

A

An Artwork is...

→ forgetting

Embodied Experience and Sensory Thought - Lived Space in Art and Architecture (2006)

Rainer Maria Rilke, one of the greatest poets of all times, gives a memorable description of the utter difficulty of creating an authentic work of art and of its density and condensation, reminiscent of the core of an atom. 'For verses are not, as people imagine, simply feelings..., they are experiences. For the sake of a single verse, one must see many cities, men and things, one must know the animals, one must feel how the birds fly and know the gesture with which the little flowers open in the morning'.¹ The poet continues his list of necessary experiences endlessly. He lists roads leading to unknown regions, unexpected encounters and separations, childhood illnesses and withdrawals into the solitude of rooms, nights of love, screams of women in labour, and being beside the dying. But even all of this together is not sufficient to create a line of verse. One has to forget all of this and have the patience to wait for their return. Only after all our life experiences have turned to the own blood within us, 'not till then can it happen that in a most rare hour the first word of a verse arises in their midst and goes forth from them'.²

Aestheticization

→ elementarism; eyes; experience has a multi-sensory essence; newness

The Existential Wisdom: Fusion of Architectural and Mental Space (2008)

In our materialist and digital age, buildings are regarded as aestheticized objects and judged primarily by their visual characteristics. In fact, the dominance of

1 Rainer Maria Rilke, *The Notebooks of Malte Laurids Brigge*, London: WW, Norton & Company, 1992, 26.

2 *Ibid.*, 27.

vision has never been stronger than in the current era of the technologically expanded eye and industrially mass-produced visual imagery, the ‘unending rainfall of images’,³ as Italo Calvino appropriately describes the present cultural condition. In today’s media culture, architecture has been turned into an artform of image and instant gratification. The rapid triumph of computerized design methods over sketching by hand, and full involvement of the body in the design process, has brought about yet another level of detachment from embodiment and immediate sensory contact.

The consumer culture of today has a blatantly dualistic attitude towards the senses and human embodied existence at large. On the one hand, the fundamental fact that, experientially, we exist in the world through the senses and cognitive processes is neglected in the established views of the human condition. This attitude is also directly reflected in educational philosophies as well as practices of daily life; in our cult of physical beauty, strength and virility we live increasingly bodiless lives. On the other hand, our culture has developed an obsessively aestheticized and eroticized cult of the body and we are increasingly manipulated and exploited through our senses. The body is regarded as the medium of identity and self-presentation as well as an instrument of social and sexual appeal. Current consumer capitalism has even developed a ‘new technocracy of sensuality’ and shrewd strategies of ‘multi-sensory marketing’ for the purposes of sensory seduction and product differentiation. This commercial manipulation of the senses aims at creating a state of ‘hyperaesthesia’ in the consumer.⁴ Artificial scents are added to all kinds of products and spaces, whereas muzak conditions the shopper’s mood. We have undoubtedly entered an era of manipulated and branded sensations. Signature architecture, aimed at creating eye-catching, recognizable and memorable visual images, or architectural trademarks, is also an example of sensory exploitation, the attempt ‘to colonize by canalizing the “mind space” of the consumer’.⁵

We are living in an age of aestheticization without being hardly aware of it. Everything is aestheticized today; consumer products, personality and behaviour, politics, and ultimately even war. Formal and aesthetic qualities have also in architecture replaced functional, cultural and existential criteria. The appearance of things is more important than their essence. An aestheticized surface appeal has displaced meaning and social significance. The social idealism and compassion that gave modernism its sense of optimism and empathy have frequently been replaced by formalist retinal rhetoric. The lack of ideals, visions and compassion is equally clear in today’s pragmatic and egoistic politics.

3 Italo Calvino, *Six Memos for the Next Millennium*, New York: Vintage Books, 1988, 57.

4 See David Howes, ‘Hyperesthesia, or The Sensual Logic of Late Capitalism’, in Id. editor, *Empire of the Senses*, Oxford and New York: Berg Publishers, 2005, 281–303.

5 *Ibid.*, 288.

Amplifiers of Emotions

→ Emotions; Emotions and Creative Thought; Microcosms; Spatialized Memories;

Selfhood, Memory and Imagination: Landscapes of Remembrance and Dream (2007)

In addition to being memory devices, landscapes and buildings are also amplifiers of emotions; they reinforce sensations of belonging or alienation, invitation or rejection, tranquillity or despair. A landscape or work of architecture cannot, however, create feelings. Through their authority and aura, they evoke and strengthen our own emotions and reflect them back to us as if these feelings of ours had an external source. In the Laurentian Library in Florence I confront my own sense of metaphysical melancholy awakened and reflected back by Michelangelo's architecture. The optimism that I experience when approaching the Paimio Sanatorium is my own sense of hope evoked and strengthened by Alvar Aalto's optimistic architecture. The hill of the meditation grove at the Forest Cemetery in Stockholm, for instance, evokes a state of longing and hope through an image that is an invitation and a promise. This architectural image of landscape simultaneously evokes remembrance and imagination as the composite painted image of Arnold Böcklin's 'Island of Death'. All poetic images are condensations and microcosms.

'House, even more than the landscape, is a psychic state', Bachelard suggests.⁶ Indeed, writers, film directors, poets and painters do not just depict landscapes or houses as unavoidable geographic and physical settings of the events of their stories; they seek to express, evoke and amplify human emotions, mental states and memories through purposeful depictions of settings, both natural and man-made. 'Let us assume a wall: what takes place behind it?', asks the poet Jean Tardieu,⁷ but we architects rarely bother to imagine what happens behind the walls we have erected. The walls conceived by architects are usually mere aestheticized constructions, and we see our craft in terms of designing aesthetic structures rather than evoking perceptions, feelings and fantasies.

Animal Architecture

→ architecture and biology; biophilic beauty

6 Gaston Bachelard, *The Poetics of Space*, Boston: Beacon Press, 1969, 72.

7 As quoted in Georges Perec, *Tiloja ja avaruuskia* [Especies d'espaces], Helsinki: Loki-Kirjat, 1992, 72.

Our established view of architecture and its history is surprisingly limited. Almost all books and courses on architectural history begin with Egyptian architecture, i.e. roughly 5500 years ago. The lack of interest in the origins of human constructions for inhabitation or cosmological and ritual purposes is truly surprising even considering the fact that material remains of earliest constructions of man would not exist. We know that domestication of fire took place about 700,000 years ago, and the centring, focusing and organizing impact of fire is already an architectural ingredient. In fact, the earliest architectural theorist, the Roman Vitruvius Pollio, acknowledges this fact in *De Architectura libri decem* (Ten Books on Architecture), which he wrote during the first decade of Pax Augusta, c. 30–20 BC. Most treatises associate the origins of architecture in tectonic construction, in other words, assembled masonry or wood structures or moulded clay and mud constructions. However, there is very little doubt in the assumption that human architecture originates in woven fibre structures. Architectural anthropology, a rather recent field of research, studies the origins of certain ritualistic and spatial patterns in the building behaviour of apes.⁸

Also, the countless vernacular building traditions of the world with their impressive features of adaptation to prevailing local conditions, such as climate and available materials, were not much thought about until Bernard Rudofsky's exhibition *Architecture Without Architects* at the Museum of Modern Art in New York in 1964.⁹ Anthropological studies have revealed the cultural, symbolic, functional and technical refinements of the unselfconscious processes of construction mediated by illiterate and embodied traditions. However, vernacular traditions still remain as a curiosity in architectural studies, although the deepening of research in the sustainability of human settlements and ways of constructions will certainly awake interest in this neglected area of human building culture.

Animal constructions serve the same fundamental purposes as human constructions; they alter the immediate environment for the benefit of the species by increasing the level of order and predictability of the habitat and improving the probability of survival and procreation. As we know, animal constructions are surprisingly varied. Some degree of building behaviour is practised throughout the entire animal kingdom, and skilful building species are scattered throughout the phyla from protozoa to primates. Pockets of special architectural skill can be found among birds, insects and spiders. It is thought-provoking to realize that the constructions of higher animals are among the least ingenious. Apes, for example, only construct a temporary shelter each night – although there seems to be more organization and skill than we have observed so far – as compared

8 Dr Nold Egenter in the University of Lausanne in particular has studied the building behaviour of apes in northern Japan.

9 Bernard Rudofsky, *Architecture Without Architects*, New York: The Museum of Modern Art, 1964.

with the termite metropolis of millions of inhabitants which may be utilized for centuries.

The interest in animal architecture among architects and architectural scholars has remained totally anecdotal although inspiring documentation on animal constructions has existed since Reverend John George Wood's remarkable treatise *Homes Without Hands* published in 1865.¹⁰ Karl von Frisch's *Animal Architecture* of 1974¹¹ was instrumental in re-awaking my own by then already forgotten childhood fascination in building activities of animals. Michael H Hansell's books and exhibition in Glasgow in 1999 have provided scientific ground on the functioning principles as well as materials and ways of constructing among animals.

The book *La Poétique de l'espace* (1958) by the French philosopher of science and poetic imagery has been one of the most influential books in the recent theorizing of architecture surprisingly includes a chapter on nests.¹² He quotes the view of Ambroise Paré written in 1840: "The enterprise and skill with which animals make their nests is so efficient that it is not possible to do better, so entirely do they surpass all masons, carpenters and builders; for there is not a man who would be able to make a house better suited to himself and to his children than these little animals build for themselves. This is so true, in fact, that we have a proverb according to which men can do everything except build a bird's nest".¹³

In relation to the size of their builders many animal constructions exceed the scale of human constructions. Others are constructed with a precision unimaginable in human construction. Artifact-building animals teach us that the organization of even simple animal life is complex and subtle. Close studies by scanning electron microscope (SEM) reveal mind-boggling refinements of structures in a scale invisible to the human eye and totally beyond the capabilities of human builders, such as the microscopic structural ingenuities of spider or caddis fly larva constructions.

Animals frequently use the same construction materials and construction methods as vernacular human cultures. Regardless of the usually great differences in scale, similarities on a formal level are often surprising. The clay structures of various swallows and wasps resemble structures of American Indians. In traditional African cultures, woven huts often appear as enlarged bird's nests or even constructions of certain fish species. Beaver's curved dam walls fight the pressure of water in the same way as some of our largest and most advanced dams.

10 Karl von Frisch, *Animal Architecture*, New York and London: Harcourt Brace Jovanovich, 1979.

11 Michael H Hansell, *Animal Architecture and Building Behaviour*, London: Longman, 1971; Id., *Animal Construction Company*, Glasgow: Hunterian Museum and Art Gallery, 1999.

12 Gaston Bachelard, *The Poetics of Space*, Boston, MA: Beacon Press, 1964.

13 Paré Ambroise, *Le livre des animaux et de l'intelligence de l'homme. Oeuvres complètes*, Vol. III, Paris: Editions JF Malgaigne, 1840, 74.

A tiny butterfly larva may protect its case with a dome assembled of its own larva hair, echoing the geometry of Buckminster Fuller's geodesic structures which are among the most efficient human constructions in their ratio of enclosed volume to weight ever conceived. A Green Building research project (1990) by Future Systems utilizing a jar-like external shape and a system of natural ventilation strikingly evokes the internal nest shape and automated air-conditioning system of *Macrotermes bellicosus* termites, one of the finest constructions in the animal kingdom. I have myself paired such similar images, but they are, of course, bound to remain on the level of the similarity of appearance only. These comparisons can be interesting and stimulating but they cannot teach us anything essential, I believe.

So far, the institution that has made the most serious research on the internal logic of certain animal constructions and their adaptability in human architecture is the Institute of Lightweight Structures at the University of Stuttgart directed by Frei Otto, a notable architect and constructor. These studies have focused on net and pneumatic structures.¹⁴

After mentioning some parallels, I would like to point out certain significant differences in animal and human architecture. Let me begin with the time factor. Animal building processes are the result of immensely long evolutionary processes, whereas our own architectural history is very short in comparison.

Spiders and their web-building skills have evolved, perhaps, during some 300 million years; *The Economist* published high-resolution X-ray micro-tomograph images of 312- million-year-old fossilized arachnids that had eight legs but lacked spinnerets and presumably could not produce silk. When such periods of evolutionary development are compared with the meagre couple of million years of human development since *Homo erectus* stood up on two legs, we can easily expect animal building skills to exceed ours. There were surely animal architects on earth for tens of millions of years before *Homo sapiens* put together his first clumsy structures. As I said earlier, our conventional concepts of architecture are restricted to constructions that have taken place over roughly 5000 years of Western high culture.

Another difference arises from the fact that animal architecture has evolved, and continues to do so, under the laws and control of evolution, whereas human architecture has detached itself from this control mechanism and immediate feedback. Whereas animal structures are continuously tested by the reality of survival,

14 Bach, Klaus et al. under the direction of Helnske, JG and Otto Frei, *Nets in Nature and Technics*, Institute for Lightweight Structures, University of Stuttgart, Stuttgart, 1975; Bach, Klaus et al. under the direction of Schaur, Eda et. al., *Pneus in Nature and Technics*, Institute for Lightweight Structures, University of Stuttgart, Stuttgart, 1976; under the direction of Otto Frei, *Lightweight Structures in Architecture and Nature*, Institute for Lightweight Structures, University of Stuttgart, Stuttgart, 1983.

we can, and do, develop absurd architectural ideas without the punishment of natural selection and immediate elimination. As Mies van der Rohe said, we tend to 'invent a new architecture every Monday morning'. This temporary emancipation from the logic of survival allows us to build totally irrational structures in terms of the real necessities of life. In our 'Society of the Spectacle', as Guy Debord calls the current era, architecture has often turned into sheer fashion, representation, aestheticization and visual entertainment. The punishment is delayed, of course, because the false models are not eliminated and, consequently, the causal absurdity becomes a concern for the future generations. It is a sad fact that our architecture keeps developing largely without the test of reality.

Sverre Fehn, the great Norwegian architect, once said to me in a private conversation: 'The bird nest is absolute functionalism, because the bird is not conscious of its death'.¹⁵ This aphoristic and cryptic argument contains a significant truth. Ever since we became conscious of ourselves and our existence in the world, all our actions and constructions, material and mental, are bound to be engaged in the metaphysical enigma of existence itself. We cannot achieve perfect functionality and performance in our dwellings because our houses and other structures have their metaphysical, representational and aesthetic dimensions which necessarily compromise performance in the strict terms of biological survival. These metaphysical concerns and aspirations frequently overrule the requirements of biological and ecological survival.

Animal constructions are structurally efficient, and natural selection has gradually optimized both the forms of structures and the use of materials. The hexagonal cell structure of the bee with its specific angles is the mathematically optimum structure for storing honey. The vertically suspended cell wall of the bee with its two layers of cells, built back-to-back with one-half a cell's shift in the position of the cell walls, to create a continuous three-dimensional folded structure made of pyramidal units at the boundary surface, is structurally ingenious.

The inner cell of the abalone is twice as tough as human-made high-tech ceramics; instead of breaking, the shell deforms under stress like a metal. Mussel adhesive works underwater and sticks to anything, whereas rhino horn repairs itself although it contains no living cells. All these miraculous materials are produced in body temperatures without toxic by-products and they return back to the cycle of nature.

The extraordinary strength of spider drag line is the most impressive example of the technical miracles of evolutionary processes. None of the man-made metals or high-strength fibres of today can come close to the combined strength and energy-absorbing elasticity of spider drag line. The tensile strength of the line spun by the spider is more than three times that of steel. The elasticity of spider drag line

15 Sverre Fehn, personal communication, 1985.

is even more amazing; its extension at break point is 229% as compared with the 8% of steel. The spider silk consists of small crystallites embedded in a rubbery matrix of organic polymer – a composite material developed, perhaps, a couple of hundred million years before our current age of composite materials.

Two thousand years ago, wasps taught the Chinese how to make paper, and the nesting chambers of potter wasps are believed to have served as models of clay jars for the American Indians. The Chinese learned 4600 years ago, how to use the fine silk line spun by the larva of the silk moth, and even today we are using several million kilograms of raw silk annually. In addition to being used as material for fine cloth, silk thread was earlier used to produce fishing rods and strings of musical instruments.

How could we take advantage of the inventions of animals today and what lessons could we learn from a study of animal building behaviour?

The slow evolution of animal artefacts can be compared with the processes of tradition in traditional human societies. Tradition is a force of cohesion that slows down change and ties individual invention securely to patterns of tradition, established through endless time and the test of life. It is this interaction of change and rigorous testing by forces of selection that is lost in human architecture of the industrial era. We believe in individuality, novelty and invention. Human architecture evolves more under forces of cultural and social values than forces of the natural world.

The role of aesthetic choice is important, as it is a guiding principle in human structures. Whether aesthetic choice exists in the animal world is arguable, but it is unarguable that the principle of pleasure guides even the lowest animal behaviour and the transformation of physical pleasure to aesthetic pleasure could well be rather unnoticeable. Regardless of the question of the intentionality of beauty in animal constructions the beauty of superb performance and causality of animal architecture gives pleasure to the human eye and mind.

I will give one example of the human use of animal inventions reported in *The Economist*.¹⁶ David Kaplan and his colleagues at Tufts University have succeeded to extend the range of properties of spider silk beyond those found in nature. By shuffling the order and number of the hydrophilic, hydrophobic and structure – organizing sections of DNA, and then recruiting bacteria to turn the resulting artificial genes into proteins, the research team has turned out about two dozen novel forms of silk. Some of the tougher and more water-resistant forms of silk might be employed to impregnate synthetic fibres and lightweight materials called hydrogels to make them stronger and waterproof. The more

¹⁶ 'Does even more than a spider can: how to make something useful of spider silk', in *The Economist*, January 31, 2009, 81.

resilient materials that resulted could then be used to coat and toughen surfaces, strengthen the biologically friendly plastics employed in surgery, and create strong, lightweight components for use in aircraft.

Material sciences which also develop novel materials also for architectural purposes that can be automatically be responsive to prevailing environmental conditions, such as temperature, moisture and light, in the way that live tissue adjusts its functions, are becoming important in the scientific development of human building. Analogies and models from the biological world can be decisive, as in the case of the development of self-cleaning glass, based on observations of the surface structure of the giant water lily and practically invisible nano-technology.

It is also becoming increasingly essential that our own constructions are seen in their anthropological, socio-economic and ecological frameworks, in addition to the traditional aesthetic sphere of the architectural discipline. It is equally important that our aesthetic understanding of architecture is expanded to the biocultural foundations of human behaviour and construction. The field of bio-psychology is an example of such an extension. As builders, we could learn from studying the gradual and slow development and adaptation of animal constructions over the course of endless time.

Animal constructions open up an important window on the processes of evolution, ecology and adaptation. Ants have the biggest biomass and as a consequence of their skills in adapting to a wide variety of environmental conditions they are the most numerous and widespread of animals, including man. They are among the most highly social of all creatures, and the study of ants has produced insights into the origins of altruistic behaviour.

Architecture and the Human Nature: Searching for a Sustainable Metaphor (2011)

I do not support any romantic bio-morphic architecture. I advocate an architecture that arises from a respect of nature in its complexity, not only its visual characteristics, and from empathy and loyalty to all forms of life and a humility about our own destiny.

Indeed, architecture cannot regress; all life forms and strategies of nature keep developing and refining. The magnitude of our problems calls for extremely refined, responsive and subtle technologies.

It is becoming evident that we have distanced ourselves too far from nature with grave consequences. The research of the Finnish allergiologist Tari Haahtela has shown convincingly that many of the so-called 'civilization diseases', such as all allergies, diabetes, depression, many types of cancer, and even obesity, are consequences of living in too sterile and 'artificial' environments. We have destroyed the

natural bacterial habitats in our intestines. This specialist in allergies tells us that he has never met an allergy patient ‘with earth under his fingernails’.¹⁷

Anonymity

→ humility; personality cult

Voices of Tranquility: Silence in Art and Architecture (2011)

In today’s consumerist culture we are misled to believe that the qualities of art and architecture arise from expression of the artist’s or architect’s *persona*. However, as the philosopher Maurice Merleau-Ponty writes: ‘We do not come to look at a work of art, we come to look at the world according to it’.¹⁸ In a late interview Balthus, one of the greatest figurative painters of last century, makes a thought-provoking comment on artistic expression: ‘Modernity, which began in the true sense with the Renaissance, determined the tragedy of art. The artist emerged as an individual and the traditional way of painting disappeared. From then on, the artist sought to express his inner world, which is a limited universe: he tried to place his personality in power and used paintings as a means of self-expression. But great painting has to have universal meaning. This is sadly no longer so today and this is why I want to give painting back its lost universality and anonymity, because the more anonymous painting is, the more real it is’.¹⁹ In his work and teaching, the dignified Finnish designer, Kaj Franck, also sought anonymity; in his view the designer’s *persona* should not dominate the experience of the object. In my view, the same criterium applies fully to architecture; profound architecture arises from facts, causalities and experiences of life, not from personal artistic inventions. As Alvaro Siza, one of the greatest architects of our time argues: ‘Architects do not invent anything, they just transform conditions’. In a television interview in 1972, Alvar Aalto made an unexpected confession: ‘I don’t think there’s so much difference between reason and intuition. Intuition can sometimes be extremely rational. [...] It is the practical objectives of constructions that give me my intuitive point of departure, and realism is my guiding star. [...] Realism usually provides the strongest stimulus to my imagination’.²⁰

17 Edward O Wilson, *Biophilia: The human bond with other species*. Cambridge, MA, and London: Harvard University Press, 1984, 37.

18 Maurice Merleau-Ponty as quoted in Iain McGilchrist, *Master and His Emissary: The Divided Brain and the Making of the Western World*, New Haven: Yale University Press, 2009, 409.

19 Balthus, *Balthus in His Own Words*, New York: Assouline, 2001, 6.

20 Interview for Finnish Television, July 1972, in Göran Schildt, editor, *Alvar Aalto in His Own Words*, Helsinki: Otava Publishing Company, 1997, 273–274.

In my own work, I have always wanted to pull myself away from the work when it is finished. The work needs to express the beauty of the world and human existence, not any idiosyncratic ideas of mine. This call for anonymity does not imply lack of emotion and feeling. Meaningful design re-mythicizes, re-animates and re-eroticizes our relationship with the world. I wish my designs to be sensuous and emotive, but not to express my emotions.

Architectural Courtesy

→ verbs vs nouns

Artistic Generosity, Humility and Expression: Reality Sense and Idealization in Architecture (2007)

In addition to an 'aesthetic withdrawal' and 'politeness', I have spoken of an 'architectural courtesy' referring to the way a sensuous building offers gentle and subconscious gestures for the pleasure of the occupant: a door-handle offers itself courteously to the approaching hand, the first step of a stairway appears exactly at the moment you wish to proceed upstairs, and the window is exactly where you wish to look out. The building is in full resonance with your body, movements and desires.

Architecture and Being

→ being in the world; senses

Artistic Generosity, Humility and Expression: Reality Sense and Idealization in Architecture (2007)

I could tell of countless spaces and places that I have encapsulated in my memory and that have altered my very being. I am convinced that every one of you can recall such transformative experiences. This is the power of architecture; it changes us, and it changes us for the better by opening and emancipating our view of the world.

Skilfully designed buildings are usually expected to direct and channel the occupant's experiences, feelings and thoughts. In my view, this attitude is fundamentally wrong; architecture offers an open field of possibilities, and it stimulates and emancipates perceptions, associations, feelings and thoughts. A meaningful building does not argue or propose anything; it inspires us to see, sense and think ourselves. A great architectural work sharpens our senses, opens our perceptions

and makes us receptive to the realities of the world. The reality of the work also inspires us to dream. It helps us to see a fine view of the garden, feel the silent persistence of a tree, or the presence of the other, but it does not indoctrinate or bind us.

Selfhood, Memory and Imagination: Landscapes of Remembrance and Dream (2007)

In addition to practical purposes, architectural structures have a significant existential and mental task; they domesticate space for human occupation by turning anonymous, uniform and limitless space into distinct places of human significance, and, equally importantly, they make endless time tolerable by giving duration its human measure. As Karsten Harries, the philosopher, argues: ‘Architecture helps to replace meaningless reality with a theatrically, or rather architecturally, transformed reality, which draws us in and, as we surrender to it, grants us an illusion of meaning. [...] We cannot live with chaos. Chaos must be transformed into cosmos’²¹. ‘Architecture is not only about domesticating space. It is also a deep defence against the terror of time’, he states in another context.²²

Altogether, environments and buildings do not only serve practical and utilitarian purposes, they also structure our understanding of the world. ‘The house is an instrument with which to confront the cosmos’, as Gaston Bachelard states.²³ The abstract and undefinable notion of cosmos is always present and represented in our immediate landscape. Every landscape and every building are a condensed world, a microcosmic representation.

Architecture and Biology

→ animal architecture; biophilic beauty; tradition

Architecture as Experience: Existential Meaning in Architecture (2018)

Profound architects have always intuitively understood that buildings structure, re-orient and attune our mental realities. They have also been capable of

21 Karsten Harries, ‘Thoughts on a Non-Arbitrary Architecture’, in David Seamon, editor, *Dwelling, Seeing and Designing: Toward a Phenomenological Ecology*, Albany, NY: State University of New York Press, 1993, 47.

22 Karsten Harries, ‘Building and the Terror of Time’, in *Perspecta: The Yale Architectural Journal*, issue 19. Cambridge, MA, and London: The MIT Press, 1982, as quoted in David Harvey, *The Condition of Postmodernity*, Cambridge: Blackwell, 1992, 206.

23 Bachelard, *The Poetics of Space*, op. cit., 46.

imagining the experiential and emotive reactions of the other. The fact that artists have intuited mental and neural phenomena, often decades before psychology or neuroscience has identified them, is the subject matter of Jonah Lehrer's thought-provoking book *Proust Was a Neuroscientist*.²⁴ In his pioneering book *Survival through Design* (1954), Richard Neutra acknowledges the biological and neurological realities, and makes a suggestion that is surprising for its time: 'Our time is characterized by a systematic rise of the biological sciences and is turning away from oversimplified and mechanistic views of the 18th and 19th centuries, without belittling in any way the temporary good such views may have once delivered. An important result of this new way of regarding this business of living may be to bare and raise appropriate working principles and criteria for design'.²⁵ Later he even professed: 'Today design may exert a far-reaching influence on the nervous make-up of generations'.²⁶ Thanks to electronic instruments such as the fMRI scanner, today we know that this is the case. Also, Alvar Aalto intuited the biological ground of architecture in his statement: 'I would like to add my personal, emotional view, that architecture and its details are in some way all part of biology'.²⁷ The direct impact of settings on the human nervous system and brain has been proven by research in today's neuroscience. 'While the brain controls our behaviour and genes control the blueprint for the design and structure of the brain, the environment can modulate the function of the genes and, ultimately, the structure of the brain. Changes in the environments change the brain, and therefore they change our behaviour. In planning the environments in which we live, architectural design changes our brain and our behavior'.²⁸ This statement by Fred Gage, neuroscientist, leads to the most crucial realization: when designing physical reality, we are, in fact, also designing experiential and mental realities, and external structures condition and alter internal structures. We architects unknowingly operate with neurons and neural connections. This realization heightens the human responsibility in the architect's work. I, myself, used to see buildings as aestheticized objects, but for three decades now, architectural images have been primarily mental images, or experiences of the human condition and mind. I have also gradually come to understand the significance of the designer's empathic capacity, the gift to

24 Jonah Lehrer, *Proust Was a Neuroscientist*, New York: Houghton Mifflin, 2008.

25 Richard Neutra, *Survival Through Design*, Oxford: Oxford University Press, 1954, 18.

26 *Ibid.*, 7.

27 Alvar Aalto, 'The Trout and the Stream', in Göran Schildt, editor, *Alvar Aalto In His Own Words*, Helsinki: Otava Publishing Company Ltd., 108.

28 Fred Gage, as summarized by John Paul Eberhard, 'Architecture and Neuroscience: A Double Helix' in Sarah Robinson, Juhani Pallasmaa, editors, *Mind in Architecture: Neuroscience, Embodiment, and the Future of Design*, Cambridge, MA, and London: The MIT Press, 2015, 135.

simulate and empathize with the experience of ‘the little man’, to use Alvar Aalto’s notion.²⁹

Empathic Imagination: Embodied and Emotive Simulation in Architecture (2016)

The Paimio Sanatorium, designed in 1929–1933 by Alvar Aalto, is one of the landmarks of Functionalist architecture, but it is also an example of the architect’s empathic attitude and skill. This is what Aalto writes about his design process: ‘I was ill at the time I received the commission, and was able to experiment a little with what it means to be really incapacitated. It was irritating to have to lie in a horizontal position all the time, and the first thing I noticed was that the rooms are designed for people in a vertical position, not for those who have to lie in bed all the time. Like flies around a lamp, my eyes turned towards the electric light, and there was no inner balance, no real peace in the room that could have been designed specially for a sick, bedridden person. I therefore tried to design rooms for weak patients that would provide a peaceful atmosphere for people who have to stay in a horizontal position. Thus, I decided against air conditioning because the entering current of air feels unpleasant to the head, and in favor of fresh air heated ever so slightly between the two window panes of the double glazing. I cite these examples to show how incredibly small details can be used to alleviate people’s suffering. Here is another example, a washbasin. I strove to design a basin in which the water does not make a noise. The water falls on the porcelain sink at a sharp angle, making no sound to disturb the neighboring patient, as in the physically or mentally weakened condition the impact of the environment is heightened’.³⁰ Aalto often spoke of ‘the little man’ as the architect’s real client, and he concluded that we should always design for ‘the man at his weakest’.³¹ These are examples of an empathic imagination in opposition to formalist imagination.

Architecture as Experience

→ experience has a multi-sensory essence; reconciling

Architecture as Experience: Existential Meaning in Architecture (2018)

The phenomenon of architecture has also been approached through subjective and personal encounters in poetic, aphoristic or essayistic ways, as in the writings of

29 Alvar Aalto, ‘Art and Technology’, in *Alvar Aalto in His Own Words*, op. cit., 176.

30 *Ibid.*, 178.

31 Alvar Aalto, ‘Rationalism and Man’, in Göran Schildt, editor, *Alvar Aalto Sketches*, Cambridge, MA, and London: The MIT Press, 1985, 49.

many of the leading architects from Frank Lloyd Wright and Le Corbusier to Alvar Aalto and Louis Kahn and further to Steven Holl and Peter Zumthor. In these writings, architecture is approached in a poetic and metaphorical manner, without any ambitions or qualifications as scientific research. These writings usually arise from personal experiences, observations and beliefs, and they approach architecture as a poetic encounter and a projection of life, and their ambition is to be experientially true. I must personally confess that these personal, and often confessional accounts, have valorized the holistic, existential and poetic essence of architecture to me more than the theoretical or empirical studies that claim to satisfy the criteria of science.

Historically there are three categories of seeking meaning in human existence: religion (or myth), science and art, and these endeavours are fundamentally incomparable with each other. The first is based on faith, the second on rational knowledge and the third on existential and emotive experiences. The poetic, experiential and existential core of art and architecture has to be confronted, lived and felt rather than understood and formalized intellectually. There are certainly numerous aspects in construction, in its performance, structural reality, formal and dimensional properties, as well as distinct psychological impacts, that can be, and are being, studied 'scientifically', but the experiential mental and existential meaning of the entity can only be encountered and internalized.

During the past few decades, an experiential approach, based on phenomenological encounters and first-person experiences of buildings and settings, has gained ground. This thinking is initially based on the philosophies of Edmund Husserl, Martin Heidegger, Maurice Merleau-Ponty, Gaston Bachelard and many other philosophical thinkers. The phenomenological approach, which acknowledges the significant role of embodiment, was introduced into the architectural context by such writers as Steen Elier Rasmussen, Christian Norberg-Schulz, Charles Moore, David Seamon, Robert Mugerauer and Karsten Harries, for instance. I also believe that the book *Questions of Perception* of 1994 by Steven Holl, Alberto Pérez-Gómez and myself helped to spread this manner of thinking especially in schools of architecture internationally.

The poetic and existential dimension of architecture is a mental quality, and this artistic and mental essence of architecture emerges in the individual encounter with and experience of the work. In the beginning of his seminal book of 1934, *Art as Experience*, John Dewey, the visionary American pragmatist philosopher argues: 'In common conception, the work of art is often identified with the building, book, painting, or statue in its existence apart from human experience. Since the actual work of art is what the product does with and in experience, the result is not favorable to understanding. [...] When artistic objects are separated from both conditions of origin and operation in experience, a wall is built around them that renders almost opaque their general significance, with which esthetic theory deals'.³² Here, the philosopher connects the condition of making a piece of art and

32 John Dewey, *Art as Experience*, New York: Putnam's, 1934, 4.

its later encounter by someone else, as in both cases the mental and experiential reality dominates and the work exists ‘nakedly’ as a human experience. The philosopher suggests that the difficulties in understanding artistic phenomena arise from the tradition of studying them as objects outside of human consciousness and experience. Dewey writes further: ‘By common consent, the Parthenon is a great work of art. Yet, it has aesthetic standing only as the work becomes an experience for a human being. [...] Art is always the product in experience of an interaction of human beings with their environment. Architecture is a notable instance of the reciprocity of the results in this interaction. [...] The reshaping of subsequent experience by architectural works is more direct and more extensive than in the case of any other art. [...] They not only influence the future, but they record and convey the past’.³³ Here, Dewey even assigns an actively conditioning role to architecture in relation to the nature of experience itself, as well as to our understanding of the passing of time and history. I have formulated this view with the argument that architecture creates frames and horizons for perception, experience and understanding of the human condition, and consequently, instead of being the end product, it has essentially a mediating role. The true meaning is always beyond the material essence of the building.

The significance of experience has been grasped in other art forms, such as theatre, cinema and music, but it has not been understood in relation to such material and utilitarian objects as buildings and larger environments. That is why I have taught architecture through examples and ideas in other art forms.

Architecture as Impure Discipline

→ architecture and being; art vs science I; art vs science II; forgetting; hearth; modes of thinking; moving; optimism; playing with forms; tasks of architecture [the]; triad

Landscapes and Horizons of Architecture: Architecture and Artistic Thought (2007)

The complexity of the phenomenon of architecture results from its ‘impure’ conceptual essence as a field of human endeavour. Architecture is simultaneously a practical and a metaphysical act; a utilitarian and poetic, technological and artistic, economic and existential, collective and individual manifestation. I cannot, in fact, name a discipline possessing a more complex and essentially more conflicting grounding in the lived reality and human intentionality. Design is

³³ Ivi.

essentially a form of philosophizing by means of its characteristic means: space, matter, structure, scale and light, horizon and gravity. Architecture responds to existing demands and desires at the same time that it creates its own reality and criteria; it is both the end and the means. Moreover, authentic architecture surpasses all consciously set aims and, consequently, it is always a gift of imagination and desire, will power and foresight.

Landscapes of Architecture: Architecture and the Influence of other Fields of Inquiry (2003/2010)

In the first century BC, in the most influential treatise in the history of architecture Vitruvius acknowledged already. The breadth of the architect's craft and its interactions with numerous skills and areas of knowledge: 'Let him [the architect] be educated, skilful with the pencil, instructed in geometry, know much history, have followed the philosophers with attention, understand music, have some knowledge of medicine, know the opinions of the jurists and be acquainted with astronomy and the theory of heavens'.³⁴ Vitruvius gives careful reasons why the architect needs to master each of these fields of knowledge. Philosophy, for instance, 'makes an architect high-minded and not self-assuming, but rather renders him courteous, just and honest without avariciousness';³⁵ this is a most valid piece of advice to architects even today.

Architecture and the Human Nature: Searching for a Sustainable Metaphor (2011)

I have called architecture an 'impure' and 'messy' discipline because it contains inherently irreconcilable ingredients, such as metaphysical, cultural and economic aspirations, functional, technical, and aesthetic objectives, etc. In fact, I cannot think of a more complex human activity, or artefact, than architecture. The conflicting aspirations that are an inseparable part of human architecture tend to turn our constructions towards irrationality. The great Norwegian architect Sverre Fehn once said to me in a private conversation: 'The bird's nest is absolute functionalism because the bird is not conscious of its death'.³⁶ Our actions, however, are deeply motivated by our suppressed fear of death. To condense the 'illogical' nature of architecture, we can say that architecture is at the same time the means and the end.

34 Vitruvius (Marcus Vitruvius Pollio), *The Ten Books on Architecture* (De Architectura Libri Decem), New York: Dover Publications, Inc., 1960, 5–6.

35 *Ibid.*, 8.

36 Sverre Fehn in a private conversation with the author in the Villa Mairea, 1985.

As Alvar Aalto claimed in the 1950s that only artistic vision can bring the thousands of conflicting ingredients in an architectural problem into a harmonious synthesis.³⁷ Yet, in the perspective of sustainability, the various crucial qualities of this synthesis have to pass a critical evaluation and measurement. I am not preaching of a 'scientific architecture', I suggest an architecture that is grounded in the full existential understanding of human destiny, and this view certainly calls for a deeply lived vision more than scientific formulations. Our task is more ethical than technical. Architecture is not only engaged with today, it also expresses what we want to become. We build and dwell in accordance with our thoughts, fears and dreams.

Architecture is Constructed Mental Space

→ beauty; emotions; ideals; optimism; physical and mental landscape

Embodied Experience and Sensory Thought: Lived Space in Art and Architecture (2006)

'Architecture is constructed mental space', as my late friend architect Keijo Petäjä used to say. When experiencing a negative attitude towards life or a sense of gloom and anxiety, often projected by environments of our time, we are usually unwilling and incapable of identifying our own mental landscape in it. If we could learn to interpret the unintentional message of environment and architecture, we would certainly understand better both ourselves and the problems of our fanatically materialist and irrational collective mind better. A psychoanalysis of the environment could cast light on the mental ground of our paradoxical behaviour, such as adoration of individuality and the simultaneous unconditional subordination to conditioned values. The regressive attitudes in relation to architecture in the case of Collegiate Gothic in American universities, for instance, calls for an urgent analysis.

The disappearance of beauty in the environment cannot mean anything else but the disappearance of the capacity of idealization and reverence of human dignity and the loss of hope. Yet, man is able to construct only if he has hope; Hope is the Patron Saint of Architecture.

George Nelson an American architect-designer, who died 15 years ago, foresaw the fall of the Nazi Empire already in the mid-1930s through reading the unconscious hidden messages of Nazi stone architecture. He understood that the message which made most observers believe in the thousand-year

37 Aalto, 'Art and Technology', op. cit., 174.

future of the Third Reich, in fact, signified an unconscious fortification against self-destruction.³⁸

Art as Representation and Reality

→ eyes; light

Between Art and Science: Reality and Experience in Architecture and Art (2018)

One of the central developments in the arts of the past 100 years has been its distancing from its mediating representational function to become an increasingly autonomous and independent reality of its own. In his book *The Dehumanization of Art* of 1925, José Ortega y Gasset presented a thought-provoking idea concerning the shifting subject matter of art. In his view, the subject matter was first ‘things’ or events (as in the art of Caravaggio and Velázquez), then ‘sensations’ (as in the works of Cézanne and Picasso), and finally, ‘ideas’ (as in modern art).³⁹ Ortega’s view actually suggests that art has approached science in its new ideational quality. However, ‘The object of art is not to reproduce reality, but to create a reality of the same intensity’, as Alberto Giacometti reminds us.⁴⁰ The historical development of art encompasses the emergence of abstraction and autonomy, the pluralisation of conceptions of reality as well as the increasing prominence of multisensory practices and shifting away from pure retinality towards total embodiment. These orientations also include the questioning of the artist’s unique creativity grounded in emotional reactions (Marcel Duchamp, automatism, conceptual art), disengagement of the work of art from its frame and base and its transformation into an environment or part thereof (landscape and land art) and, lastly, atmospheric works whose essence lies in their multi-sensory, physical and emotive presence, rather than in representation. At the same time, art has accepted the multi-sensory nature of human perception. In his works Richard Serra, for example, has activated the sense of weight, gravity and muscular experience, while James Turrell has articulated experiences of light, and enabled us to see ‘tactile light’ and ‘old light’, cosmic light that has travelled thousands of light years through outer space before

38 Letter of George Nelson to the writer 31August 1982.

39 José Ortega y Gasset, *The Dehumanization of Art and Other Essays on Art, Culture, and Literature*, Princeton, NJ: Princeton University Press, 2013.

40 I learned the quote of Alberto Giacometti from a student in my workshop in Ljubljana in 2015. Original source unknown.

hitting our retina; this experience even permits us to touch time and sense infinity and eternity.

A number of artists have also approached their field by means of scientific theories and methods, such as the members of the Light and Space Movement (most notably Robert Irwin and James Turrell), that emerged in the 1960s, and more recently the Icelandic-Danish artist Olafur Eliasson, a later member of this movement.

Olafur Eliasson is the artist who has fundamentally shaken up our ideas about artistic representation and communication. His works project their own experiential reality that is constituted in the viewer's act of encountering the work, without any mediating reference to other subjects. His works constitute their own reality, which takes place in the act of experiencing them. At the same time, Eliasson has doubtlessly taken the artistic experience further into the realm of scientific phenomena than other artists.

He collaborates in his studio of nearly 100 assistants with engineers, crafts people, architects, specialized technicians, archivists and administrators. For a number of years, he has been working on extremely large environmental works which play upon the viewers' emotional state in a multisensory, peripheral, unconscious and atmospheric way not unlike natural or weather phenomena. The aim of such artistic experience is no longer an illusory, mediated image or reality, determined by the artist, but a phenomenon or process that takes place in the viewer's process of perception and experience by means of an experimental situation devised by the artist. Eliasson himself calls them 'experimental setups'.⁴¹

The most famous of Eliasson's works to date, based on the experience of light and weather, and also the most archetypal in its simplicity, is *The Weather Project* (2003) in the huge Turbine Hall of the Tate Modern in London. The work, which attracted more than two million visitors, consisted of an artificial sun shining inside a thin fog that created an extraordinary atmosphere. Eliasson's works produce alternative experiences that nevertheless possess the complexity and ultimate inexplicability of lived reality. His works are 'reality machines' of sorts, following Giacometti's call for an artistic reality of the same intensity as the lived reality. In the case of Eliasson's *Weather Project*, the experience was so enticing that visitors lay down on the floor as sun bathers spontaneously do on a beach.

Architecture, Reality and Self

→ being in the world; time and eternity

41 Richard Dawkins, 'Bar Codes in the Stars', *Olafur Eliasson: Your Lighthouse: Works with Light 1991–2004*, Holger Broecker, editor, Wolfsburg: Kunstmuseum Wolfsburg / Hatje Cantz Verlag, 2004, 13.

Touching the World: Lived Space, Vision and Hapticity (2007)

It is evident, that 'life-enhancing' (to use Goethe's notion) art and architecture addresses all the senses simultaneously, and fuses our sense of self with the experience of the world. Architecture needs to strengthen the sense of the real, not to create settings of mere fabrication and fantasy. The essential mental task of the art of building is reconciliation, mediation and integration. Profound buildings articulate experiences of being-in-the-world and they strengthen the sense of reality and self. It frames and structures experiences and projects a specific horizon of perception and meaning. In addition to inhabiting us in space, architecture also relates us to time; it articulates limitless natural space and gives endless time a human measure. Architecture helps us to overcome 'the terror of time', to use a provoking expression of Karsten Harries, the philosopher.⁴²

Art vs Science I

→ architecture as impure discipline; modes of thinking

Embodied Experience and Sensory Thought: Lived Space in Art and Architecture (2006)

The prevailing view in our culture makes a fundamental distinction between the worlds of science and art; science is understood to represent the realm of rational and objective knowledge, whereas art stands for the world of subjective sensations. The first is understood to possess an operational value, whereas the world of art is seen as a form of exclusive cultural entertainment.

Landscapes and Horizons of Architecture: - Architecture and Artistic Thought (2007)

The relation between scientific and artistic knowledge, or instrumental knowledge and existential wisdom, requires some consideration. The scholarly and literary work of the unorthodox French philosopher Gaston Bachelard, who has been known to the architectural profession since his influential book *The Poetics of Space* (first published in French in 1958), mediates between the worlds of scientific and artistic thinking. Through penetrating philosophical studies of the ancient elements, earth, fire, water and air, as well as dreams, day-dreams and imagination, Bachelard suggests that poetic imagination, or 'poetic chemistry',⁴³ as he says, is closely related to pre-scientific thinking and an

⁴² Harries, op. cit., 206.

⁴³ Gaston Bachelard, *Water and Dreams: An Essay on the Imagination of Matter*, Dallas, TX: The Pegasus Foundation, 1983, 46.

animistic understanding of the world. In *The Philosophy of No: A Philosophy of the New Scientific Mind*, written in 1940⁴⁴ during the period when his interest was shifting from scientific phenomena to poetic imagery (*The Psychoanalysis of Fire* was published two years earlier), Bachelard describes the historical development of scientific thought as a set of progressively more rationalized transitions from animism through realism, positivism, rationalism and complex rationalism to dialectical rationalism. ‘The philosophical evolution of a special piece of scientific knowledge is a movement through all these doctrines in the order indicated’, he argues.⁴⁵

Significantly, Bachelard holds that artistic thinking seems to proceed in the opposite direction – pursuing conceptualizations and expression, but passing through the rational and realist attitudes towards a mythical and animistic understanding of the world. Science and art, therefore, seem to glide past each other, moving in opposite directions.

Embodied Experience and Sensory Thought: Lived Space in Art and Architecture (2006)

In an interview in 1990 concerning complexities and mysteries of new physics, Steven Weinberg, who won the Nobel Prize for physics in 1979 for his discovery of the relationship between electromagnetism and the weak nuclear force, was asked: ‘Whom would you ask about the complexity of life: Shakespeare or Einstein?’ The physicist answered quickly: ‘Oh, for the complexity of life, there’s no question – Shakespeare’. And the interviewer continued: ‘And you would go to Einstein for simplicity?’ ‘Yes, for a sense of why things are the way they are – not why people are the way they are, because that’s at the end of such a long chain of inference...’⁴⁶

Landscapes and Horizons of Architecture: Architecture and Artistic Thought (2007)

In addition to animating the world, the artistic imagination seeks imagery able to express the entire complexity of human existential experience through singular

44 Gaston Bachelard, *The Philosophy of No: A philosophy of the New Scientific Mind*, New York: The Orion Press, 1968.

45 *Ibid.*, 16.

46 Interview in *Time*, 1990. Source not identified in detail.

condensed images. This paradoxical task is achieved through poeticized images, ones which are experienced and lived rather than rationally understood. Giorgio Morandi's tiny still lives are a stunning example of the capacity of humble artistic images to become all-encompassing metaphysical statements. A work of art or architecture is not a symbol that represents or indirectly portrays something outside itself; it is a real mental image object, a complete microcosm that places itself directly in our existential experience and consciousness.

Embodied Experience and Sensory Thought: Lived Space in Art and Architecture (2006)

Art articulates our existentially essential experiences, but also modes of thinking, that is, reactions to the world and processing of information take place directly as an embodied and sensory activity without being turned into concepts, or even entering our sphere of consciousness.

Landscapes and Horizons of Architecture: Architecture and Artistic Thought (2007)

Although I am here underlining the difference between scientific and artistic inquiry, I do not believe that science and art are antithetical or hostile to each other. The two modes of knowing simply look at the world and human life with different eyes, foci and aspirations. Stimulating views have also been written about the similarities of the scientific and the poetic imagination, as well as of the significance of aesthetic pleasure and embodiment for both practices.

Art vs Science II

→ limits; limits and immensity

Infinity and Limits: Infinitude, Eternity and Artistic Imagination (2017)

In Renaissance time, architecture aspired to mediate between the worlds of gods and mortals, and aimed at giving the act of building a new authority by giving it a mathematical grounding. 'The belief in the correspondence of macrocosm and microcosm, in the harmonic structure of the universe, in the comprehension of God through the mathematical symbols of center, circle and sphere - all these closely related ideas which had their roots in antiquity, and belonged to the undisputed tenets of medieval philosophy and theology, acquired new life in

the Renaissance'.⁴⁷ 'There was an unbroken tradition coming down from antiquity according to which arithmetics (the study of numbers), geometry (the study of spatial relationships), astronomy (the study of motions of celestial bodies), and music (the study of motions apprehended by the ear), formed the quadrivium of the "mathematical arts". By contrast to these, the "liberal arts" of painting, sculpture and architecture, were regarded as manual occupations',⁴⁸ Rudolf Wittkower informs us. In order to raise architecture from the level of a mechanical to that of a mathematical art, it had to be given a firm theoretical, i.e. mathematical foundation, and that was to be found in musical theory based on the studies of the Greek geometrician Pythagoras.

The relationships and interactions of science and art are still an ongoing issue. Science is usually judged to have a higher truth value, but there are voices that see the meaning of art being closer to lived human reality. Vittorio Gallese, one of the four discoverers of the mirror neurons 30 years ago, which have opened exciting views into our unconscious interactions with the world, expresses an unexpected view of the relationship between science and art: 'From a certain point of view, art is more powerful than science. With much less expensive tools and with greater power of synthesis, artistic intuitions show us who we are, probably in a more exhaustive way with respect to the objectifying approach of the natural sciences. Being human squares with the ability to ask ourselves who we are. Since the beginning of mankind, artistic creativity has expressed such ability in its purest and highest form', Gallese writes.⁴⁹

Certain modern and contemporary artists, especially of the conceptual orientation, have produced purely cerebral artistic works, that rely more on thought processes and intellect than sensory perceptions and emotive identifications, approaching thus the realm of science. The work of the Icelandic-Danish artist Olafur Eliasson is frequently suspended between the realms of science and art. Usually, his works have a meticulously considered scientific ground, based on a theoretical knowledge of physics and perceptual psychology. This background gives rise to his perfectly executed technical constructions, which lead the viewer to personal sensory observations and, often unnoticeably, also from the realm of objectivity into that of the subjective. Frequently the experiences have the nature of miracle or magic. The viewer's experiences are evident and clear at the same time that they are enigmatic and unbelievable. The dual character of the works as unmasked scientific experiments and emotive confrontations usually

⁴⁷ Rudolf Wittkower, *Architectural Principles in the Age of Humanism*, London: Academy Editions, 1988, 117.

⁴⁸ *Ibid.*, 39.

⁴⁹ Vittorio Gallese and Cinzia Di Dio, 'Neuroesthetics: The Body in Esthetic Experience', in *The Encyclopedia of human Behaviour*, Vol. 2, VS Ramachandran, editor, Amsterdam: Elsevier, 2012, 693.

creates a feeling of a phenomenon that is beyond the boundaries of normality. Eliasson's atmospheric installation in the immense Turbine Hall at the Tate Modern in London, entitled *The Weather Project* (2003), created the authority of real sunlight, that encouraged visitors to lie down on the concrete floor as if they were sunbathing on a beach.

Altogether, there are three categories of giving human meaning to our being-in-the-world: religion (or myth), science and art. The first is based in belief and faith, the second on rationality and knowledge, and the third on emotion and experience. Eliasson's works usually fuse or short-circuit the categories of science and art, and give rise to a sublime experience, which can even invoke religious forebodings. While many of his works project sublime experiences, they can also reverse or contradict the viewer's expectations. In a concrete perceptual sense, his mirror works create infinitely repeating spaces or endless perspectival corridors. In his installation at the Louisiana Museum in Copenhagen, the modernist white interior of the Museum was turned into a landscape of rocks, gravel and water, reversing time as if the landscape that existed there before the construction of the museum had taken over. His works in the Bregenz Museum, designed by Peter Zumthor, turned the white minimalist museum interiors into landscapes of water, water plants and fog – the man-made architectural space turns into a jungle.

The relationship of reality and art is not as simple and self-evident as we might think. 'Nothing is more abstract than reality', Giorgio Morandi states thought-provokingly,⁵⁰ while another great artist, Alberto Giacometti gives another advice on the problematic relationship of reality and art: 'The object of art is not to reproduce reality, but to create a reality of the same intensity'.⁵¹ Neither does science reproduce reality, it reveals its inner structure.

Artists as Phenomenologists and Neurologists

→ beauty; biophilic beauty

Sarah Robinson, Juhani Pallasmaa, editors, *Mind in Architecture: Neuroscience, Embodiment, and the Future of Design*, Cambridge, MA, and London: The MIT Press, 2007, 66–68

Semir Zeki, a neurologist who studies the neural ground of artistic image and effect, considers a high degree of ambiguity – such as the unfinished imagery of Michelangelo's slaves, or the ambivalent human narratives of Johannes Vermeer's

50 Giorgio Morandi, quote from: https://en.wikiquote.org/wiki/Giorgio_Morandi.

51 Alberto Giacometti, quote from: <https://www.azquotes.com/quote/535146>

paintings - to be essential to the greatness of these works.⁵² In reference to the great capacity of profound artists to evoke, manipulate and direct emotions, he posits the surprising argument: 'Most painters are also neurologists [...] they are those who have experimented with and, without ever realizing it, understood something about the organization of the visual brain, though with the techniques that are unique to them'.⁵³ This statement interestingly echoes an argument of the Dutch phenomenologist-therapist JH van den Berg: 'All painters and poets are born phenomenologists'.⁵⁴ Artists and architects are phenomenologists in the sense of being capable of 'pure looking', an unbiased and 'naive' manner of encountering things. In fact, Bachelard advises practitioners of the phenomenological approach 'to be systematically modest' and 'to go in the direction of maximum simplicity'.⁵⁵ A recent book, *Proust Was a Neuroscientist* by Jonah Lehrer, popularizes this topic, arguing that certain masterly artists, such as Walt Whitman, Marcel Proust, Paul Cézanne, Igor Stravinsky and Gertrude Stein, anticipated some of today's crucial neurological findings through their art more than a century ago.⁵⁶ In his important books *The Architect's Brain* and *Architecture and Embodiment*, Harry F Mallgrave connects the latest findings in the neurosciences with the field of architecture directly in accordance with the objective of this book.⁵⁷ In *Inner Vision*, Semir Zeki suggests the possibility of 'a theory of aesthetics that is biologically based'.⁵⁸ Having studied animal building behaviour and the emergence of 'aesthetically' motivated choices in the animal world for 40 years, I have no doubt about this. What else could beauty be than nature's powerful instrument of selection in the process of evolution? Joseph Brodsky assures us of this with the conviction of a poet: 'The purpose of evolution, believe it or not, is beauty'.⁵⁹ It is beyond doubt that nature can teach us great lessons about design, particularly about ecologically adapted design and dynamic processes. This can be seen in emerging fields of study, such as bionics and biomimicry. Several years ago, I had the opportunity to participate in a conference in Venice entitled "What Can We Learn from Swarming Insects?" organized by the European Center for Living Technologies. The participants were biologists, mathematicians, computer scientists and a couple of architects. The

52 Semir Zeki, *Inner Vision: An Exploration of Art and the Brain*, Oxford: Oxford University Press, 1999, 22–36.

53 *Ibid.*, 2.

54 JH van den Berg as quoted in Bachelard, op. cit., xxiv.

55 *Ivi*, xxi, 107.

56 Jonah Lehrer, *Proust Was a Neuroscientist*, New York: Houghton Mifflin, 2008.

57 Harry Francis Mallgrave, *The Architect's Brain: Neuroscience, Creativity, and Architecture*, Chichester: Wiley-Blackwell, 2010, and Id., *Architecture and Embodiment: The Implications of the New Sciences and Humanities for Design*, Abingdon, UK: Routledge, 2013.

58 Zeki, op. cit., 1.

59 Joseph Brodsky, 'An Immodest Proposal', in Id., *On Grief and Reason*, New York: Farrar, Straus and Giroux, 1997, 208.

purpose of the encounter was to gain understanding, through recent research findings and computer simulations, of the miraculous capacities of ants, termites, bees and wasps to construct perfectly adapted nests and wider environmental systems, such as fungus farms and covered road networks. So far, the chain of collective and instinctual actions that enable termites to construct a vault has been simulated, but the embodied collective knowledge that enables them to construct their nest as an artificial lung to sustain the life of a community of millions of individuals remains far beyond our understanding.⁶⁰ We can surely expect more of such deliberations in the future. Edward O Wilson, the world's leading myrmecologist and pioneer of biophilia, 'the new ethics and science of life', makes the dizzying argument that 'the superorganism of a leaf-cutter ant nest is a more complex system in its performance than any human invention, and unimaginably old'.⁶¹ In his study on the neurological ground of art, Zeki argues that 'art is an extension of the functions of the visual brain in its search for essentials'.⁶² I see no reason to limit this idea of extension, or externalization, only to the visual field. I believe that art provides momentary extensions of the functions of our perceptual systems, consciousness, memory, emotions and existential 'understanding'. The great gift of art is to permit us ordinary mortals to experience something through the perceptual and emotive sensibility of some of the greatest individuals in human history. We can feel through the neural subtlety of Michelangelo, Bach and Rilke, for instance. And again, we can undoubtedly make the same assumption about meaningful architecture; we can sense our own existence amplified and sensitized by the works of great architects from Ictinus and Callicrates to Frank Lloyd Wright and Louis Kahn. The role of architecture as a functional and mental extension of our capacities is clear, and in fact Richard Dawkins has described various aspects of this notion among animals in his book *The Extended Phenotype*;⁶³ he suggests that such fabricated extensions of biological species should be made part of the phenotype of the species in question. So, dams and water regulation systems should be part of the phenotype of the beaver and the astounding nets of the spider. Works of meaningful architecture intuitively grasp the essence of human nature and behaviour, in addition to being sensitive to the hidden biological and mental characteristics of space, form and materiality. By intuiting this knowledge, sensitive architects are able to create places and atmospheres that make us feel safe, comfortable, invigorated and dignified without being able to conceptually theorize their skills at all. In this context, I have earlier used the notion 'a natural philosophy of architecture',

60 See Juhani Pallasmaa, editor, *Eläinten arkkitehtuuri – Animal Architecture*, Helsinki: Museum of Finnish Architecture, 1995.

61 Wilson, op. cit., 37.

62 Zeki, op. cit., 1.

63 Richard Dawkins, *The Extended Phenotype*, Oxford: Oxford University Press, 1982.

a wisdom that arises directly from an intuitive and lived understanding of human nature, and architecture as an extension of that very nature. Simply, great architecture emanates unspoken but contagious existential wisdom.

Artists vs Architects

→ microcosms; tasks of architecture [the]; tasks of art [the]

Selfhood, Memory and Imagination: Landscapes of Remembrance and Dream (2007)

Artists seem to grasp the intertwining of place and human mind, memory and desire, much better than we architects do, and that is why these other art forms can provide such stimulating inspiration for our work as well as for architectural education. There are no better lessons of the extraordinary capacity of artistic condensations in evoking microcosmic images of the world than, say, the short stories of Anton Chekhov and Jorge Luis Borges, or Giorgio Morandi's minute still lives consisting of a few bottles and cups on a table top.

Atmospheres in Architecture

→ atmospheric intelligence; atmospheres in the arts; atmospheric sense [the]; peripheral vision; physical and mental landscape; unfocused vision

Space, Place and Atmosphere: Peripheral Perception in Existential Experience (2011)

The quality of a space or place is not merely a visual perceptual quality as is usually assumed. The judgement of environmental character is a complex multi-sensory fusion of countless factors which are immediately and synthetically grasped as an overall atmosphere, feeling, mood, or ambience. 'I enter a building, see a room, and – in the fraction of a second – have this feeling about it', Peter Zumthor, one of the architects who have acknowledged the importance of architectural atmospheres, confesses.⁶⁴ John Dewey, the visionary American philosopher, who already eight decades ago grasped the immediate, embodied, emotive and subconscious essence of experience, articulates the nature of this existential encounter followingly: 'The total overwhelming impression comes first, perhaps in a seizure by a sudden glory of the landscape, or by the effect upon us of entrance into a cathedral when dim light, incense, stained glass and majestic proportions

⁶⁴ Peter Zumthor, *Atmospheres: Architectural Environments – Surrounding Objects*, Boston, Berlin, Basel: Birkhäuser, 2006, 13.

fuse in one indistinguishable whole. We say with truth that a painting strikes us. There is an impact that precedes all definite recognition of what it is about'.⁶⁵

This experience is multi-sensory in its very essence. In his book *The Experience of Place*, Tony Hiss uses the notion "simultaneous perception" of the system we use to experience our surroundings'.⁶⁶ This is, however, also the way we normally observe, with all the senses at once. As Merleau-Ponty witnesses: 'My perception is [...] not a sum of visual, tactile, and audible givens: I perceive in a total way with my whole being: I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once'.⁶⁷ An atmospheric perception also involves judgements beyond the five Aristotelian senses, such as sensations of orientation, gravity, balance, stability, motion, duration, continuity, scale and illumination. Indeed, the immediate judgement of the character of space calls for our entire embodied and existential sense, and it is perceived in a diffuse and peripheral manner rather than through precise and conscious observation. This complex assessment also includes the dimension of time as experiencing implies duration and it fuses perception, memory and imagination. Moreover, each space and place are always an invitation to and suggestion of distinct acts: spaces are verbs.

In addition to environmental atmospheres, there are cultural, social, work place, family, interpersonal, etc. atmospheres. The atmosphere of a social situation can be supportive or discouraging, liberating or stifling, inspiring or dull. We can even speak of specific atmospheres in the scale of cultural, regional or national entities. *Genius loci*, the Spirit of Place, is a similarly ephemeral, unfocused and non-material experiential character that is closely related with atmosphere; we can, indeed, speak of the atmosphere of a place, which gives it its unique perceptual character and identity. Dewey explains this unifying character as a specific quality: 'An experience has a unity that gives it its name, *that* meal, *that* storm, *that* rapture of friendship. The existence of this unity is constituted by a single *quality* that pervades the entire experience in spite of the variation of its constituent parts. This unity is neither emotional, practical, nor intellectual, for these terms name distinctions that reflection can make within it'.⁶⁸ In another context, the philosopher re-emphasizes the integrating power of this experiential quality: 'The quality of the whole permeates, affects, and controls every detail'.⁶⁹

65 John Dewey, *Art as Experience*, New York: Perigee Trade, 2005, 145.

66 Tony Hiss, *The Experience of Place: A New Way of Looking at and Dealing with Our Radically Changing Cities and Countryside*, New York: Random House, Inc., 1991.

67 Maurice Merleau-Ponty, 'The Film and the New Psychology', in Id., *Sense and Non-Sense*, Evanston, IL: Northwestern University Press, 1964, 48.

68 Dewey, *Art as Experience*, op. cit., 37.

69 John Dewey, 'Qualitative Thought', in Larry A. Hickman, Thomas M. Alexander, editors, *The Essential Dewey, Volume 1: Pragmatism, Education, Democracy*, Bloomington, IN: Indiana University Press, 1998, 197.

Martin Heidegger links space indivisibly with the human condition: 'When we speak of man and space, it sounds as though man stood on one side, space on the other. Yet space is not something that faces man. It is neither an external object nor an inner experience. It is not that there are men, and over and above them space'.⁷⁰ As we enter a space, the space enters us, and the experience is essentially an exchange and fusion of the object and the subject. Robert Pogue Harrison, an American literary scholar, states poetically: 'In the fusion of place and soul, the soul is as much of a container of place as place is a container of soul, both are susceptible to the same forces of destruction'.⁷¹ Atmosphere is similarly an exchange between material or existent properties of the place and the immaterial realm of human perception and imagination. Yet, they are not physical 'things' or facts, as they are human experiential 'creations'.

Paradoxically, we grasp the atmosphere before we identify its details or understand it intellectually. In fact, we may be completely unable to say anything meaningful about the characteristics of a situation, yet have a firm image, emotive attitude and recall of it. In the same way, although we do not consciously analyse or understand the interaction of meteorological facts, we grasp the essence of weather at a glance, and it inevitably conditions our mood and intentionality. As we enter a new city, we grasp its overall character similarly, without having consciously analysed a single one of its countless material, geometric, or dimensional properties. Dewey even extends processes that advance from an initial but temporary grasp of the whole towards details all the way to the processes of thinking: 'All thought in every subject begins with just such an unanalysed whole. When the subject matter is reasonably familiar, relevant distinctions speedily offer themselves, and sheer qualitiveness may not remain long enough to be readily recalled'.⁷²

This is an intuitive and emotive capacity that seems to be biologically derived and largely unconsciously and instinctively determined through evolutionary programming. 'We perceive atmospheres through our emotional sensibility – a form of perception that works incredibly quickly, and which we humans evidently need to help us survive', Zumthor suggests.⁷³ The new sciences of bio-psychology and ecological psychology actually study such evolutionary causalities in human instinctual behaviour and cognition.⁷⁴ It is evident that we are genetically and culturally conditioned to seek or avoid certain types of situations or atmospheres.

70 Martin Heidegger, 'Building, Dwelling, Thinking', in Id., *Basic Writings*, New York: Harper & Row, 1997, 334.

71 Robert Pogue Harrison, *Gardens: An Essay on the Human Condition*, Chicago and London: The University of Chicago Press, 2008, 130.

72 Dewey, 'Qualitative Thought', op. cit., 198.

73 Zumthor, op. cit., 13.

74 See, for instance, Grant Hildebrand, *Origins of Architectural Pleasure*, Berkeley, Los Angeles, London: University of California Press, 1999, and Id., *The Wright Space: Pattern & Meaning in Frank Lloyd Wright's Houses*, Seattle: University of Washington Press, 1992.

Our shared pleasure in being in the shadow of large trees looking onto a sun-lit open field, for instance, is explained on the basis of such evolutionary programming – this specific type of setting demonstrates the polar notions of ‘refuge’ and ‘prospect’, which have been applied to explain the pleasurable pre-reflective feel of Frank Lloyd Wright’s houses.⁷⁵

Although atmosphere and mood seem to be overarching qualities of our environments and spaces, these qualities have not been much observed, analysed or theorized in architecture or planning. Professor Gernot Böhme is one of the pioneering thinkers in the philosophy of atmospheres, along with Hermann Schmitz.⁷⁶ Recent philosophical studies, relying on neurological evidence, such as Mark Johnson, *The Meaning of the Body: Aesthetics of Human Understanding*,⁷⁷ and neurological surveys as Iain McGilchrist, *The Master and His Emissary: The Divided Brain and the Making of the Western World*,⁷⁸ significantly valorise the power of atmospheres. Current neurological findings on mirror neurons help to understand that we can internalise external physical situations and experiences through embodied simulation.

Atmospheric Intelligence

→ atmospheres in architecture; atmospheres in the arts; atmospheric sense [the]

Touching the World: Integration of the Senses and the Experience of Reality (2018)

Recent studies on the differentiation of the human brain hemispheres have established that regardless of their essential interaction, the hemispheres have different functions; the left hemisphere is oriented towards the processing of detailed observation and information whereas the right hemisphere is dominantly engaged in peripheral experiences and the perception of entities. Besides, the right hemisphere is also oriented towards emotional processes while the left deals with concepts, abstractions and language.

75 See Hildebrand, *Origins of Architectural Pleasure*, op. cit., Id., *The Wright Space*, op. cit., and Edward O Wilson, ‘The Right Place’, in Id., *Biophilia*, op. cit., 103–118.

76 Gernot Böhme, *Atmosphäre: Essays zur neuen Ästhetik*, Frankfurt am Main: Suhrkamp Verlag, 1995, Id., *Architektur und Atmosphäre*, München: Wilhelm Fink GmbH & Co. Verlags-KG, 2006, and Hermann Schmitz, *System der Philosophie. Studienausgabe: System der Philosophie 3/1. Der leibliche Raum: BD III/1*, Bouvier, Bonn/Bonn: Bouvier, 2005.

77 Mark Johnson, *The Meaning of the Body: Aesthetics of Human Understanding*, Chicago and London: The University of Chicago Press, 2007.

78 Iain McGilchrist, *The Master and His Emissary: The Divided Brain and the Making of the Western World*, New Haven and London: Yale University Press, 2009, 184.

It seems that the recognition of atmospheric entities takes place in a peripheral and subconscious manner primarily through the right hemisphere. In his challenging and thorough book *Master and His Emissary: The Divided Brain and the Making of the Western World*, Iain McGilchrist assigns the task of peripheral perception and the integration of the multifarious aspects of experience to the right hemisphere: 'The right hemisphere alone attends to the peripheral field of vision from which new experience tends to come; only the right hemisphere can direct attention to what comes to us from the edges of our awareness, *regardless of the side*. [...] So, it is no surprise that phenomenologically it is the right hemisphere that is attuned to the apprehension of anything new'.⁷⁹ The right hemisphere, with its greater integration power, is constantly searching for patterns in things. In fact, its understanding is based on complex pattern recognition.⁸⁰

Atmospheres in the Arts

→ atmospheric intelligence; atmospheric sense [the]; peripheral vision; physical and mental landscape; unfocused vision

Space, Place and Atmosphere: Peripheral Perception and Emotion in Architectural Experience (2012)

Atmosphere seems to be a more conscious objective in literary, cinematic and theatrical thinking than in architecture. Even the imagery of a painting is integrated by an overall atmosphere or feeling; the most important unifying factor in paintings is usually their specific feel of illumination and colour, more than their conceptual or narrative content. In fact, there is an entire painterly approach, as exemplified by Joseph Mallord William Turner and Claude Monet, which can be called 'atmospheric painting', in the two meanings of the notion; atmosphere being both the subject matter and expressive means of these paintings. 'Atmosphere is my style' Turner confessed to John Ruskin, as Zumthor reminds us. The formal and structural ingredients in the works of these artists are deliberately suppressed for the benefit of an embracing and shapeless atmosphere, suggestive of temperature, moisture and subtle movements of the air. 'Colour field' painters similarly suppress form and boundaries and utilize large size of the canvas to create an intense interaction and presence of colour.

⁷⁹ *Ibid.*, 47.

⁸⁰ Ilpo Kojon, 'Mielikuvat ovat todellisia aivoille (Images are real for the brain)', in *Helsingin Sanomat*, Helsinki 16.3.1996. The article refers to the research at Harvard University in the mid-1990s by a group of researchers under the supervision of Stephen Kosslyn.

Great films, such as the films by Jean Vigo, Jean Renoir, Michelangelo Antonioni and Andrei Tarkovsky, are also steeped in their characteristic atmospheric continuum. Also, theatre relies heavily on atmosphere which supports the integrity and continuity of the story regardless of the often abstracted and vaguely hinted features of the place or space. The ambience can be so suggestive and dominating that very few cues of the setting are needed, as in Lars von Trier's film *Dogville* (2003) in which houses and rooms are often indicated by mere chalk lines on the dark floor, but the drama takes a full grip of the spectator's imagination and emotions.

Somewhat paradoxically, we can also speak of 'atmospheric sculpture', such as the sketch-like modelled works of Medardo Rosso, Auguste Rodin and Alberto Giacometti. Often it is the atmosphere of the works, as the abstracted sculptures of Constantin Brancusi, that creates the unique sense of a singular artistic world. Artists seem to be more aware of the seminal role of ambience than architects, who tend to think more in terms of the 'pure' qualities of space, form and geometry. Amongst architects, atmosphere seems to be judged as something romantic and shallowly entertaining. Besides, the serious western architectural tradition is entirely based on regarding architecture as a material and geometric object as experienced through focused vision. Standard architectural images seek clarity rather than ephemerality and obscurity.

When describing his creative process in the essay 'The Trout and the Mountain Stream', Alvar Aalto confesses: 'Led by my instincts I draw, not architectural syntheses, but sometimes even childish compositions, and via this route I eventually arrive at an abstract basis to the main concept, a kind of universal substance with whose help the numerous quarrelling sub-problems [of the design task] can be brought into harmony'. Aalto's notion of 'universal substance' seems to refer to a unifying atmosphere or intuitive feeling rather than any conceptual, intellectual or formal idea.

Music of the various art forms is particularly atmospheric, and has a forceful impact on our emotions and moods regardless of how little or much we intellectually understand musical structures. That seems to be the very reason why music is commonly used to create desired atmospheric moods in public spaces, shopping malls and even elevators. Music creates atmospheric interior spaces, ephemeral and dynamic experiential fields, rather than distant shapes, structures or objects. Atmosphere emphasizes a sustained being in a situation rather than a singular moment of perception. The fact that music can move us to tears is a convincing proof of the emotive power of art as well as of our innate capacity to simulate and internalize abstract experiential structures, or more precisely, to project our emotions on abstractly symbolic structures.

Atmospheric Sense [The]

→ atmospheres in architecture; atmospheric intelligence; atmospheres in the arts; odours in architecture; peripheral vision; physical and mental landscape; unfocused vision

Sarah Robinson, Juhani Pallasmaa, editors, *Mind in Architecture: Neuroscience, Embodiment, and the Future of Design*, Cambridge, MA, and London: The MIT Press, 2007, 60–61

I have become so impressed with the power of our atmospheric judgment that I want to suggest that this capacity could be named our sixth sense. Thinking only of the five Aristotelian senses in architecture fails to acknowledge the true complexity of the systems through which we are connected to the world. Steinerian philosophy, for instance, deals with twelve senses,⁸¹ whereas a recent book, *The Sixth Sense Reader*, identifies more than 30 categories of sensing through which we relate to and communicate with the world.⁸² This idea of a wider human sensorium underlines the fact that our being-in-the-world is much more complex and refined than we tend to understand. That is why understanding architecture solely as a visual art form is hopelessly reductive. Besides, instead of thinking of the senses as isolated systems, we should become more interested in and knowledgeable about their essential interactions and crossovers. Merleau-Ponty emphasizes this essential unity and interaction of the senses: 'My perception is [...] not a sum of visual, tactile, and auditive givens: I perceive in a total way with my whole being. I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once'.⁸³ This flexibility and dynamic of our interaction with the world is one of the important things that neuroscience can illuminate for us. The craft of architecture is deeply embedded in this human sensory and mental complexity. This criticism of the reductive isolation of the senses also applies to the common understanding of intelligence as a singular intellectual capacity. Contrary to the common understanding of intelligence as a definite cerebral category, psychologist Howard Gardner suggests seven categories of intelligence, namely linguistic, logical-mathematical, musical, bodily-kinaesthetic, spatial, interpersonal and intrapersonal intelligences, to which he later adds three further categories: naturalistic, ethical and spiritual intelligences.⁸⁴ I would add four further categories to Gardner's list: emotional,

81 Albert Soesman, *Our Twelve Senses: Wellsprings of the Soul*, Stroud, Glos.: Hawthorne, 1998.

82 David Howes, editor, *The Sixth Sense Reader*, Oxford: Berg Pub Ltd, 2009.

83 Maurice Merleau-Ponty, 'The Film and the Psychology', in Id., *Sense and Non-Sense*, op. cit., 48.

84 Howard Gardner, *Intelligence Reframed: Multiple Intelligences for the 21st Century*, New York: Basic Books, 1999, 41–43.

aesthetic, existential and atmospheric intelligences. So, we may well have a full spectrum of a dozen modes of intelligence instead of the single quality targeted by IQ tests. The complex field of intelligence also suggests that architectural education, or education at large, faces a much wider task, and at the same time, possesses far greater potential, than standard paedagogy has thus far accepted. Education in any creative field must start primarily with the student's sense of self, as only a firm sense of identity and self-awareness can serve as the core around which observation, knowledge, and eventually wisdom can evolve and condense.

