CECI TUERA CELA: ARCHITECTURAL PRACTICE IN THE AGE OF UBIQUITOUS SOFTWARE

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> All fixed, fast frozen relations, with their train of ancient and vener-able prejudices and opinions, are swept away, all new-formed ones become antiquated before they can ossify. All that is solid melts into air, all that is holy is profaned …- Marx & Engels, *Communist Manifesto* (1848)

In his 2009 *A Brief History of the Future*, Jacques Attali characterizes the history of progress as one of the conversion of service industries into consumer goods. This process can be traced back millennia, and Attali does so, showing that at each transformative stage of civilization dominance has been established by the invention of new technical devices. In recent years we have seen this notion taken one step further, as consumer goods such as CDs and books – themselves products of a previous such transformation, physical congellations of the service industries, of musical performance and storytelling – have vanished before our eyes, converted this time into pure information – and into immense profit for those who manufacture the storage devices. What we are witnessing is a double change of state: relational (the musician playing for an audience) to solidified (the tape, record or CD) to indexical (the MP3); however, unlike the state changes of ordinary matter, these changes are not reversible. And today, in the early days of cloud computing, even the storage device is melting into air.

Our industry, our discipline, is of course not immune from such developments. A previous generation of architects saw the same process happen in the building trades, as craft-based guilds gave way to an industry based on mass-produced and increasingly standardized components. Of course, and famously, the profession of the architect adapted in order to accommodate this new reality – indeed, in a very real way, once could claim that the architectural profession – that is, a self-regulated, organized body established and protected through legislation – came into being precisely as a result of these developments and of the inherent need for standardization they produced. On the ground, the day-to-day activities of the architect were also transformed in the process; we can see this in the gap between Sullivan and Wright, for example. In the extreme, the role of the architect moved from delineating custom details to be reproduced by skilled craftsmen, to curating and coordinating manufactured components chosen from a catalogue. By the 1980s, when I entered architectural practice, the heart of any office was its catalogue library, epitomized by Sweets Catalogue of catalogues. Perhaps this transformation is most clearly epitomized by the publication in 1932 of Ramsey and Sleeper's *Architectural Graphic*

Standards, which is only now, after ten editions, joining Sweets in the vapour, while the catalogue library is now the internet.

These two institutions – the profession on the one hand, and the practices on the other – provide two strands of what I have come to call the institutional DNA of architecture. There is of course a third strand, that which brings us all here to Barcelona – the schools. The same processes that wrought wholesale transformations in the first two strands also gave rise to a complete overhaul in the education of an architect. In its radical mode, this transformation gave rise to the Bauhaus, Taliesin, and so on; in its wider and arguably more instrumental mode it meant, in crude terms, a transformation from schools of art to professional schools. These three institutional strands have formed the stable core of our profession for approximately the past eighty to a hundred years. Like all institutions, they are inherently conservative – with notable exceptions – and slow to change once formed into their crystallized structure. As we negotiate a new period of rapid changes of state, how will this institutional DNA evolve?

PROFESSIONAL TRANSITIONS

The architectural profession – or at least that part of the profession devoted to the service of clients – is inherently vulnerable to such an historical development as laid out by Attali. We are surely on the brink of massive incursions into the life of the professional architect of technological solutions – indeed, we see them already, as performance-modeling tools take over the traditional role of human calculation. There are more to come: the analysis software that verifies (and certifies, for official purposes) compliance with local building codes; detailing software that produces technically competent, affordable and sustainable solutions for any tectonic situation (along with a discount on your liability insurance). Can design itself – or Design – be far behind? Patrik Schumacher (2011) has suggested that parametric design shifts the role of the designer to that of curator, coordinating inputs and subsequently choosing among potentially many automatically generated outcomes; for Schumacher this innovation, parametricism, provides an unbeatable competitive advantage and a new dominant style for architecture. Meanwhile Cynthia Ottchen (2009) points to a future in which soft data sets – a numerical encoding of hitherto subjective information such as tastes and desires, safe until now from the grasp of quantitative analysis, render even the curatorial

services of the architect/designer unnecessary. One could argue, indeed, that none of the core components of what make up the traditional – traditional, that is, in the past fifty years – role of the architect are immune from algorithmic emulation, or, as a result, from transformation away from the person of the architect.

Technological evolution is not new to architecture, of course – in fact, it has long been one of the drivers of architectural development, and any static view of the profession is, as I see it, illusory. However, we seem to me to be at a bit of a cusp, at a moment when evolutionary change turns revolutionary. The architectural office today has less in common, in terms of its methods, tools and even perhaps its architecture than the office of fifteen years ago than that office did of its predecessor from fifty or more years before. As educators, we have arrived at one of those unique historic moments in which we cannot rely on the traditions of the profession, the lessons we were taught by our teachers, the accumulated disciplinary knowledge, to educate the next generation; instead, we have to find ways, to paraphrase Mark Wigley (Chadwick, 2004), of allowing our students to invent their own (and our) future. Vilem Flusser went even further as far back as 1993, proclaiming the birth of a new species, as *homo faber*, defined for millennia by the ability to grasp tools, is overcome and subjugated, if not driven to extinction, by *homo ludens*, man the player, defined no longer by the thumb but by the tips of the fingers, by the ability to type (although recently, it seems, the thumb is coming back; Flusser and Mathews, 1999). This new species lives comfortably in the indexical and the virtual (perhaps *homo digitalis* would be a more apt name), privileging the discrete world of quantity and number over quality and extension. What new world will this new human, this new *ubermensch*, create? What new architecture? It is perhaps more than coincidence that those children born in 1993 are now students entering our universities.

Not surprisingly, in this rapidly evolving technological context for the profession, prognostications about the future of the profession have been commonplace over the past decade or so – indeed, this conference is itself part of that trend, as we all try to figure out what to do now for where we need to be tomorrow. To mention just a few examples, Michael Speaks (2002) suggests that the profession will become much more embedded in the workings of global capital, while Kieran Timberlake (Kieran and Timberlake, 2006) argue that the profession will need to emphasize research and innovation over design services. Patrick Schumacher, as I mentioned earlier, contends that new parametric design methods will create a new design hegemony, a new International Style, while Gregg Pasquarelli (SHoP, 2010) speculates that BIM technologies will radically and irrevocably alter the role of the architect in the construction process – as does Jeremy Till, arguing from a very different position, that of the needs of the millions of inhabitants of informal cities. Meanwhile, a 2010 report on the future of the profession commissioned by the Royal Institute of British Architects (2010) indicates that the structure of the profession will be very different in 2025, dominated by very large and very small firms, many transformed into broad consulting practices working well beyond the traditional disciplinary scope of the architect.

Attali's view of the state-change process of transformation progress suggests another way of considering the possibilities for the future of the profession, once all the core competencies of the traditional architect have become algorithmicized. Ottchen (p.25) insists that even at that point the architect is still critical to the process; as "multidisciplinary strategist [the] new architect is still ultimately responsible for design intent." While compelling, this view – in which the architect becomes something like a curator or choreographer, rather than a designer *per se* - is not the only conceivable or even likely operational future for the profession. Equally plausible are three other scenarios: the architect as expanded public intellectual, engaged in and embedded in the likely increasingly strident debates around the form of our urban and natural environments in coming decades; the architect as specialist, increasingly in demand to manage and choreograph aspects of large projects; and the architect as pure innovator, as primary researcher, engaged in pushing the profession beyond the limits set by algorithmic design. In what follows, I would like to examine each of these scenarios from the point of view of architecture's institutional DNA – the profession, the practice(s), and the discipline – in order to open for discussion the ways in which we today, as educators, might anticipate the future needs of our students.

In these scenarios, the current role of the architect as producer of building designs is taken over by software. The full implementation of parametric design systems has turned design into a process of determining parametric inputs, on the one hand, and choosing between resultant solutions on the other. We can further imagine that each of these solutions have already been demonstrated to be *compliant*, on the one hand, with minimum standards of public safety, and *producible* – that is, capable of being designed on a detail level and constructed, again through automatic and certifiable processes. The vast majority of architectural services – certainly everything between conceptual design and contract administration – has been obliterated, turned into a consumer good. What is more, the small pieces of the work remaining (leaving aside contract administration, for the moment) will more and more come to be communal activities outside of the direct control of the architect. After all, once the client has (potentially) access to compliant and producible designs, what need is there for an architect?

Regardless of all other issues, this line of thinking raises immediate red flags around the legal aspects of architectural practice – and especially around the assessment of liability. Firms, insurers and courts will have to come to grips with thorny questions around the assignation of both liability and risk in an intensely collaborative, networked and algorithm-driven process. Regulatory bodies may have to reconsider the very meaning of the word "architect." Certainly, the image of the individual architect – or, for that matter, the firm made up of more or less equivalent architects – in (legal and practical) control over all aspects of the process and product is one that an image that can only be seen as hopelessly nostalgic. Instead, we might come to think as the architect as a complex, networked body, a multiple in Badiou's terms, made up of an increasingly large number of human and non-human entities.

THE ARCHITECT AS MULTIDISCIPLINARY STRATEGIST

One answer is that architects will continue to be in control of the process, organizing and choreographing the production of inputs and outputs. We will become experts at negotiating and mobilizing these increasingly complex networks of human and non-human collaborators. We will increasingly develop skills around financial and time management. Our design skills will move into the background, as we defer to our clients, on the one hand, and our software partners on the other.

This may not be a bad scenario – indeed, given arguments around environmental degradation, increasing poverty, and the rise of informal settlements, this may be a highly positive scenario for the future not just of the profession but of mankind. However, much as we would like to see our profession as steeped in issues of ethical process, we have not in reality been good at process control. In recent decades the profession has generally lost control of the process to the project management industry, which has managed to portray itself both as more professional and more intelligent in these areas; to the general public, architects are often considered exactly out of control, prone to authoritarian decision-making, cost overruns, and expensive mistakes.

The next-generation architect, in control of and embedded in complex process, will approach the role from the position of strategic multidisciplinarity. This position is perhaps most in line with the traditional role of architect as Prime Consultant, but will involve extended responsibilities in areas of process management and collaborative action. Regulatory bodies will continue to be able to view the architect (or firm) as a single entity for the purposes of licensure and liability. Firms will likely increase in size and complexity, as the needs of an increasingly specialized and complex technical process are serviced, but for the most part will maintain the separation between producers and decision-makers typical of mid-size and large firms today. Schools will continue to feel the pressure for an ever-increasing scope of disciplinary subject matter; while the traditional broad-based architectural education may simply be amplified in areas related to process management and collaboration – a trend already seen in many schools – we may come to see multiple streams of study within professional programs, aimed at developing specialist architects for divergent roles within the firms.

THE ARCHITECT AS PUBLIC INTELLECTUAL

Closely related to the view of the architect as multidisciplinary strategist is that of the architect as Public Intellectual. In this mode, the future architect acts in a transdisciplinary fashion, mobilizing core architectural competencies of organization, structuration, projection and envisioning in order to make impacts in diverse fields of endeavor not traditionally within the realm of architecture. This trend has been developing for a number of years; for example, we see architects, especially within the academy, working in areas of infrastructure design, urbanism, and regional and megaregional

planning – but doing so as architects, that is, using architectural skills and tools, rather than as engineers, planners, ecologists or geographers. Simultaneously, we see the emergence of design and especially design intelligence as a force in the business community, opening up new potential for engagement on the part of architects.

Such a position suggests a re-alignment, or even a redefinition of the profession towards its core operational practices, and away from its traditional products: we define the architect not as the designer of buildings, but in operational terms. While one could, of course, claim that when operating in these diverse fields the architect is not acting as an Architect, operating outside of the bounds of professional registration, licensure and liability, the boundaries will become increasingly difficult to define and the grey areas increasingly more vast. Once removed from the role of designer-of-buildings, how is the profession to be defined – in a legal and regulatory sense? This question points right at the heart of the architectural identity.

Schools will continue the recent trend of focusing less on the development of building tectonics and more on the construction and mobilization of core architectural operations for diverse means and multiple but increasingly large scales. The construction of the architectural idea through operations of structure, organization and visualization, understood to be a process transportable to diverse scales, will be promoted over the tactical results seen in the form of building designs. Meanwhile, architectural firms will undergo a significant transformation as new revenue streams, clients and projects are discovered and naturalized within the firm structure. Ironically, at least in the short to medium term a relatively traditional firm structure may be maintained, as the movement into ever more diverse areas of operation away from the production of the object-building may temporarily keep the forces of algorithmicization at bay – but this is likely a losing battle in the long term.

THE ARCHITECT AS SPECIALIST

A contrary approach to that of transciplinarity is for the architect to simply ignore the traditional role of the architect as generalist, choosing instead to specialize to a deeper level in particular aspects of the architectural design or construction process. In principle, of course, this is nothing new – architectural firms have long had specialized staff members dealing with detailing, client liaisons, contract administration, and so on, and firms themselves have probably always found niche areas of specialization in order to succeed in the market. However, with the rapidly increasing technical demands of contemporary buildings – ubiquitous computing, sustainable design, responsive systems, and so on – the demands for a high level of specialized expertise on the part of architects could well become irresistible.

This move towards specialization is likely to effect significant restructuring of architectural education, not least in its relationship with the accreditation and registration boards. The standard model of architectural education, at least in North America, Australia

and some other jurisdictions, is predicated on a one-size-fits – all model: all areas of knowledge important to contemporary building construction must be developed to an acceptable level of competency in all students. As the technical and other demands of construction have increased in the past generation or so, this standard model has increased in length from five years, to six (in North America). How can such a model be further expanded to deal with increasing needs of specialization?

One answer, of course, would be the continued expansion of the professional curriculum – but six years as a basic professional training already seems very long, especially when compared to the four-year programs in other professional fields such as engineering (and given that architects do not, typically, obtain the financial benefits after graduation that doctors or lawyers do). Of course, it may be possible that the rise of ubiquitous software could reduce the amount of attention paid to technical aspects in the core curriculum – but this would not come without significant angst. The difficulty of the situation is made abundantly clear by the number of variations and divergent models of architectural education that have arisen in part in order to address this problem, including post-professional M.Arch. programs in North America and the Master of Advanced Architecture programs in Europe (such as that at IaaC here in Barcelona).

The likely, although politically difficult answer, given the certain push-back from University administrators already reeling over the cost of delivering a studio-based education, will almost certainly be one form or another of a reduction in the core of required knowledge included in the professional program. This will be a difficult process, and will include a fair amount of hand-wringing. It will induce a difficult and likely fractious discussion around the question of what, exactly, constitutes the core competencies of an architect.

THE ARCHITECT AS INNOVATOR

Finally, we can imagine practitioners – such a strange word in this new world – who move away from the realm of client-driven design altogether, to focus on innovation within architecture. As all of us at this meeting are no doubt aware, research within architecture proper – by which I mean projective research into innovative techniques, processes, materials, form and so on, as opposed, for example, to research into architectural history or criticism – is still an underdeveloped but rapidly growing field, both inside and out of the academy. In a world dominated by ubiquitous software and design by algorithm, there will be an extended need for a separate and parallel process of innovation.

The new innovation focused firms will be confronted by many of the issues we have already discussed. First and foremost, what will be the revenue streams for such firms? There will certainly be the possibility for commercialization of research – but much important research, of course, does not lend itself to monetization. While such research may well happen within the schools, under the guidance of faculty-architects, the difficulties inherent in these relationships (around intellectual property, liability, conflict of interest, and more mundane issues such as the ability to hire staff) are well known. The schools themselves will inevitably start to refocus, especially as faculty are driven to carry out more research and innovation; we are already seeing, on the one hand, the emergence within the professional programs of research-based components, and of a sudden emergence of post-professional programs in areas of research and innovation on the other.

CONCLUSION

The future of the architect is uncertain, more now than ever. These four scenarios present difficult, perhaps extreme, and often contra-dictory demands on the institutions of architecture.

It is important to note, however, that these are not discrete 'either or' scenarios. The future architect will be all of this and more, a messy, complex and internally self-contradictory hybrid. These scenarios are evolving now and this future will emerge rapidly - this beast is charging at us. When it arrives, this new organism may look nothing like what I have described here; like the new always, it will take us by surprise and unawares, knocking on the door in the middle of the night. Will we be ready?

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