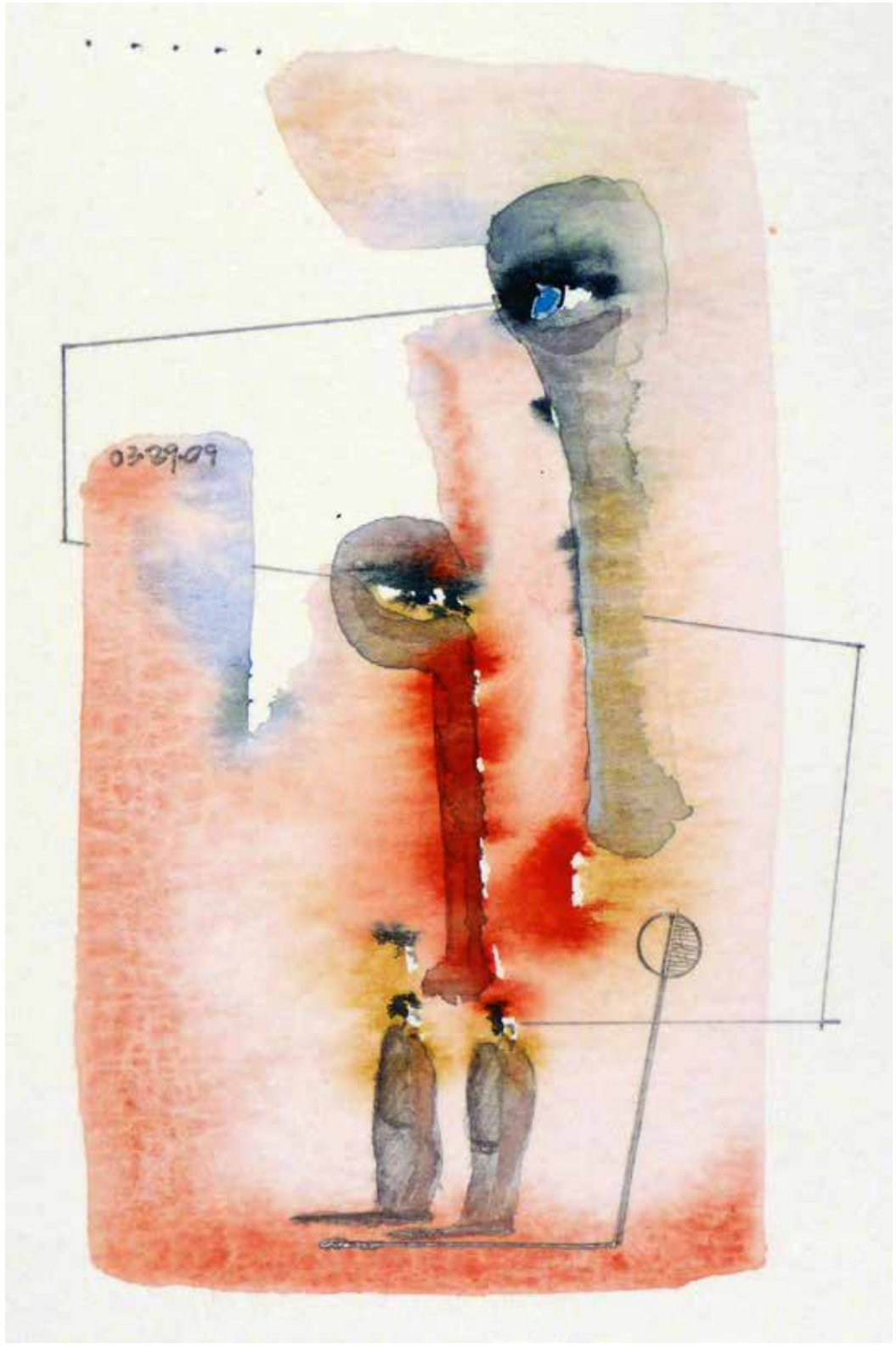


Bob Condia, “Each Kiss without Holding,” Watercolor and graphite on paper, From: Not Simply Every Sunset over Eden (Manhattan KS: Kansas State Architectural Press, 2009)

[Dialogues]

The interface of two cultures

Harry F. Mallgrave and Sergei Gepshtein

An architectural historian and a neuroscientist engage in a wide-ranging dialogue about the problem of two cultures at the interface of architecture and natural sciences of the human being. The conversation revolves around the question of how such disciplines as systems neuroscience, cognitive science, and sensory psychophysics can breathe new life into creative endeavors of students and practitioners of design. The authors explore how designers could become more fully aware of biological complexity of the human being and how design education could be reformed for that purpose.

Modern man has no unified worldview. He lives in a double world, at once in his own naturally given environment and in a world created for him by modern natural science, based on the principle of mathematical laws governing nature. The disunion that has thus pervaded the whole of human life is the true source of our present spiritual crisis. It is understandable that thinkers and philosophers have often attempted somehow to overcome it, yet they have generally gone about this in a way generally meant to eliminate one of the two terms, to logically reduce one to the other, to present one—usually on the basis of causal argument—as a consequence and a component of the other.

Jan Patočka [1]

1. The Two Cultures

| HM |

This remark of Jan Patočka, originally made in 1936, is reminiscent of a lecture given by C. P. Snow at Cambridge University a few decades later. It was entitled "The Two Cultures," and there he too lamented the divide between the arts and the sciences. He couched the breach, somewhat narrowly, as one between scientists and engineers on the one hand, and intellectuals on the other. A similar divide has also haunted the practice of architecture for much of its recorded history. The classical treatise of Vitruvius is mostly science in the sense of its day, with only a few lines given to the beauty of built form. Geometries, proportions, and technologies were strong influences in the seventeenth, eighteenth, and nineteenth centuries, and even modernism had its more than flirtatious moments with industrial prototypes, the machine age, and design methodologies.

Yet few transformations were as severe as what has transpired over the past fifty years. The aberrations of the postmodern, poststructural, and Lacanian eras aside—the architect has relegated all of the 'technical' chores to engineers, and (while often casting aside the thoughtful fluency of the pencil) has claimed the mantle of 'artist.' The world has been presented with the phenomenon of 'starchitecture' and the result has not been particularly fruitful. The digital desktop designer has reduced the practice of design to manipulating the object on the computer screen, delineated with a few perspectives filled with magazine cutouts of fashionably-dressed people to feign a gesture of humanity. And the solution to virtually each and every urban commission across our global culture today has become the glass tower, crimped and twisted to the latest software program. Meanwhile,

the lonely people who walk by these boxes in the windy canyons below do so with a quickened pace and feelings of boredom and stress. D-503, the supremely rational protagonist of Yevgeny Zamyatin's dystopian novel We, written in the 1920s, would feel completely at home in our crystalline cities. The only question is whether D-503's sensuous Eve (I-330), in her short yellow silk dress with tall black stockings, will come forth and, in an act of self-immolation, show us that beyond these glass walls are flesh-and-blood biological organisms with haunting psychological, social, and physiological needs (real people). Meanwhile, major breakthroughs in the past quarter-century in the areas of human biology, social anthropology, phenomenology, and affective psychology have passed by designers with little notice. Where do future architects and planners go to rediscover the encultured human being?

Richard Neutra once made the observation that the future architect should be "a gardener of nervous growth," and it is with such an ambition in mind that we might pay attention these rather remarkable advances in the human sciences before us. Becoming more fully aware of the extent of our biological complexity is one step, but only an initial one. What should follow is the recognition of the depth of our sensory-emotive connection with the world, the manner in which our built environments align or resonate with our being. Informed designers can utilize this knowledge in ways that can breathe new life into creative endeavors, with an approach seeking a new-found equilibrium between our bodies and the conditions of our existence, between our social needs and larger ecological responsibilities. The building or the city can in this way become the interface bridging the biological sciences and humanities.

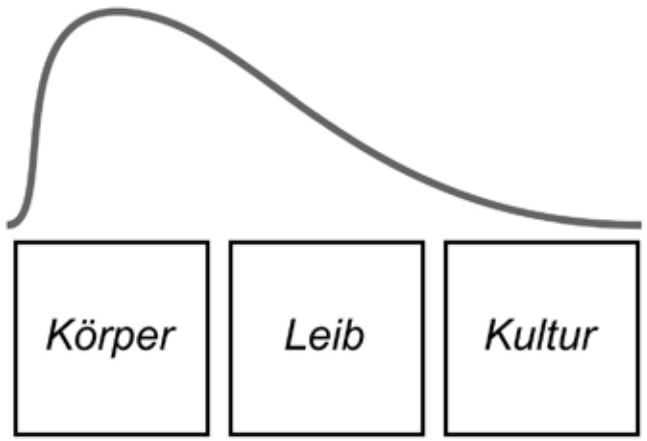
| SG |

I also find it useful to think of architecture as an interface that has grown over millennia between the human being and Nature. From Neolithic settlement to modern city, from Vitruvius to Louis Kahn, this interface became an imperative part of our environment. As you know, biological sciences offer considerable insight into how complex interfaces works, and this interface should not make an exception. For example, we have learned from systems biology that it is misleading to think of biological organisms as bodies placed in the "box" of their environment. Rather, an organism and its *Umwelt* [2] are multivariate functions of one another. But there is an important difference between your typical biological organism and the human being. Human culture with its multiple manifestations is an integral constituent of the fully conceived human organism. It is in this broader sense of the human organism that architecture should be considered as a part of the human *Umwelt*.

As you pointed out, the biological nature of the human being has not been fully recognized in architectural theory and practice. One should only encourage the accelerating penetration of biological sciences into the sphere of architecture. And yet, introducing biology into the macrocosm of architecture must be tempered by carefully understanding how biological facts entwine with other facts about the human being. Much confusion has been created in the nascent nexus of architecture and natural human sciences because of the excessive emphasis on the biological aspect of humanity.

I attempted to capture this notion in the diagram, just above, using two distinctions. The first distinction, common in phenomenology, is between two connotations of the concept of body, borrowed from German: *Körper* and *Leib*. *Körper* is physical body with all of its objective attributes, including physiological functions. And *Leib* is body as a subject.[3] Natural sciences excel in understanding the biological body in the sense of *Körper*, where body is an externally observed object.

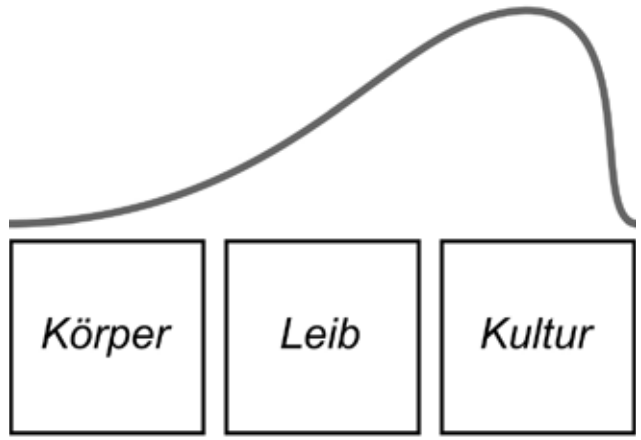
Scientific investigation of body in the sense of *Leib* is relatively new; it belongs to the forefront of research in natural human sciences, including the neurosciences.[4]



The second distinction is between body and culture, represented in the diagram by the component of *Kultur* added to *Körper-Leib* body. Just as *Leib* enlarges the concept of biological body to its fuller scope, the component of *Kultur* further enlarges the concept, elevating it to a level suitable for architectural discourse.

This diagram may help one to contemplate varieties of bias in design. In the figure at the bottom of the opposite page, I represent this bias by a curve that depicts the distribution of knowledge across the three parts. Here the weight of the distribution is shifted to the left, depicting excessive emphasis on *Körper*. This is the architect afflicted with scientism, who is intemperately enthusiastic about inserting biology into architecture at the expense of traditional architectural knowledge. The diagram equally represents the scientist who sees himself or herself as a mere messenger tasked with injecting a dose of biological fact into the interdisciplinary dialogue.

In the diagram just below, the distribution has its weight shifted to the right, representing the worldview in which biological knowledge contributes to design nominally or trivially.



This is the architect who is intrigued by the dialogue but who shies away from getting into the thick of biological knowledge, and who believes that sufficiently deep insight onto the human dimension of architecture can be attained by means of ethnography, cultural geography, historiography and other *Geisteswissenschaften*.

I imagine the marriage of architecture and natural human sciences will last only when the parties learn to distribute emphasis evenly across the full compass of the human being. But how can we accomplish that?

2. Biology and Culture

| HM |

You have hit upon a very key issue, and one that can be seen in our current crisis of architectural education. You are also correct in noting that many architects have a problem with the word 'biology,' but this may also be a terminological one rooted more in the past than in the present. Architectural training in the future will without question have a substantial biological component, but also a more expansive understanding of the word 'biology.' As with the broadening of Uexküll's idea of *Umwelt*, the reach of biology now encompasses human culture and explores the emotional and cognitive dimensions unique to our species.

Culture is another word that has shifted in its meaning. When Johann Gottfried Herder reintroduced the Latin term *cultura* into German parlance in the late-eighteenth century, he employed the word *Kultur* in the tangible sense of rooting a people (*Volk*) in their local landscape, climate, language, traditions, and social mores. By the mid-twentieth century, the meaning of culture had sharply contracted to those "outside the skin" or extragenetic control devices that humans impose upon themselves: "nurture" to overcome the shortcomings of human "nature." This definition has in recent years collapsed in light of our understanding of the human genome, and there is a curious cycle at play here. The environment in many ways affects genomic expression, and genomic expression alters the course of cultural behavior, which in turn (through the practice of design) transforms the built environment. In this light, can we seriously make the case that our current approaches to design are improving the human environment? Are our environments ecologically sound or salutary to our mental and physical health? Do we really know what we are doing with our urban hardscapes, now ballooning into cities of twenty million people or more? And look at how one particular virus within these dense environments can virtually paralyze normal human behaviors and wreak havoc on both education and international commerce.

We need to redefine the idea of culture in design, which, in light of current knowledge, might be better considered as *tending to the human organism within its built and social environments*, the inseparable milieu in which our particular organism either thrives or languishes. From such a perspective, architects have new responsibilities. They no longer operate freely (as prismatic artists) within an existing culture, because by designing the built environment they also in part define the culture in which we live. This is not to disparage the ideas of aesthetics or beauty, but the way in which we assess these terms. Well-tempered forms, materials, and detailing are important parts of good design, but so are the social and emotional dimensions that breathe life into these otherwise lifeless facades.

No less important is the creative imagination that cast

things in a new light and gathers the appreciation of the human dweller. If we expand the scope of our consideration to the city, is it possible to transform our concrete-and-glass jungles into metaphorical gardens? Into literal gardens?

The larger question, of course, is how this instinct can be enacted. It certainly cannot be done by training designers to read scientific papers or sub-contracting this new field of knowledge to consultants. The latter's input will only further distance architects from the encultured human being, and more likely this information will come to the designer's attention only in later stages of the design process. This new knowledge, however, can significantly affect the course of design from its earliest conception. It can modulate the attitude that one brings to design.

| SG |

I must agree that appending scientists to design teams as advisors or sub-contractors will only turn scientific expertise into a prosthesis: a temporary solution, and a superficial one at that. A true solution will require that we reimagine how architecture is conceived and taught.

For the sake of concreteness, let me try to imagine how this problem could be tackled using the family of ideas conglomerated under the rubric of "space." Indeed, a large swath of architectural thought has been dedicated to the problem of space. Neuroscience and affiliated disciplines, too, have much to say on the matter: how space is sensed, mapped, structured and valued by biological organisms in the interest of perception, imagination, and action. There are massive specialist literatures dedicated, for example, to hippocampal "place cells" (responsible for representation and memorization of location), to binocular vision and stereopsis (which help to create a sense of vivid depth and layering of the perceptual world), to the figure/ground perceptual organization of the sensory field (which is a theme pursued in psychological and physiological studies of perception), and then to peripersonal space and body schemata in cognitive psychology and cognitive neuroscience. In surveying this polyphony of ideas, we learn that instead of one concept of space illuminated by specialist sciences from different sides, there are many disparate—sometimes incommensurable—concepts of space generated by different scientific disciplines.

But is it not the case that architects also came up with their own concepts of space, just as phenomenologists, painters, and filmmakers did? Before long, we discover a sweeping spectrum of domain-specific concepts of space that stretch from physics (where space is couched in objective observer-independent terms) to poetics (where space is a social construct recognized as essentially narrative material). Taken together, these concepts of space form a densely populated continuum, on which the concepts listed in the previous paragraph occupy intermediate positions.[5]

These concepts overlap. Consider, for example, how certain ideas in the history of architectural thought anticipated or mirrored scientific concepts of space. Recall August Schmarsow's pioneering speculations of 1893 about "intuited form of space" and about space being "created" (*Raumgestaltung*) dynamically by moving the human body. I cannot help but see how Schmarsow's ideas and ideas prevalent in modern sciences (motor neuroscience and sensorimotor psychophysics) are driven by similar questions, even as these questions are motivated differently. Similarly, Paolo Portoghesi's spirited writings in the 1970s about buildings generating a "field

[of] continuous variability of what surrounds the architectural structures" suggest that architects and scientists strive towards a grip on the same basic ideas.

Discovering this convergence augurs well for collaboration of architects and scientists. But I have learned from my own experience in this arena how difficult it is to realize this promise in practice. It requires enduring effort and, perhaps, a new hybrid specialization on the boundary of design and science. To illustrate, consider the same notion of an architectural field entertained by Portoghesi. The idea was taken up by other thinkers, such as the Gestalt-trained psychologist Rudolf Arnheim in *The Dynamics of Architectural Form* of 1975, and the architectural theorist and educator Pierre von Meiss in *De la Forme au Lieu* of 1986 (translated into English in 1990 as *Elements of Architecture. From Form to Place*). The concept of a field was borrowed from science but used metaphorically in both cases. The metaphor suggested new way of thinking about architecture, yet the full potential of the scientific idea has not been realized.

This metaphor is just one instance of a scientific concept transfigured by crossing a disciplinary boundary. I am not suggesting we should disparage such transfiguration: terms borrowed from science may help to express ideas for which other disciplines may have no other means of expression. Still, discovery of such commonalities only opens the door. Walking through that door will depend on long-term collaborations, personal commitments, and much support by institutions in research and educational institutions, by funding agencies and charitable foundations. Such organizations as the Academy of Neuroscience for Architecture hailing from San Diego and The Driehaus Foundation in Chicago have helped us to make first steps.

In summary, I would argue that scientific and architectural traditions already have multiple common roots, even if these commonalities could not have been noticed at the time of inception, or we simply forgot about them. We would do well to look for such commonalities, nurture them, and frame interdisciplinary dialogue in their light. This is in place of building bridges between narrowly conceived specialist disciplines propped by pedagogical habits fixated on one or another arbitrary image of the human being.

3. A Truly Human Architecture

| HM |

As someone who has in recent years addressed architectural audiences regarding our new biological understanding, I often get the question of just what can this knowledge really offer the designer? How does it inform the design process? It is a very difficult question to answer first because it can be approached on so many different levels, and second because there is inevitably that latent fear of the questioner that science will somehow inhibit or prescribe norms for design to the detriment of the architect's imagination or creativity. I believe the opposite is the case, because this knowledge enlivens that abstract 'occupant' for whom we design—not only with flesh and blood, but also with moods, visceral sensations, opiate receptors, multi-modal perceptual faculties, and all of those encultured or social instincts refined over millions of years of human evolution. This knowledge also enlivens the former abstraction of the 'occupant' with a human being preferring environments both salutary and fitted to one's needs.

Fear of science is nevertheless a very foundational question that has to be answered with some specificity. First, the broadened biological and cultural focus of design highlights the human individual for whom we design. It suggests a design process centered less on the programmatic features of the building or its photographic image, and more on the health and happiness of the individual. When Alvar Aalto several years ago noted that the task of the designer was to build a paradise on earth,[6] he was not talking about some grand utopian scheme imposed on society by the ego-inebriated architect, but rather that design should be focused on human happiness, where "even a small increase of happiness is welcome."[5] To do so, he goes on the say, one must first remove the existing "ballast" that prevents us from creating a truly human architecture. What is the existing ballast today? Is it the mirrored hyperreality of our building facades, what Robert Sommer once referred to as "hard architecture," or the scaleless explosion of our global cities? Whether it be through our infatuations with our urban skylines or our miasmic fascination with theory, we have over the years lost sight of human scale and human needs, what Jan Gehl has called the human dimension.

Second, these newer biological models provide us with new insights into how our multiple and autonomous biological systems engage with or enact the designed environment. We have now come to realize that forms and spaces are not neutral or isotropic. We measure a built design not just from a conceptual reading of its 'meaning,' as designers only a few decades ago were taught to believe, but on multiple levels with our entire organic apparatus. As you noted with your mention of Schmarsow, we scale a room's expanse and proportions with our bodies; we respond as organic systems to the mass, texture, weight, and color of materials; we have a profound emotional reading of the atmospheric effects of form and space. We also have organic responses of which we might be entirely unaware. As with the avant-garde experiments of the past, this new knowledge offers exciting new dimensions for designers to explore, areas to be addressed with a much-enhanced biological understanding of ourselves.

Third, and this I would argue is science's most important contribution, is that it allows us from an informed basis to rethink our habitats and cities in the most fundamental way. This is not simply a generational issue, but something that can forever change the course of human history. We have for many years now been aware of the baneful effects of poor environments on human health and behavior. Enough said. Yet this new knowledge allows us to pose the question of what constitutes a good environment, and this is something with many interesting possibilities. In saying this, I am not referring to such trends as "smart cities" with their security cameras and digital control of every aspect of our lives, or to the censorious and increasingly puerile attempts of big-tech and media companies to regulate our speech and set the terms of our debate.

Let me give you an example. We now have abundant evidence that people who live near parks or who have access to nature are healthier, have fewer addictions, fewer fits of depression, lower rates of morbidity, and are generally happier. The implications of biophilic design are immense, both for the individual and for the planet, but this is only a small part of what is about to unfold with a better understanding of ourselves. Another example is what we have learned about the profound human need for social contact with others. This is true for adults, but especially so with children. Neurologists

tell us that a child's social brain develops at a relatively precise chronological window of neural growth, and if this social mingling does not take place, normal social behavior can be forever cramped or thwarted. This knowledge was not known when I began my architectural practice many years ago, and indeed worked on the design of a few schools. Yet where was this knowledge during our current pandemic when ill-informed politicians in some countries mindlessly closed all schools? Look at some of the more successful cities in the world today and you will find places in which people celebrate life in public display, whether the Viennese waltz, the Venetian Carnevale, or Singapore's Garden Rhapsody. These cafes, squares, and pedestrian venues—cappuccino on the Øresund—are there by design in response to genuine human needs. Conversely, why do we tolerate a large city in which people are fearful of stepping outside in the evening? Why do we still allow people with addictions and mental problems to live on sidewalks? Such problems are obviously symptomatic of abject political failure, but there is also a dimension here for the designers and planners to explore. Design decisions, after all, contribute to making the culture in which we live.

| SG |

You are describing new powers of biologically-informed design which are truly exciting. This new vision is disseminated by the growing community of architects and scientists engaged in the interdisciplinary dialogue, promulgated by interdisciplinary meetings of the sort organized by the Academy of Neuroscience for Architecture in California. Such meetings have heightened the sense that the time has come for this transformative thinking to penetrate every corner of the architectural profession. But I do not believe that this transformation is taking place on the scale it deserves. It feels, instead, that this movement got detained in a sort of antechamber—somehow it cannot quite enter the main room. Why is it so?

On the surface, the obstacles are thoroughly familiar to anyone who has attempted to work in this arena. Financial and institutional support for this kind of interdisciplinary work is rare. And then, even more importantly, very few curricula in architecture schools are capable of preparing their students for dialogue with natural human sciences. Still, it appears that these immediate obstacles are mere symptoms of a deeper issue of incompatible worldviews. We have already touched on this issue in our opening quotation from Jan Patočka and in the famous lament of C. P. Snow about the two cultures. In my mind, this problem is perpetuated by the habit of paradigmatic thinking, which is difficult to cure because we tend to be oblivious to the fact that we always see the world through a selective lens.

Indeed, specialist paradigms have this pernicious capacity to remain unnoticed by their proponents. As Patočka insisted, the parties tend to render the other side "as a consequence and a component" of itself. On the one hand, scientists participating in the dialogue often convey the impression that, in their minds, the future of architectural design will be nothing less than applied science. This ambition—labeled by critics as scientific imperialism—is of course not shared by every participating scientist, but it taints the larger dialogue, eliciting resistance from the architects who feel they must defend their right of self-determination: professional, creative, intellectual. On the other hand, as a counterpoise provoked by scientific imperialism or independent of it, we encounter the narcissistic claim that the best architects already know everything they need to know, and thus the dialogue with natural human sciences will at best help the less insightful architect to catch up.

I hope that, in place of this unnecessary tug-of-war played by the imperialist and the narcissist, the parties will learn to assume a self-critical stance and avoid their dyed-in-the-wool commitment to professional paradigms. Or else we will keep running in place: the parties will keep having false expectations of one another, scientists will keep overreaching, architects will keep using scientific ideas metaphorically, and the larger society will keep failing to support the much-needed new interdisciplinary research.

I agree with you that reforming architectural education will help to deliver a decisive solution to this problem. We should find a way to present the picture of the real human being to students of architecture early in their careers, when their professional worldviews are just beginning to form. Yet the picture presented to students of architecture will have to be different from that presented to students of science. We should not forget that methods and goals of the professional scientist will remain different from those of the professional architect. This self-evident notion seems to be forgotten when the scientist invited to participate in the dialogue commits the mistake of following the manner of education in the sciences. It is a pressing challenge to find pedagogical models that stand outside of traditional scientific curricula and still reveal the full complexity of the human being—without trying to convert students of architecture into amateur scientists.

4. The Challenge

| HM |

What you are underscoring is the larger problem of how the arts (architecture) and the human sciences (our knowledge of ourselves) can be channeled to inform and improve our designed environments. I think the solution can only be found in the academy, and specifically in the curriculum by which designers are trained. With our more expansive meaning of human biology, we are not talking only about inserting a course or two within the architectural curriculum, as we do with coursework on structures or mechanical systems—although a basic course in human perception or human sociology would indeed be helpful. If architectural programs are built around the design studio, where students may spend up to eighty or ninety percent of their educational efforts, this knowledge must be brought into the design studio. It is here that the desired mediation must take place.
The first point I want to make is that the studio, in its current structure and conception, is in need of a major overhaul. I say this not referring to the open and regular critiques that take place within studios, but rather with the way that the design projects themselves are structured. There is a single question that is often posed by design juries that encapsulates the problem: “What is the concept of your design?” The question is deadly for two reasons. First, it requires the student to invent an all-embracing concept or idea for the design approach, even when there is none. I have seen students spend a significant portion of the semester trying to come up with this elusive ‘concept,’ instead of exploring the knowledge base needed to approach a design in an informed way. Second, the question suggests that design is a conceptual problem, a matter of coming up with new idea for a building’s profile or its constructional system, rather than the concern for those beings to be housed in a dwelling or workplace. Architects, who are generally empathetic by nature, generally bring an anthropological attitude to smaller commissions, such as residences or community centers, but as the scale of the project increases, the mitigation of this concern seems, literally, to vanish into

thin air. The focus of design now becomes the 'object,' often within a forest of other objects. How do we re-humanize the art of design?

In returning to the problem of architectural education, I would like to offer another interpretation of the idea of 'interface.' Just as the built environment is the interface between the human being and nature, so is the design studio that place or interface where the arts and sciences have to be reconciled. One almost wants to do so with a sleight of hand—such as replacing the word biology with human ecology to ease the fear of timid academicians. Our knowledge of ourselves—our physical, social, and psychological needs—has not only grown substantially but it has also become highly specialized, and it is unprofessional and naive for design studios to play down the sophistication of knowledge needed for good design and remain fettered to the functionalist tendencies of the past. This biological, social, and anthropological knowledge must be integrated into the studio, which inevitably will require the format of the studio itself to change. We can and should debate how this transformation to an "integrated design studio" will come about, but come about it must. Already, it seems clear, that European architectural programs are taking the lead in this regard. On the larger question of serious scientific research into the nature of designed environments, obviously this is best pursued at a doctoral level. If one doctoral program would seek out an affiliation with a biological institute, it would soon lead to other programs pursuing a similar route. It nevertheless must be affirmed that design remains a hermeneutic process of interpretation free of any positivist tendencies.

Design studios in the future will also require research on the part of students, and likely collaborative research in the humanities during the early stages of the design process to accommodate the range of resources to be consulted. Perhaps design itself will become more collaborative, as is generally the case in practice. The reviews of design juries will require non-architectural jurors to speak to the human issues of design. There will also likely be supporting coursework related to the design studio and level of difficulty—that is, tailored readings in the humanities and sciences. A first-year design studio working on a nature conservancy, for example, requires some advanced ecological understanding of plant life, but the scope is within the grasp of the individual. A fourth-year studio devoted to a large cultural complex or rebuilding a quarter of a city will need an extensive knowledge of alternative approaches and their failures before real work can begin. Yet in looking at the urban models on display in so many schools of design, it is clear no critical research was ever undertaken. Students and studio leaders seem to take the status quo as a given.

Of course, this research is but a part of becoming a skilled designer. Design is ultimately a form of play, an exercise of imagination underpinned or ushered in with a sense of joy. The education of the architect should be well-rounded and global in its scope. One of the things that schools of architecture have done well in the last few decades has been the creation of international summer and semester programs. Nothing is more important for acquiring an anthropological perspective than in having an exposure to other people and their cultures, their historical accomplishments, and their forms of artistic expressions. Future designers need to look, to listen, and to interact with them. These programs also offer restive periods of fun and recreation, and the opportunity to acquire a confidence with drawing skills. It would be ideal to see these programs expand during the five or six years of architectural education. All designers benefit from travel and exploration.

What I am suggesting, by way of summary, is greater rigor in design education, one that balances a joy of learning with the disciplinary knowledge that every architect should wield. A basic knowledge of engineering or HVAC systems are legitimate parts of design education, even though they contracted to specialists in practice. A knowledge of human ecology, in its encompassing and encultured sense, cannot be relegated to others; it should reside at the heart of the architect's mission. Only a well-rounded knowledge of our "lived world"—Edmund Husserl's old notion of a *Lebenswelt*—will make the designer a true professional.

| SG |
I imagine this reform of architectural education will stir up new ways of thinking about traditional architectural questions and foment asking radically new questions. But even before we seek new knowledge, making new curricula will require that we reframe and regroup known facts. In particular, we will need to rethink how biological facts hang together outside of the context of scientific discovery.

This work may lead to unexpected consequences. Recall that reframing and regrouping of known facts was what Nicolaus Copernicus did to instigate one of the most significant breakthroughs in our intellectual history. Dissatisfied with the prevalent interpretation of facts about movement of celestial bodies (Ptolemy's geocentric model), Copernicus reorganized these facts into a different model (the heliocentric one).

I don't think our project will be hurt by setting this dazzling accomplishment as a point of reference. After all, we are talking about a radical reorientation of institutions and practices which will shape the built environment of the future. What may be harmful is thinking of this reform prosaically, as building bridges between long-established disciplines. The metaphor of bridge-building implies that the two sides remain entrenched and separated. What we need instead is to learn living in the river. Let me try to explain this metaphor using two illustrations.

ONE ILLUSTRATION is the ingenious theory of aesthetics developed by the American thinker John Dewey, who is best known for other reasons: as a theorist of education and a foremost public intellectual of the first half of the twentieth century. In his monumental *Art as Experience* of 1934, Dewey makes it clear that study of experience of art should not begin with study of works of art. It should rather begin with the "live creature" who finds "stability and order in the whirling flux of change" and "who shares in the ordered relations of its environment." Dewey's project is a study of the live creature with the overarching aim "to restore continuity between the refined and intensified forms of experience that are works of art and the everyday events, doings, and sufferings that are universally recognized to constitute experience."

Dewey's inclusive premise strikes me as a fitting opening for the pedagogy we are looking for, even as this approach may surprise the architect who believes that study of architectural experience should begin with and revolve around the built environment. Indeed, this vision demands that pursuit of architectural questions should take place between concentrated investigations of human behavior and experience. On this view, a design project should begin with a study of the desired behavior and experience, employing tools or representation which at present exist only in embryo. Subsequent design would be founded on results of the opening study, followed by another study of human behavior and experience aiming to learn about the impact of design.

Notice also that Dewey does not begin with a review of biological fact or terminology. His vision transcends specialized paradigms. It is in this sense that Dewey's thought offers a galvanizing example of and a precursor to an outlook centered squarely on the human being in its full complexity: as a biological organism, a subjective agent, a conduit and progenitor of the ambient culture, while no part of this expansive nexus is placed above another part.

MY OTHER ILLUSTRATION is the early philosophy of nature by the French thinker Maurice Merleau-Ponty, best known for his later phenomenology of body. *La Structure du Comportement* of 1942 (translated as *The Structure of Behavior* in 1963) is Merleau-Ponty's first book, which I believe is more useful for our inquiry than his celebrated later works.[7] At its core, this book is a study of the relationship between what Merleau-Ponty describes as three "orders" of nature: physical, vital, and human. Most pertinent to our present concern is how, in Merleau-Ponty's hands, concepts developed for investigating one order are reorganized (dialectically, as he puts it) for investigating another order.

For example, Merleau-Ponty talks about desires of a biological organism directed to features of the environment that are made distinct and connected only by virtue of being desired. Merleau-Ponty called such features "virtual conditions" of the environment because they are brought into existence and maintained by the biological organism. This notion is reminiscent of the popular notion of "affordance" introduced by the psychologist James Gibson. Yet Merleau-Ponty's *virtual conditions of the environment* suggest a broader and more nuanced perspective that links perceptual, motoric, and cognitive activities of biological organisms: a theme that could be developed to great effect by the forthcoming new discipline that will mix ideas originating from science and design. Merleau-Ponty's dialectic philosophy of nature is replete with other lessons for how empirical facts can be resettled within the enlarged conception of the human being and how these facts can acquire previously unsuspected significance for design.

These illustrations from Dewey and Merleau-Ponty come from the first half of the twentieth century, engaging empirical facts that may have grown out of date but suggesting an innovative manner of investigation for which the tools have been developed only recently. I imagine these texts may overwhelm the modern reader with their intellectual range and poetic intensity uncommon in modern writing. I would not offer either text as an introductory undergraduate reading. But those of us concerned with developing a mold-breaking architectural curriculum—perhaps for the integrated design studio that you've just described—may find inspiration in Dewey and Merleau-Ponty's pioneering visions of the enlarged and recentered conception of the human being.

NOTES

1. Jan Patočka. The Natural World as a Philosophical Problem. Northwestern University Press, 2016, p. 3.
2. I am referring to the organic inseparability of the perceiving organism and its environment in the sense that the perceived environment is determined by the constitution and behavior of the organism rather than by the physicalist description of the organism and its environment.
3. Here I am using the terms "Körper" and "Leib" in a narrow sense, signifying body-as-object and body-as-subject. The reader may find a helpful review of this distinction in Slatman, Jenny, "The Körper-Leib Distinction." In 50 Concepts for a Critical Phenomenology, pp. 203-209. Northwestern University Press, 2019. I engage critical phenomenology because it helps to throw light on some of our inveterate beliefs and assumptions, not because I believe that phenomenology can furnish a comprehensive framework for our project.
4. Here the term "neurosciences" refers to an expansive spectrum of disciplines whose interests range from intra-neuronal molecular operations, to computational powers of microscopic neural circuits and macroscopic distributed networks and systems, to molar sensory and motor behavior, to cognitive processes and affective states of animals and humans across lifespan. This broad conception is illustrated in Albright, Thomas D. "Neuroscience for Architecture." Mind in Architecture, eds S. Robinson and J. Pallasmaa (Cambridge, MA: MIT Press) (2015): 197-217.
5. I discuss this spectrum in Sergei Gepshtein, Species of Space. Architectural Design, 90 (6), 2020, 36-41.
6. Alvar Aalto, "The Architect's Dream of Paradise," in Göran Schildt (ed.), *Alvar Aalto in His Own Words*, Helsinki: Otava Publishing, 1997, p. 217.
7. I like to think about this work of Merleau-Ponty as pre-phenomenological because, rather than assuming a phenomenological stance, he investigates the relationship between phenomenology (a philosophical discipline) and Gestalt psychology (a scientific discipline). Anyone willing to explore this distinction will benefit from reading Paolo Bozzi's elegant essay "Experimental phenomenology: A historical profile" of 1999, reprinted recently as Chapter 17 in Bianchi, Ivana, and Richard Davies, eds. Paolo Bozzi's Experimental Phenomenology. Routledge, 2018. For a review of the scientific side of this distinction, see (1) "A century of Gestalt psychology in visual perception: I. Perceptual grouping and figure-ground organization." Psychological Bulletin 138, no. 6 (2012): 1172–1217, (2) "A century of Gestalt psychology in visual perception: II. Conceptual and theoretical foundations." Psychological Bulletin 138, no. 6 (2012): 1218-1252.

ACE - DIALOGUES

THE INTERFACE OF TWO CULTURES

Harry F. Mallgrave and Sergei Gepshtein / Discussant Juhani Pallasmaa

JUHANI PALLASMAA' S COMMENTS

General

It was invigorating for me to read the dialogue of two widely read humanists, an architectural historian/theorist and a neuroscientist scholar. They both ground their arguments and judgements in a wide scholarship and experience on the complex issues of the theme of our conversation. I fully agree with the general views on the crucial significance of the need to widen and fuse knowledge against the overwhelming tendencies of specialization and separation. I also find the existential and poetic understanding of the art of architecture seminally important.

1 Two Cultures

I have myself written and lectured on the two cultures of Jan Patočka and C.B. Snow. Also Gaston Bachelard, the philosopher of science and poetic image, wrote on the two realms and argued unexpectedly firmly, that the two worlds are fundamentally different in their constitutions and intentionalities. He associated the realm of science with conceptual thinking and that of art with poetic imagery, and argued that the two cannot be fused. Yet, the two cultures still continue to be a relevant frame for conversation, although the dominance of technology, as well as the political and commercial exploitation of the image in today's aestheticized consumer culture (see Gernot Böhme's recent book *Critique of Aesthetic Capitalism* (2017) complicate the fruitful interplay of the two realms. Although this dialogue also introduces a third world, the lived world, *Umwelt or Lebenswelt*, I want to stress, that in order to speak relevantly about the realm of architecture, the third world, the lifeworld, definitely needs to be included, as in architecture the three worlds need to be fused. For the sake of a complete picture, even a fourth world has to be named, the world of spirituality, cosmogony and myth, which includes also the realm of religion. The fourth world has historically had a significant impact in cultures, and it still is a guiding aspect of being a human in numerous cultures. All these four worlds are part of the constitutive reality of architecture.

Harry uses the notion of "real people", a notion which I associate with Alvar Aalto's "little man". The individual realities in their unique life worlds can only be grasped through the empathic capacity of the designer. The architect needs to identify with "real people" and "the little man" in his design process; people are not merely projections of socio-economic and behavioural statistics. I am not supporting any populist orientation, but the practice of architecture is increasingly seen as an outsider specialist's professionalist expertise. Real architecture, as all art, intends to create a new world, or at least a pocket of new existential

sensitivity and understanding. Design is not primarily problem-solving, it is fundamentally a task of judging and setting cultural and ethical goals, placing the human being in the world.

2 Biology and Culture

I agree with both speakers that our deep biological and evolutionary historicity and the complexities of human sensory, metabolic, perceptual and emotive interactions are hardly at all understood among designers today. Edward O. Wilson, the spokesman of biophilia, formulates this view followingly: ”Our greatest problems arise from the fact that we do not know who we are, and we cannot agree on what we want to become.” The world is taken as given, but in a fundamental way we make our worlds through either our ignorance or knowledge. We absolutely need to re-define the idea of culture, as Harry suggests. Human culture needs to be understood as a historical, biological and evolutionary continuum. Architecture also needs to be seen against our evolutionary trajectory. Even the fact, referred to by Sigfried Giedion in *The City in History*, that the earliest built structures of humans were funerary structures, constructed much earlier than humans made any shelters to protect themselves, reveals the mental and spiritual origin and essence of architecture.

Today’s decline in architecture arises from seeing the architect´s task as an aestheticized techno-economic service, parallel to the practice of law. I cannot either agree with the common view of regarding architecture as ”solutions” – solutions to what, I ask? True architectural works are always propositions and confessions, which must be grounded in a wide and internalized base of knowledge and personal experience, but they do not ”solve” anything. They project a distinct manner of being, a sensitized and responsible way of being in this world and relating to other humans and cultures.

3 A Truly Human Architecture

Harry points out the possible fear of science as the driver of the design process. I cannot see how further knowledge could be a problem, but the splitting of the field into independent specializations, combined with the controlling and predetermining legislation, technologies, norms and standards is a real threat as it turns design into a search for a ”solution”, instead of structuring and articulating our experiences of being in the world. The real danger is the breaking of the fundamental scientific base of design into independantly manipulative specializations, and the consequent loss of the human dimension.

Alvar Aalto argued that it is the moral task of architecture ”to defend the individual against technological violence”. The reason why I have difficulties in accepting design as an applied science, is the fact that authentic design always traces and creates new dimensions of being a human; true art does not simply process the given realities; it also explores new territories of human understanding and mediation. Creativity is always an exploration and excavation into the unknown. It maps the mental realm as well as the mediating potential of architecture. An architecture that only echoes scientific views, does not genuinely widen and deepen the scope of human experience, which is existential in its very essence. I fully agree with Sergei’s point that education should not convert the student of architecture into an amateur scientist. Education should mold the self-identity and consciousness of the student to grasp the multitude of issues in design, including the ethical reality. At the age of nearly 85, and having had a busy practice for over fifty years and written nearly seventy books, I myself willingly

and proudly confess being an uncertain amateur in everything I do. My confidence is placed in the innocence and passionate curiosity of the amateur.

4 The Challenge

I fully agree with Harry that the current orientation in architectural education to emphasize concepts is a mistake; concept is a significant tool in science, but not in the arts. Yet, conceptual art is an interesting in-between phenomenon between cognition and emotion. When my friend Steven Holl speaks about concepts in his design, in my view, he is rather speaking of metaphors, and what would poetry, literature and architecture, for that matter, be without them; already Aristotle praised the use of metaphor as the true mastership in the arts.

I have been interested in the senses, and especially the fusion of the sensory experiences in our sense of being. I now think that artistic and architectural experiences are fundamentally existential experiences and qualities, fusions of the work, the world and the sense of self. Instead of observing the world from outside, we confront ”the flesh of the world” (Merleau-Ponty’s notion) with our entire sense of being; we are part and parcel of that flesh.

I share Sergei’s concern in his question: how do we re-humanize the art of design? Allthough I cannot fully agree with José Ortega y Gasset’s argumentation in *The Dehumanization of Art,* I feel that architecture is clearly being dehumanized in its continuous technologization, conceptualization, and intellectualization. The irreplaceable humane quality of art and architecture is the liberation and emancipation of experience, feeling, emotion and imagination. Architecture needs to strengthen our connections with the world – history, culture, nature and the spiritual realm. As Harry beautifully formulates, ”Only a well-rounded knowledge of our lived world” will make the designer a true professional”.

14 August 2021, Helsinki