inter-disciplinary teams, in which everyone contributes as (more or less) equals. Moreover, the architect of Swiss Re is the hardly avant-garde Foster + Partners, winner of a recent poll in *Building Design* magazine as the most influential of all architectural practices.

This review may seem unduly harsh because, for all the book's serious limitations, much of the discussion is illuminating and, within its own terms, conducted with well-informed rigour. I can imagine parts of it being recycled in an anthology of late-modern theory. Because ultimately this is the problem with this ambitious book: its style of argument and the style it promotes are what many would refer to as forms of hyper-modernity, what we now see as the limitations and pathologies of modernity pushed to new limits. What we need instead is what some would refer to as trans-modern theory (postmodernism being merely the repressed flipside of modernity). This would elaborate a more complex and complete view of architecture, which would not only address many of the pressing problems we face, but also help us to shape and move into a whole new epoch, that of sustainable civilisation. To rival in impact *Vers Une Architecture* this vision of architecture, and of the new epoch, would have to be much more inspiring than this book.