

The Architect's Brain. Neuroscience, Creativity and Architecture

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Proponents of the 'architecture of the senses' or of the 'architecture of experience' are in luck. Despite the fact that from the second half of the twentieth century, hand in hand with the crisis of modern functionalist rationalism, 'organicism' began to recover wings, momentum, and validity, the truth is that in this classic and ongoing confrontation between the rational and the sensory, the former—rationalism—has been supported by scientific objectivity, while the latter—the sensory—has been a victim of its alleged relativism and ambiguity, and on many occasions, sentimental romantic imprint: science has always been the best guarantee to legitimize proposals and theories. Yet it so happens that advances of neuroscience, which studies the brain, (the greatest at the end of the twentieth century and in the first two decades of this twenty-first century), give more and more prominence to the emotional and perceptive aspects than to rational and abstract ones. This issue has revolutionized disciplines such as psychology and affected certain architectural discourses, such as that of Harry Francis Mallgrave. The recent work of the architect, scholar, editor, and distinguished professor emeritus at the Illinois Institute of Technology, has focused on the relationship between contemporary science and humanities and architectural thought.

In his book, *The Architect's Brain: Neuroscience, Creativity and Architecture* (2010), dedicated to the analysis findings in the field of neuroscience that could contribute to both the design and pedagogical exercise of architects, he says:

"While the architecture of the last 500 years has become increasingly abstract and rationalistic, today neurologists tell us that the brain is more about the visceral, biological, sensory, and emotional. It turns out that even highly cognitive processes recruit primary emotions".

He continued the path initiated in that book with the publication of two others, more focused on the architecture of the senses and experience itself: *Architecture and Embodiment: The Implications of the New Sciences and Humanities for Design* (2013) and *From Object to Experience: The New Culture of Architectural Design* (2018). All three publications are framed within the growing interest that neuroscience has aroused in the field of architecture, especially in the United States, as evidenced by the ANFA: Academy

of Neuroscience for Architecture, founded in 2003 in San Diego, California, whose mission is to "promote and advance knowledge that links neuroscience research with the growing understanding of human responses to the built environment".

This interest in neuroscience fits in with the spirit of the new times, whose thinking gravitates towards territories where, beyond rationalism and Western tradition, emotions rise as the favorite instrument in the search for cultural and political performance. Needless to say, the role of the emotional in the new relational universe caused by the internet and social networks.

It is somewhat paradoxical that this endorsement of the emotional and sensorial has its basis, at least in part, in the rational and scientific realm.

Studies in neuroscience include questions that, having traditionally been the domain of the spiritual, transcendental, or intuitive, see their meaning altered from a biological and scientific perspective. They dismantle the historical mind-body duality by demonstrating that, at least part of what we have previously understood as the ethereal mind, which inhabits the space of the metaphysical, is a physical, bodily, scientifically rooted matter of biological reality. Neuroscience makes the line that separate metaphysics from science (the Cartesian *res extensa* from the *res cogitans*) increasingly blurry. For example, today we know that, regardless of cultural issues, the spectral range of fluorescent light can disturb the nerves of the eyes that have not evolved to adapt to that light spectrum. Something physical.

Theories about the perception and experience of architecture are not new, and many of the advances in neuroscience that affect architecture are not so much discoveries as nuanced proof of hypotheses that had been previously intuited and predicted by others throughout history. Hence, the first of the two parts that organize the book, "Historical Essays", is a panoramic tour through history to select and analyze theories and writings that dealt with perceptions and thoughts on the built environment (with the breadth, wealth, and variety of issues that this raises), from the Renaissance to the present. It starts with the geometries and canonical proportions 'imitating' nature and Alberti's *concinnitas* and culminates in the current multisensory experience of Pallasmaa. It is a chronological and linear journey enriched with contextual digressions and brief biographical notes on authors and architects. The identification of crossed relationships gives coherence and roundedness to the whole, both in content and narrative. Each one of the theories it presents corresponds to the nine chapters and is identified with a type of brain (from the Humanist to the Phenomenal through the Enlightened, the Sensational, the Transcendental, the Animate, the Empathetic, the Gestalt, and the Neurological) in tune with one of the key findings that neuroscience provides: the plasticity of the brain that makes it able to

mutate, change, and vary throughout history. Burke's theories, the predictive *Einführung* and Gestalt, Rasmussen's experience of architecture, Norberg-Schultz's existentialism, Rykwert's ritualism and symbolism, Pallasmaa's multisensory experience, etcetera, acquire a new anticipatory condition and scientific legitimization.

The second part of the book, "Neuroscience and Architecture", is more heterogeneous. Its four chapters start with a series of anatomical descriptions accompanied by graphic illustrations about the composition of the brain (both very detailed, at least for an architect reading about neuroscience), and they go on to address its general and particular characteristics and physiological features (the latter focusing on the interests of architects).

General features of the brain that stand out are its extraordinary complexity, its labyrinthine rather than mechanical structure, its plasticity or capacity to alter its synaptic networks and neurological connections in response to environmental conditions, and its embodiment, being as we are, embodied beings whose brains, bodies, environments, and culture are interconnected at various levels and only now are we beginning to appreciate how body movements, postures, homeostasis, emotional responses, and self-perception affect our thinking and reflective processes.

These general features provide relevant data for learning and therefore also for the teaching of architecture. For example, the brain is born having developed only half of the synapses and most of its higher functions will depend on the environment, experience, and neurological stimulation, which links to the brain's plasticity. Synaptic circuits are strengthened or weakened according to their use, hence the brain of a musician has more developed areas than that of a non-musician. It has also been discovered that in perceptive and cognitive processes, the relevance of the brain's own spontaneity (not directly linked to external stimulus) tends to be greater and greater.

In the following three chapters ("Ambiguity: Architecture of Vision", "Metaphor: Architecture of Embodiment", and "Hapticity: Architecture of Senses") Mallgrave selects some particular features that may be of interest to architects. For example, the brain has a predilection for what is clear and known, for essential and permanent forms, for what is easier to classify and organize; perception is extraordinarily ambiguous and metaphorical; metaphor is intimately linked to thought and in particular to creative processes; and, as we have already said, the sensory and emotional prevail over the abstract and rational.

Mallgrave's book ends up being an ode to the architecture of experience, of a 'biophilic' nature, in a bid against object-oriented, formalist, conceptual, and abstract architecture (and in many cases excessively economic-speculative). That said, it is worth

pointing out that when the architecture of the senses and experience emerged, between the 80s and 90s, as a reaction to formalist and speculative architecture, it did so aligning itself with nature and the depths of being human, while today it seems to be in happy collusion with commercial speculation: 'green' today means business.

In any case, the message that Mallgrave sends with this book is to be welcomed, as it takes us back to basic questions that have historically been at the heart of architecture, and which now are based on current models of both the humanities and the biological sciences. Together with technologies, they help reestablish

"the focus of the architect by putting it on what architecture has historically aimed at: on the occupants of our built environments and on paying attention to how they perceive, feel, respond, and apparently, on rare occasions, enjoy the experience".

Ten years have passed since the publication of the book. Technologies are less and less linear, predictable, uniform, and strictly mechanical, and they incorporate more and more variety, personalization, and even 'spontaneity', being the symbiosis of the technological and the biological realms one of the most relevant challenges of current scientific exploration, and artificial intelligence its paradigm par excellence.

The truth is that the limits between the biological and the mechanical, the perceptive and the rational-abstract are becoming increasingly softer; philosophy and computer science are fields with increasingly blurred boundaries. Perhaps in the future, the classic confrontation between architecture of the senses and experience versus architecture of the rational and abstract will cease to make sense because they may be virtually one and the same.