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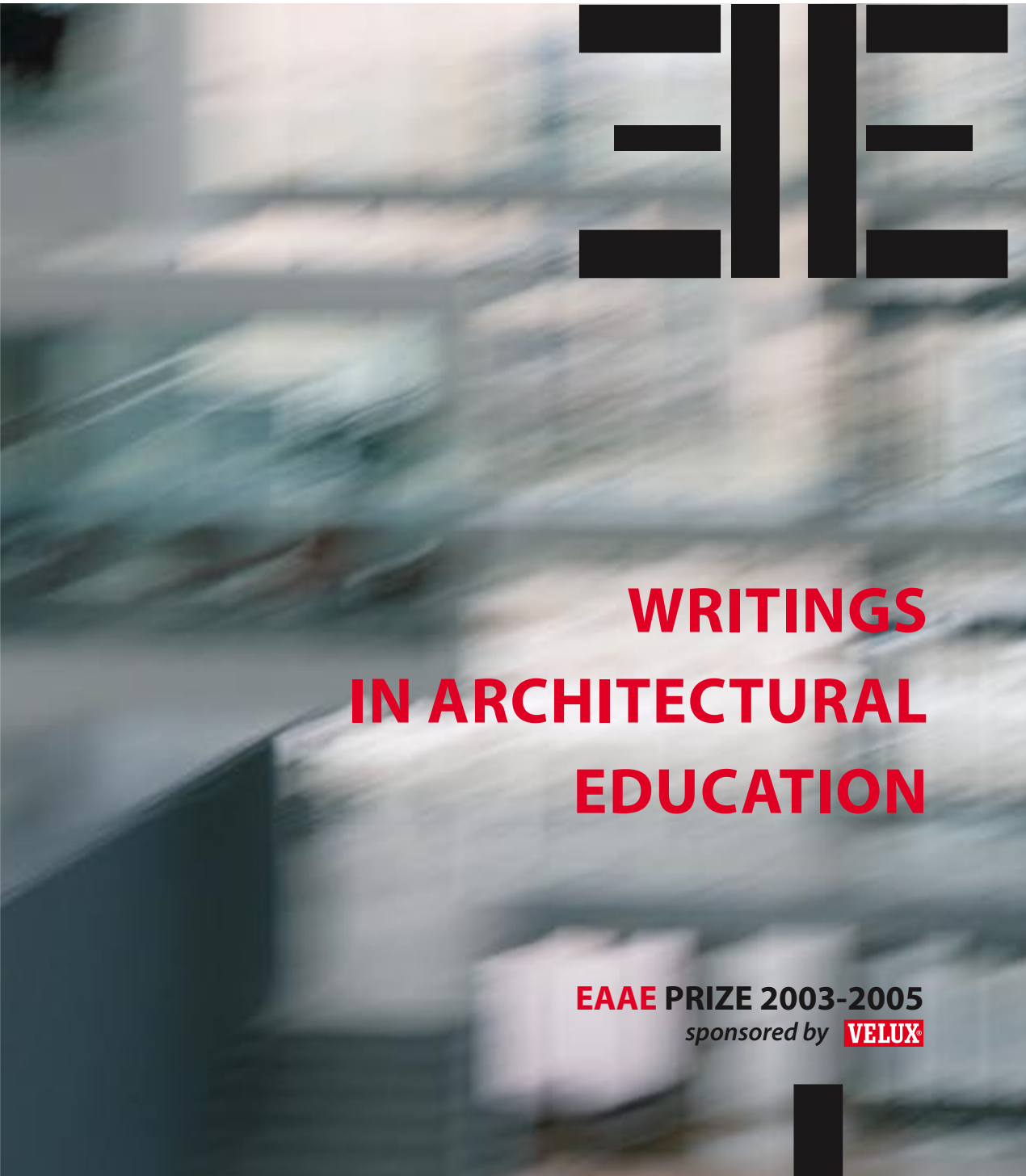

WRITINGS IN ARCHITECTURAL EDUCATION

EAAE PRIZE 2003-2005
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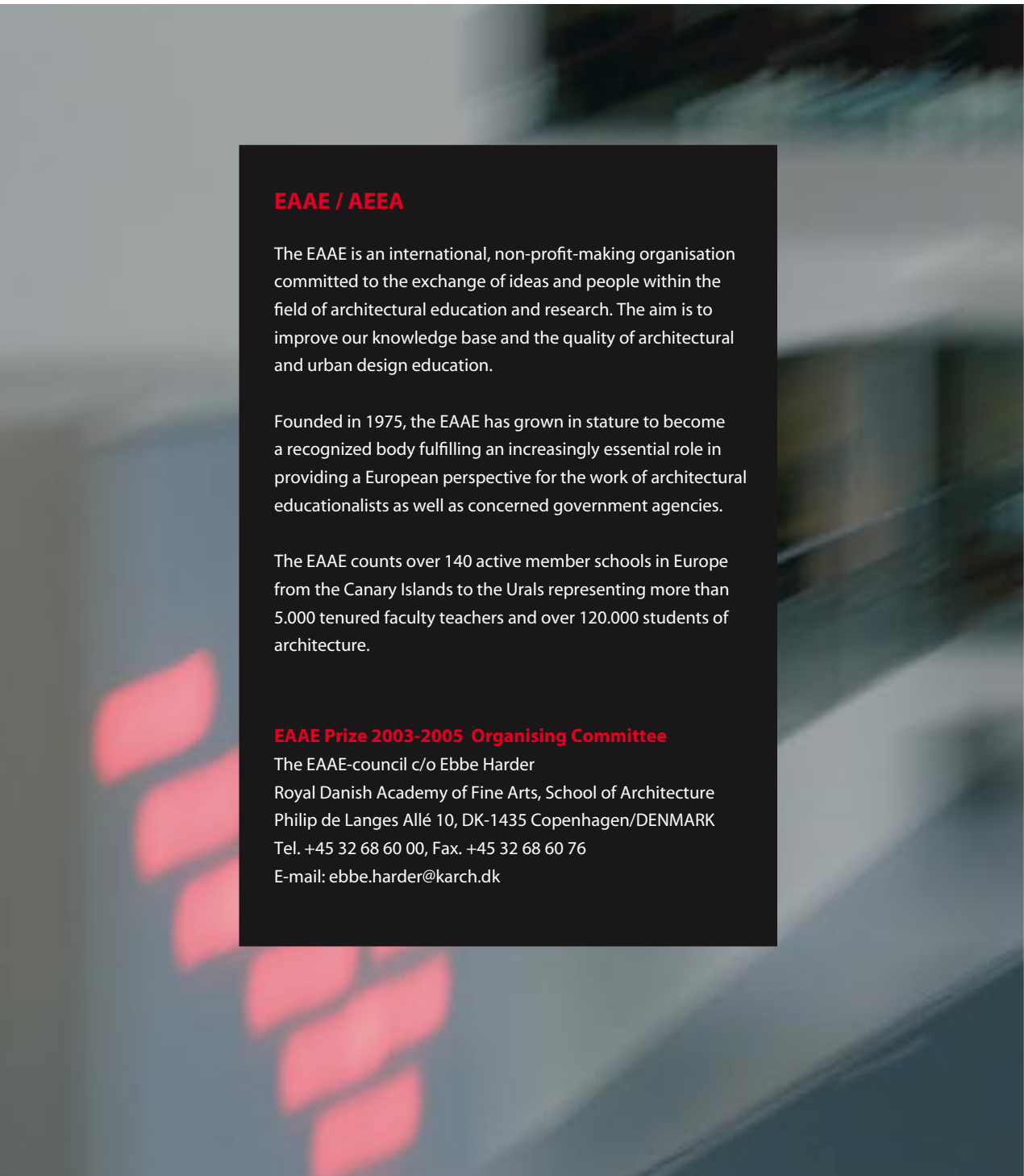

EAAE / AEEA

The EAAE is an international, non-profit-making organisation committed to the exchange of ideas and people within the field of architectural education and research. The aim is to improve our knowledge base and the quality of architectural and urban design education.

Founded in 1975, the EAAE has grown in stature to become a recognized body fulfilling an increasingly essential role in providing a European perspective for the work of architectural educationalists as well as concerned government agencies.

The EAAE counts over 140 active member schools in Europe from the Canary Islands to the Urals representing more than 5.000 tenured faculty teachers and over 120.000 students of architecture.

EAAE Prize 2003-2005 Organising Committee

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EAAE PRIZE 2003-2005

EAAE Prize 2003-2005
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WRITINGS IN ARCHITECTURAL EDUCATION

How will the demands of the information society and "new knowledge" affect on the demand of relevant or necessary "know-how" in architectural education?

EAAE PRIZE 2003-2005

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Behind: David S. Willey, Frank Weiner, Deniz Incedayi, Kim Sorvig
Front: Jeremy Till, Irina Solovyova, Upali Nanda, Thomas Wiesner, Andrew Levitt,Thomas McQuillan
Abscent: Rachel McCann

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FOREWORD

The EAAE Prize 2003-2005 invited teachers from all schools of architecture in Europe and the ARCC member institutions in the USA and Canada to participate in the prize "Writings in Architectural Education." The challenging EAAE question for 2003-2005 was: How will the demands of the information society and "new knowledge" affect the demand for relevant or necessary "know how" in architectural education?

Architects of tomorrow have to navigate in the white-water of new knowledge and master the possibilities provided by the information society. The conflict with the established practise of passing on traditional skills. Future architects however cannot rely on tradition only. These are the challenges architectural educators have to equip students for. "Architectural education is undergoing substantial changes and has moved from the training of architects to an education in architecture. Architecture is directly influenced by today's information society. The educational requirements are no longer confined to the teaching of design, but include new building technologies, digital projecting, networking and selecting relevant knowledge – to name a few challenges." Says James F. Horan, EAAE president and Head of Dublin School of Architecture, Ireland.

This publication is the result of the EAAE Prize 2003-2005 sponsored by VELUX. 75 papers were submitted from 20 countries, which have all been evaluated by the jury: Per Olaf Fjeld (chairman), Peter MacKeith, Juhani Pallasmaa, Dagmar Richter and Alberto Peréz-Goméz.

The 11 authors of the 10 papers represented in this publication were invited to participate in a workshop in November 2004, which took place in Copenhagen at The Royal Danish Academy of Fine Arts, School of Architecture. The workshop opened for a discussion between the members of the jury and the other participants with the goal for the authors to improve upon their papers. After the very successful workshop the jury re-evaluated the 10 papers and on this basis found the four winners. EAAE hopes with this somewhat extensive procedure to have produced a note-worthy publication which can be a source of reference in the educational environment.

EAAE Prize 2003-2005 was sponsored by VELUX A/S. EAAE hereby wish to thank VELUX for sponsoring the prize and for the excellent co-operation during the course of the prize.

Ebbe Harder
The Organizing Committee, The EAAE-Council

INTRODUCTION PER OLAF FJELD NORWAY / EAAE

WRITING IN ARCHITECTURAL EDUCATION

A Revitalization of Architectural Consciousness

PER OLAF FJELD

Oslo School of Architecture, Norway

Member of EAAE Board, Jury Chairman

Good morning,

Although not everyone is present today, I would first like to thank all the participants from 23 countries who have contributed to this competition. These scholars have helped to clarify a wide range of topics and hurdles facing architectural education. Thank you for your devotion and the time and effort each of you put into your papers. I would like to congratulate the ten winners who are all here today. We are looking forward to hearing each of your presentations.

In reading all the 75 papers, I have realized how important this competition, Writings in Architectural Education, is for our teaching community. It clearly sets a base for a much-needed discussion about the content and direction of architectural education. It is easy to forget that what is taught and how it is taught will have a direct impact on our built environment. This competition has generated a body of material that would otherwise be difficult to produce. Equally important, it is a singular forum for presentation, since this type of subject matter often ends up as a stray article lost between the pages of a vivid visual presentation. I hope for this reason, for architectural education, that the Velux Prize, Writings in Architectural Education, will continue for many years.

The title of the competition was: "How will the demands of the information society and 'new knowledge' affect the demands for relevant or necessary 'know-how' in architectural education?"

It was hoped that this very open title would give room to a variety of investigations and personal reflections, and not lock the competition in a single direction. At the same time we realized that this openness could present difficulties for the jury. Surprisingly this was not the case. Out of the 10 final selected papers, 7 were given the jury's unanimous vote.

I would like to make a few observations on the overall content of the competition papers:

Architectural education in both Europe and North America has no common goal or direction apart from a very simplistic or basic understanding of what architectural education should entail. Each school strives for an identity or direction that suits for the most part the immediate needs of the region, of the school, its students and their future employers. Each school sets its own course in the hope that its pedagogical direction and content will fulfill these immediate demands and at the same time miraculously anticipate future needs.

As a whole, the competition material revealed that we know very little about each other, the way we teach, and the content from which we teach and where priorities lie within a given content. It is here EAAE has a future mission and responsibility to collect and make visible the pedagogical methods and content of the various member institutions, not only as a catalogue for students to pick and choose a school, but as a platform for discussion. We

know far too little about total spectrum of teaching institutions, and because of the lack of precise, ready information about other schools, we present pedagogical methods and theories as new or inventive over and over again. In a sense we spend so much time focusing on the "new and inventive" that we do not have the capacity to study and compare similar methods and theories from other regions or other schools. This is clearly an area in which EAAE can do more.

There is no simple answer, no given approach to architectural pedagogy, but rather a continuous search and readjustment. This is directly reflected in the diversity of architecture itself. Teaching requires creative thinking, intuitive sensitivity and most of all concentration. Let us focus for a moment on the word "knowledge" as it was presented in various texts. Several papers treated "new knowledge" as an isolated or separate entity. "Old" or "existing" knowledge is the basis on which "new" knowledge is developed and understood. Is existing or traditional knowledge less relevant because of age? If this base "old knowledge" ceases to be relevant other than as a short-term factor, methods and principles of the past will reappear as new. We are so preoccupied and fascinated by newness, we tend to pass over or even forget the principles and situations from which new knowledge originated. The shifting demands of our result-oriented information society clearly tend to produce a short-term memory, but how truly creative and fruitful this will be is still unknown. A number of papers deal with the equilibrium of past and present knowledge, skills, and short- and long-term memory. There is clearly a deep concern over the changes taking place within architectural education in respect to the comprehension and application of past and present knowledge.

Pressure from the information society to be simultaneously precise and progressive also affects the role of architecture and creates an uncertain relationship to culture and cultural definitions of content. Again it is not enough just to look ahead; we must also have a clear cognizance of what we leave behind.

Computer technology as a tool for distributing new knowledge is remarkable. It is unquestionably a core instrument in today's information society. We are more and more dependent upon it to produce ready information that can both help and influence architectural realization, but very few believe that these instruments or tools have the capacity to go beyond this, in other words that they are not able to identify new content, or give the current architectural situation direction. The technology has no conscious capability beyond direct and specific problem-solving.

The limitations of the new technology in relation to both architectural education and practice will be a major challenge if architecture is to be more than direct problem-solving. The question is then, what is the role of an architect, and what is the role of architectural education? What is the task architecture is expected to solve? Is our mission also one of promoting an architectural search for and comprehension of content? If so, then the skill and knowledge in use within the restrictions and limitations of the information society are not enough to

give rise to an architectural curriculum. However, very few papers questioned the importance of architecture and the built environment as a continuous stage for our daily life, but rather the papers concentrated upon the importance of being viewed and finding form through many different conceptual attitudes. Architectural connotation and its relation to human behavior in a broad sense have no limitations except the limitation of architecture itself. Nevertheless, in the hands of commercial interests, the information society can strategically use this openness to constrain and influence choice in relation to both knowledge and know-how. Commercial or political interests can influence architectural content in such a way that it validates motivations outside the realm of architecture, and content would remain primarily focused on commodity.

Architectural research and architectural theory are now a permanent part of the curriculum in most schools, with the aim of broadening students' understanding of the subject and further developing its content. An expanding perspective is evident, but have we been able to merge the changing attitudes brought on by research, theory and new technology into the physicality of architecture, beyond a primitive delight in virtual reality's images and quick access to bits and pieces of information? Yes and no. To some extent this expansion has given rise to a new debate about the technological aspects of architecture. It has also influenced the formal aspects of architecture, and theory has launched new conceptual discussions. But the expansion has not been able to give architectural education common strategies and frameworks for the future.

Another point that seems to concern many is the future validity of the studio in the computer age, and what if any changes are being made. Here is a curious point, the studio prior to computer drawing meant different things to different schools and in different regions. It is true that the drawing studio in most schools was the core of its architectural pedagogy, but the structure, discipline, hierarchy, the number of students and the expectations could be quite different. This means that the problems and solutions associated with incorporating computer drawing into the studio change slightly from school to school and nation to nation. Yes, sketches are rare, drawings are locked to machines, models occupy the desks, and the interaction between students and teachers and between students themselves is perhaps less impulsive. But as the original studio was different for each school before computers, so the internal structure of each studio is also different today. We need a better understanding of how studio teaching has evolved in the various schools and why. The challenge of inventing a studio model that can generate a new type of openness both in terms of the work process and the relationships between students and between students and teachers is important if the studio model is to survive.

Architectural education faces several difficult adjustments. In its use of technology, it is constantly updating itself and has incorporated numerous technological innovations in order to satisfy the information society's fast pace, but the optimism in relation to technology's potential to improve life through the built environment is perhaps fading in some areas.

The new technology is very much a part or support element of the entrepreneurial industry. As yet, education has not found a clear position within the split between architecture and the building industry. On one level, there is the architect's handling of computer technology and on another the machines' capacity to handle objects or intended objects as limitless. And yet architecture is about space: the use and comprehension of space on all levels. Unfortunately the computer's spatial capacity and vocabulary do not necessarily connect with all the levels of comprehension of space inherent to architecture. The machine presents a spatial assumption quickly and easily, but we come to the computer with our hard-earned, lifelong understanding of space, not just physical but also social and psychological. This presents architectural education with a very difficult and often confusing situation. The balance between the virtual and the physical and their interaction on many levels have put great demands on today's architectural curriculum. The time allotted to comprehend and manage the complexity of the machine and the time given to architecture has become an academic battleground.

Several papers focus on what they see as a gap between architectural education and the profession. It is very clear that the updating of computer technology and the knowledge required due to the development of new materials is important for the profession both in terms of production and in satisfying the immediate demands of modern society. But is everything in this rather complex building package of equal interest for architectural education? What are the long- and short-term skills and knowledge, and what is the balance that is best for the student? Some suggest that the schools should be run more like an architectural office, and that the studio should take on real clients and make real buildings. Or at least that, before the student leaves the school, he or she must have erected a small building or a room in the scale 1/1. An internship of at least one semester is suggested in several of the papers. We have heard these suggestions before and we will hear them again, but a general agreement is far away. Each country, each school makes its own decisions and takes its own stance on these matters. The debate between the profession and the educators continues. Many papers refer to the gap or lack of understanding between the two spheres. Educators in general will continue to face the dilemma of choosing between the best interests of the students´ long-term professional life versus education directly related to the demands of the immediate job market.

There is a certain agreement, however, that architecture is pursuing and in need of new content. Curiously, few papers applied the essay question to many of the most pressing challenges that architecture will eventually be forced to face, such as ecological concerns, providing shelter for the displaced or homeless, and not least the use of material and its corresponding energy in relation to the world's ever-growing population. We have major physical and internal problems, but these problems are seldom the recipient of this new knowledge, and they are even more rarely the source of new knowledge and invention. It is rather strange, or typical, that architectural schools in general focus so little on these major and critical problems.

The “information society” does not necessarily offer any help or direction in relation to architectural content, just as it does not offer or depend upon a particular culture or belief. One paper reminds us that we have a tendency to forget the difficulties of creation, and to take the creative act for granted in assuming that information and know-how alone can replace creativity. Equally, there is an intermixing of theory and cultural observations. This shift in the understanding of the creative process will also influence architectural education.

There was also the critique that many architecture schools teach the physical aspects of architecture from a distance, as an abstraction, and thus a deeper and more complete understanding of architectural space is often compromised, because the skills needed to understand physical space, material and volume are replaced by skills needed to understand virtual space, material and volume. This process is both interesting and exasperating. The shift between two realities supports a diffuse sense of unlimited choice and material.

We must also be aware of the rather complicated architectural language that has evolved in recent years. I will contend that in reading the 80 papers, the language and its structure was often far more complicated than the actual complexity of the content. At times this was irritating considering there were so many papers, but what is important to point out is that the focus should be on architecture and its content. Yes, it is important to expand architectural content to incorporate many academic areas, and it is important that our vocabulary grows in relation to this content. But it is also important to remember that architecture for all its virtual invention is still earthbound, and, for most, a profession. The architectural profession has undergone great changes due to technological inventions over the past 50 years. Never has the profession been so in need of the reflections and interpretations of architectural educators and researchers. For this reason it is essential that we express our thoughts with clarity and precision, and that our discourse retain some form of accessibility in relation to the profession in general. I am aware that there is a very subtle balance within this argument and this balance is extremely fragile and important both for the researcher’s creativity and for the practitioner. At a time when more and more students take architectural doctorates, architectural research is more popular than ever, and this research has no clear overall definition or limitation, we produce innumerable papers and spend enormous amounts of energy in this field we call “architecture”. But does this really bring architecture forward? Hopefully it does, and I think if any architectural forums can help, it is those that bring architects and institutions together to investigate and discuss architectural education. Therefore I am proud to be part of this competition, as your papers set the stage for an important and essential discussion. The enormous interest in architecture and design that we experience today in newspapers, magazines, TV and “easy-read picture books has helped take architectural education out of its ivory tower, but it has not eased the pressure on education to define its position in relation to content, method and ideology.

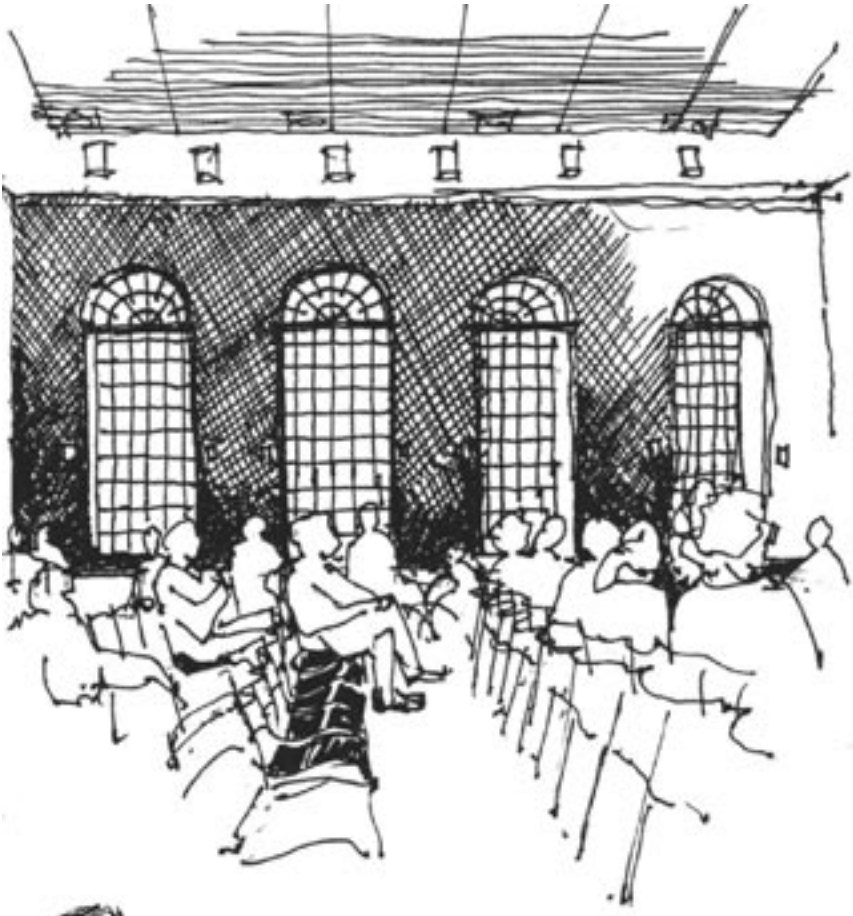
Architectural schools throughout Europe and North America are not a homogeneous mass, but rather a diverse multitude of institutions. Perhaps we struggle to accept this diversity

with grace, but what we have in common is also important. The appropriate relationship of architectural education to the digital world is still open to discussion. As the strengths and weaknesses of the digital world become more apparent, a new and more sober maturity may change the position of virtual reality in architectural education. "New knowledge" and "know-how" will be key concepts in this discussion.

The information society is based on a transient situation and frame of mind. Many will argue that it is time for a re-evaluation of architecture's symbolic and physical relationship to permanence, and the position and interpretation of the past and present. But is this re-evaluation on the coat tails of the information society's inherent need for change and new material? This is a challenge that will directly affect the core of architectural education. Architecture used with indifference or ignorance is a violent tool of destruction for the earth. It is a major consumer of nature. "New knowledge in architecture" coupled with indifference is perhaps one of the most difficult problems architectural education will face in the future.

The main purpose of this workshop is to meet the ten winners and allow them to present their papers to this audience. Hopefully the next few days will aid their final revisions. The verbal presentation will not be judged by the jury. The workshop and presentations are meant to generate a debate aimed at further improving the quality of the final papers and the book EAAE Prize: Writings in Architectural Education. At the same time this is a unique and much-needed platform for discussion among educators and researchers in architectural education.

I want to thank Velux for all their support for the competition itself and this workshop today. I also want to thank project leader Ebbe Harder for putting together and coordinating all the various facets of this competition and workshop.



Illustrations by James Horan,
EAAE Council member

1. PRIZE FRANK WEINER USA

This essay is able to investigate the competition topic very directly. In a sharp, reflective, and a positive critical approach, the paper offers an important discussion on the future of architectural education. Each of the five horizons stated by the author calls attention to areas in need of urgent critique since the discipline of architectural education will continue to transform in an age of distraction.

The horizon of criticism
The horizon of history
The horizon of theory
The horizon of philosophy and literature
The horizon of sensibility.

Each topic argues for an active resistance in architectural education relative to the external forces that influence architecture. It should become a primary responsibility of architectural education to share their visions with society rather than reacting to society. The strength of this paper is in its perception of the relationship between social and professional consciousness.

Per Olaf Fjeld, Jury Chairman

1. PRIZE

EUR 10.000

Five Critical Horizons for Architectural Educators in an Age of Distraction

FRANK WEINER

Virginia Polytechnic Institute and State University, USA

INTRODUCTION

This essay will establish five horizons related to the education of an architect and will attempt to form a legitimate and shared vision for architectural educators. The five horizons are: teaching, history/theory/criticism, philosophy, literature, and sensibility.[1] They are prompted by the European Association for Architectural Education Prize 2003-2005 question: *"How will the demands of the information society and 'new knowledge' affect the demand for relevant or necessary 'know-how' in architectural education?"*

The EAAE Prize question establishes a heightened sense of urgency as to how we see our present circumstances, and calls for thoughtful responses. One could read the EAAE Prize question as implying that the information society and architectural education may represent competing demands. This suggests the discipline of architectural education may be transformed by the pervasive global dispersion of information. At this juncture it is important to determine whether there is a base of shared common knowledge and common sense[2] in architectural education. Such a common foundation may be at odds with the emergent conditions of the contemporary 'information society'.

The EAAE Prize question and its implications have the capacity to instigate a vigorous debate about how we might find shared horizons in a time of great distraction. There are at the moment many competing demands of 'interested' claims that affect most architectural curricula. These distractions range from the global economy, information technology, sustainability, and accountability to the politics of transparency.[3]

The Idea of Horizon

The following reflections and observations about architectural education are optimistically and perhaps prematurely called horizons.[4] Hans-Georg Gadamer has written that the word horizon.

...has been used in philosophy to characterize the way in which thought is tied to its finite determinacy, and the way one's range of vision is gradually expanded. A person who has no horizon does not see far enough and hence overvalues what is nearest to him. On the other hand, to 'have a horizon' means not being limited to what is nearby but being able to see beyond it.[5]

He adds that *"... working out the hermeneutical situation means acquiring the right horizon of inquiry for the questions evoked by the encounter with tradition".*[6] For Gadamer our understanding is dependent on what he terms a "fusion"[7] of the horizons of both the present and the past. Heidegger has written, "The horizon is not a wall that cuts man off, rather, the horizon is translucent".[8] It is by virtue of a horizon that we can look through to the distance and look ahead to the future. It is the luminosity of the horizon that must be recovered in our current situation. For Heidegger the illusion of stability that the horizon and its perspective schema manage to muster occurs amidst the chaos of the "onrushing and oppressing torrent".[9] The act of forming horizons, according to Heidegger, is part of the essence of what it means to be human.

One of the urgent problems facing architectural educators is finding the right balance between an awareness of the extrinsic forces acting upon architectural education at a societal level and the intrinsic necessities of our own discipline. Given the strong presence of external forces, there is little time or space left for the cultivation of disinterested[10] inquiry into architecture.

The Ethos of Disinterest

With the accumulation of interested and tendential claims upon architectural education, it is necessary to invoke the ancient idea of disinterest to counter such forces. The idea of disinterest comes from the Greek word aurtarkia and means self-sufficiency, and that which exists for its own sake, in and of itself. In Aristotle's Nicomachean Ethics, aurtarkia is part of the dignity of our ethical life, which is defined by the ideas of happiness, friendship, the good and the excellent.

According to Meister Eckhart, disinterest is not detachment, which suggests a lack of interest, but rather a habit of mind that places one "in virtue to contemplation".[11] It is a giving up of narrow self-interest. The disinterested intelligence looks at things per se. However, the attitude of disinterested intelligence does not cut itself off from direct contact with the five senses. The recourse we have to our five senses is only to the extent "to which we can guide and lead them"[12] with our intelligence. Disinterest frees one from the accumulated vagaries, diversions and encumbrances chance brings and permits a more selective perception of the objects of our attention. As Meister Eckhart writes, "Disinterest is best of all, for by it the soul is unified, knowledge is made pure, the heart is kindled, the spirit wakened, the desires quickened, the virtues enhanced".[13]

1. THE HORIZON OF TEACHING

The Pathos of Teaching

magic *– the pretended art of influencing the course of events, and of producing marvelous physical phenomena, by processes supposed to owe their efficacy to their power of compelling the intervention of spiritual beings, or of bringing into operation some occult controlling principle of nature, sorcery, witchcraft.*
(Oxford English Dictionary)

Olivio Ferrari once remarked, "we never talk about the magic of teaching".[14] This provocative understatement seems almost unimportant until one thinks about what it implies. It is a reminder that no matter how much knowledge a teacher has, if there is no understanding of the pathos of teaching, then that knowledge will become ineffectual. It is clear that a teacher must have a philosophy,[15] must know and believe in something. A teacher must teach what they know and act upon what they believe. It is not enough to have an idea: one must be able to teach that idea. The act of teaching depends primarily on a kind of sympathetic magic. Teaching is a power passed on from one person to another. It requires a recip-

rocal operation of empathy between student and teacher, and for architecture itself. The 'magic of teaching' can generate extraordinary results, often through concealed methods. The effects of magic are baffling illusions. A teacher benevolently, indirectly and with a high sense of pathos 'tricks' a student into architecture rather than teaching architecture.[16]

Towards a Historiography of Teaching

The relatively brief history of architectural education has not been written. Nothing approaching Pevsner's Academies of Art Past and Present exists for architectural education. We lack a legitimate historiography on the education of architects and the didactic life of great teachers. This in itself should be a cause for reflection. Without a mature historiographic tradition, schools of architecture run the risk of imitating themselves in a lazy improvisation.

The tradition of a discipline is a primary way to judge the talent that emerges from that discipline. Architectural educators have spent little time documenting their tradition. Today's generation of students and faculty may not feel the resistance of a tradition that is barely visible. What results is talent without tradition and the termination of talent rather than its continuation.[17] If architectural education could have one clear goal it should be to educate and sustain the next generation of talent to have a sympathetic awareness of its origins.

Like architecture itself, the approach to architectural teaching, particularly in America, was and is dependent upon the importing of ideas and the immigration of key individuals from Europe. The scene today is of course more globalized, but the principles remain intact. The first architecture degree programs in the United States appeared in the mid to late 1800's at places such as The Cooper Union for the Advancement of Science and Art (1859), Columbia (1881) and Harvard (1893). The establishment of programs in Europe began with schools such as the Architectural Association in London (1847), the ETH in Zürich (1855) and Ecole Des Beaux-Arts in Paris (1863). Polytechnic institutes and schools, forerunners of the later schools of architecture, emerged in Paris in 1794, Prague in 1806 and Vienna in 1815. This historiography, if it is at all possible to write, is complicated by the seemingly inherent isolation of each school. A school is like a student's desk – a kind of splendid island in a sea of islands. We may find in the end that isolation is a virtue and the quality of a school is based on its ability to construct an educational specificity rooted in a particular place, group of students and faculty.

What is possible after the great and compelling experiments, some still ongoing, undertaken at the Ecole des Beaux-Arts, the Architectural Association, Cranbrook Academy of Art, the Vhutemas, the Bauhaus, the Hochshule für Gestaltung at Ulm, Black Mountain College, IIT, the ETH and Cooper Union? What is possible after the Texas Rangers and the New York Five? What is possible after great teachers such as Eliel Saarinen, Max Bill, Walter Gropius, Josef Albers, Bernhard Hoesli, Bruno Zevi, Colin Rowe, Werner Seligman, Manfredo Tafuri, John Hejduk and Olivio Ferrari?

What treatises will follow upon those of Vitruvius, Alberti, Laugier, Semper, Corbusier, Rossi and Venturi?[18] One should also give credit to the contribution of great architects who were also great teachers, such as Mies van der Rohe, Louis Kahn, Carlo Scarpa, and Herman Hertzberger. This combination of talent for both making and teaching architecture is rare. It is easy to see the above contributions as a kind of laundry list of places and names. How can one find structure and give form to the history of architectural education? There is an urgent need to record this history before we lose the evidence of its existence in an act of apathetic discourtesy. Without such a history we will lack the context to make the best decisions about the directions we might choose.

2. THE HORIZON OF HISTORY/THEORY/CRITICISM

The Triad of History / Theory/Criticism

During the mid 1960's the role of history in schools of architecture was beginning to be questioned.[19] The debate about the best way to teach the history of architecture entered a new phase. A new category emerged, perhaps borrowed from the tradition of literary criticism and literary theory, which combined the three categories of history, theory and criticism into one now familiar phrase: history/theory/criticism.[20] The influence of the triad of history/theory/criticism has not been adequately assessed with respect to the architectural curriculum.

Invoking this phrase was an attempt by architectural educators to better understand the interrelations between the ideas of history, theory and criticism in architecture. This triad had a clear hierarchy, in which history was given primacy, followed by theory and criticism. There was within this hierarchically arranged set of subjects an understanding of their simultaneity and overlap. One could no longer look at a particular work of architecture without taking into account an interrelated framework. There was the history of Ronchamp, the theory of Ronchamp and the criticism of Ronchamp. This served to re-contextualize history within the architectural curricula, and challenge the when of architecture with the why and how of architecture. The movement away from history per se towards history/theory/criticism also spawned the proliferation of new elective courses in schools of architecture, and new approaches to teaching the history of architecture. The influence of history was expanded into the rest of the professional curriculum. Despite the linkages between history, theory and criticism, it may be useful to recover their differences at a moment when their connections appear to be seamless.

History

The existence of the discipline of history presents an ultimate challenge to the immutable order of knowledge. It is not surprising to learn that one of the most difficult of all intellectual fields is the philosophy of history. The philosophy of history attempts to find the boundary between the mutable and the immutable. The challenge history presents is that *"nothing can be truly clear in history until everything is clear"*.[21] It is due to the existence of

historical reason that life *"takes on a measure of transparency"*.[22] Aristotle's claim that there can only be knowledge of universals placed history in a weak position with respect to knowledge. This position, which privileges the nomothetic over the idiographic, has affected the epistemological status of history to this day.[23] History was not allowed its own inherent legitimacy equal to that of philosophy. Vico was the first philosopher to detect the force and cyclical nature of history over the individual. He saw the confluence of truth with the things we make played out in the cycles of eternal reoccurrence. History and architecture share a common idiographic foundation. It is because of this shared idiographic nature that history is an essential part of the architectural curriculum. The laws of architecture are made each time architecture is made, and these laws are constantly re-defined based on individual, particular and unique occurrences. Architecture is idiographically nomothetic. The 'tangled skein'[24] of occurrences in the form of projects both built and un-built is what we study, essentially in an a posteriori fashion. As soon as a project is completed it is history. There is an urgent need to ground the teaching of architectural history within the questions emerging from philosophies of history.[25]

Theory

The place of theory in architecture and architectural education has of late been called into question.[26] An overriding and diminished form of pragmatism has taken hold. The totalizing tendency of theory has been avoided in favor of an approach that values the particular and the specific. In rejecting theory we may have given away aspirations towards the universal, and thus diminished the possibility of establishing a telos for architectural education.

Cennino Cennini in his Il Libro Dell'Arte explains that a theoretical attitude arose after Adam and Eve were cast out from the Garden of Eden. Adam and Eve came to what Cennini terms a "theoretical" realization that they must through their own work and craft provide for their survival and sustenance. This ingenuity under pressure led Adam to begin the activity of agriculture with the spade and Eve to begin her work of spinning.[27]
Heidegger reminds us that the modern understanding of *"theory is a constructive assumption for the purpose of integrating a fact into a larger context without contradiction"*.[28] He adds that theory in the ancient sense is *"an essential determination of nature"*.[29] Concealed behind the modern understanding of theory is the ancient understanding of nature.

The relation of nature to knowledge is embedded in the very idea of theory. We have, then, inherited a twofold notion of theory. The first is theory as our participation in the pregnant sense of nature's own self-movement. The second is theory as the search for invariant laws of nature in terms of space and time. This essential relation is easily forgotten. There is, then, both the marvel, wonder and spectacle of theory[30] and its observed rules posited as laws of nature.[31] This double condition of theory should not be dismissed but rather embraced.

Theory is steadfast in its refusal to be applied, and allows us to 'see' at a distance. The existence of theory prevents knowledge from being prematurely formed and applied as a kind of

wallpaper. The existence of a distinct realm of theoretical knowledge as articulated by Aristotle had the virtue of giving poetical knowledge its own legitimacy. Theory creates the necessary space for the praxis of making.

Theories of the Education of Architect

There is an enduring relevance in the thoughts of Vitruvius and Alberti on the education of architects[32] and on establishing principles of knowledge for the discipline of architecture itself. The 'know-how' of architectural education essentially emerges from the thought of these two individuals. Vitruvius, long before the fashion of multi-, inter- and transdisciplinary education existed, was the first to understand the various forces that affect architectural education from without. His broad list of subjects with which an architect should be familiar locates the education of an architect within a wider framework of knowledge.[33] In comparison, Alberti works from within the discipline and provides a more demarcated and internally motivated program for the education of an architect. The philosopher Alfred North Whitehead said something to the effect that all philosophy is a footnote to Plato. In terms of the education of architects and architectural theory all thoughts exist under the long shadow of Vitruvius and Alberti. This thought may seem like an exclusive conservatism; however, my hope is that it prompts fresh readings of these canonical texts.[34] One should not attempt to apply their theories literally, but instead attempt to understand the contexts and the times in which they lived.[35] The debate between Alberti and Vitruvius forms the sky upon which we gaze. This is not to say there have not been important contributions to the sky of architectural theory since Alberti, but rather that Vitruvius and Alberti set out the conditions for theoretical debate. J.N.L. Durand provides perhaps the most vigorous and far-reaching critique of blind adherence to Vitruvian and Albertain principles amidst societal change.[36]

Vitruvius placed a demand upon students of architecture to study other disciplines as well as the discipline of architecture.[37] He thus framed a primary educational principle: the education of an architect is founded on understanding analogous regions of knowledge. According to Vitruvius, an architect must know something about a number of subjects. It is somewhat curious that other professional educations, such as medicine and law, do not require some knowledge of architecture. What is it about the education of an architect in Vitruvius's view that demands such an anterior and tangential approach? The English playwright and poet Ben Jonson, who owned copies of Vitrivius's treatise, had sympathy for the Vitruvian approach to knowledge when he wrote: "The reason why a Poet is said, that he ought to have all knowledges, is that hee should not be ignorant of the most, especially of those hee will handle".[38]

According to Alberti, a secure knowledge of painting and mathematics was all an architect needed to know in terms of being an educated professional.[39] If an architect knew more, it would not be held against him or her. We should remember that for Alberti painting and mathematics had a significance and merit far beyond what they may mean to us today.[40]

One could argue that his notion of painting and mathematics includes and condenses all of Vitruvius' requirements. For Alberti, the education of an architect is dependent upon the construction of professional legitimacy.

On the one hand we have Vitruvius's expansive program of study with a focus on architecture, and on the other Alberti's more tightly formed program, looking outward at the role of the architect. Vitruvius's formulation has to do with the relationship of an architect to the idea of an educated life, whereas Alberti's formulation is about the relationship of life to the idea of a professionally educated architect. There is a positive tension between these two fundamental positions, and perhaps a good school of architecture should strive for reciprocity between the Vitruvian and the Albertian approaches to architectural education.

Theories of Architecture

Alberti directly and explicitly criticized Vitruvius's broad educational scheme and developed a radically and self-consciously delimited professionalized field of study for architectural education. These differences are reflected in their theories on architecture. For Vitruvius, architecture was a process of signification consisting of taxis (order), diathesis (arrangement), and oeconomia (eurythmy, symmetry, propriety and economy).[41] He distinguished between the actual work (practice) and the theory of it.[42] There were three departments of architecture: building (public and private), dialing and mechanics. These were set within the triad of firmness, commodity and beauty.[43] For Alberti, architecture or the art of building beautifully consisted of lineaments (design) and structura (construction).[44] Alberti allowed for both an independent and dependent relationship between these two ideas, thereby forming a duality of mind and body in the building. The building itself divides into six elements: locality, area, compartition, wall, roof and opening.[45] The idea of ornament plays a significant role for Alberti. Ornament was not simply the application of decoration onto a form. A building in its entirety was understood to be an ornament of the city, with duration and beauty.

Criticism

In The Birth of Tragedy, Nietzsche finds the origins of tragedy through a profound act of sustained criticism. By invoking two ideas, the Apollonian and the Dionysian, he detects the heartbeat of tragedy in the coupling of dreams and intoxication. Without a critical tradition it seems very unlikely that Nietzsche could have formulated the moment of the emergence of Attic tragedy. His criticism, through the brilliance of his erudition, brings the reader to an intimate confrontation with the essence of Greek tragic form. Architectural educators forgetful of their origins have no similar method to detect the nascent and eternal beginnings of the art of teaching architecture. Without a consideration of its beginnings, the possibility of imagining the future of architectural education is foreclosed.

If literature has literary criticism, what is the comparable critical apparatus for the critique of architectural education and architecture? One could propose that Aristotle's Poetics is to poetry and literature what Vitruvius's The Ten Books on Architecture is to architectural edu-

cation. These works should not be taken on faith, and require dispassionate critiques in order for the original questions to remain alive. Nietzsche's The Birth of Tragedy renewed the perennial questions contained in the Poetics, as did Alberti's intelligent disagreements with Vitruvius. In the case of Vitruvius and Alberti, there were over 1,500 years between their works. We should not overlook or underestimate the long duree between Vitruvius and Alberti. Consider the tradition of literary criticism from Aristotle to Barthes. The tradition of literary criticism was begun by Plato with the banishment of the poets from the Ideal City.[46] Initially criticism was a fear of poetry or an acknowledgement of the deleterious effects of certain kinds of poetry.

There is of course a degree of censorship, selection and exclusion involved in criticism, and criticism itself is not immune from criticism. However literature and poetry have not suffered, but rather prospered amidst a vigorous tradition of criticism. Nevertheless, architectural education and pedagogy have few formal instruments for their own criticism, and this fact seems to be more than an oversight. Manfredo Tafuri has written that *"criticism sets limitations upon the ambiguity of architecture"*.[47] Without the setting of limits, confusion prevails and we get *"baby-talk, mysterious silences, [and] a whirl of banalities"*.[48] For Tafuri, to criticize means *"to catch the historical scent of phenomena, put them through the sieve of strict evaluation, show their mystifications, values, contradictions, and internal dialectics and explode their entire charge of meanings"*.[49]

Where will such a critique of architectural education emerge, and on what basis shall we make critical judgments? The situation is made problematic by a number of considerations. Firstly, the period of time that formally established schools of architecture have existed in the United States and Europe is relatively brief, dating from the mid to latter half of the 1800's to the present. Secondly, the history of architectural education has not been written, so collectively we have only anecdotal evidence of what has been done. This lack of collective and recorded institutional memory in the architectural academy in turn does not give us much perspective to speculate upon the future of architectural education. Thirdly, most architectural educators have not had formal educations about education, and more specifically about architectural education. There are few degree programs that address the training of future teachers in architecture. Maybe this is a good thing in that it is simply too direct an approach to a problem of great complexity, namely how best to educate architectural educators. Fourthly, we simply permit the existence of a professional degree in architecture and the profession itself to be synonymous with the adequate development of architects. Lastly, we unduly rely on external critiques by accrediting agencies.

One could take the position that the future is over[50] and that the brief moment of formal architectural education has passed with all but a faint record of its existence and beliefs. To think about the future of something that has come to an end presents an impossible contradiction. Perhaps it would be more appropriate to look selectively at the ideas and philosophies that have been the most influential. It seems reasonable to look to the past and

find new ways to project the historicity of the education of an architect into the present. In this way one might be able to reconstitute a horizon for architectural education in a manner that addresses fundamental changes in contemporary society.[51]

The Studio in an Age of Distraction

In the short experiment called 'architectural education' one has to ask: how long can the design studio model last? This question goes to the heart of what we do. One has a sense of ending when thinking about the studio.[52] Many forces have intervened since this model of teaching architecture was devised and had its heyday in the late 1960's and early 70's. Nevertheless, we carry on today with this 'new' tradition in a stubborn and unthinking mode. The design studio is understood to be the 'center' of architectural education. Can this 'center' hold? How many conditions surrounding architectural education have changed since this position was articulated? Can we find a position today that better fits the circumstances confronting us?

A studio depends on a lack of distractions. Today the degree and means of distraction have become so extreme that the existence of the studio model has been put into question. Without an almost monastic condition of autonomous, disinterested reflection, the space of a studio is rendered ineffectual. The studio is a fragile model, considering how even a seemingly innocuous device such as a cell phone ringing can ruin the atmosphere of contemplation and making that a studio sustains. When the studio is invaded by distractions its sanctity is eroded, and the significant effort needed to sustain its vitality is erased in a moment. There is also what appears to be an increasing movement toward the personal and the private in the studio. With headphones and access to the internet, students escape into their own private worlds, with little sense of public obligation to sustain a discourse and an authentic working environment.

Given these forces, there is a need to find fresh approaches and alternatives to the current studio model. These models will be partial and fragmentary at best, but well worth the effort to conceptualize them. How can schools best inhabit the space(s) they have? If one proposed 'eliminating' the studio, how would design be taught and how would the former studio spaces be best used?

History in the Studio and Design in the Lecture Room

The waning of the studio model suggests a space of possibility in the interchange between design and history in the education of an architect. A significant part of architectural education revolves around understanding the relationships and differences between design and history.[53] History collects what happened and design is the inchoate individual will that tends towards novelty and provides history with the examples it needs. The curriculum at the Bauhaus may mark the first time in formal education that the study of history was deferred for the study of design.[54] This attitude suggests that history can stifle creativity, and has influenced the attitude of many schools of architecture towards history. At the Bauhaus,

historical issues were temporarily held in abeyance until the third year of study to create a space or freedom for initial design inquiry at a basic level. This created a kind of purification through the intentional bracketing out of the questions of history and representation. The design studio became and still might be a place of will without representation.[55]

Traditionally, design has been taught in a studio setting and history has been taught in a lecture room. If we accept that this approach has become ineffectual, how could one conceptualize a new model that is more efficacious? One could propose a reversal, so that history is taught in the studio and design in the lecture room.[56] This model might encourage more thought about how these 'subjects' are taught, and more broadly about how space is utilized in the daily life of a school. For example, larger seminar-scale tables shared by a group of students might replace the typical studio desk scaled to the individual student. With individual wireless access to the internet and cell phones, students have become personal information societies unto themselves requiring little else for sustenance. In this environment there is a decline in face-to-face conversation and interchange. It may be surprising to learn that the very essence of architecture, space, becomes the most significant consideration in considering the educational setting of a school. Where, in the sense of activity and location, does design happen and where does history occur in a school of architecture? This is a question about the locus of design and the locus of history and how we might think about their habitation in schools of architecture.

3. THE HORIZON OF PHILOSOPHY

Philosophy enables us to limit our confusion as to what is mutable and what is immutable. To paraphrase Hans-Georg Gadamer, the stability of being announces itself in the relativity of perception.[57] He writes that *"immortality has really only been proven for the idea of life, for the idea of soul, not for the indestructibility of the discrete individual. This is a problem that runs through all of philosophy"*.[58] The search involved in the determination of universals means that *"philosophy wavers back and forth between the beginning in the sense of origin...and the beginning in the sense of cognition and thinking"*.[59] Gadamer locates the beginnings of philosophy in Plato and Aristotle, who then in turn give us access to interpret the Pre-Socratics who came before them. Gadamer employs a historical reversal to find a philosophical order, so as not to historicize philosophy.

For Heidegger it was important to distinguish between ontic and ontological evidence. That we see a table constitutes ontic evidence. That we know a table is constitutes ontological evidence of its being.[60] Heidegger writes that *"philosophy has always, from time immemorial, asked the question about the ground of what is"*.[61] In the absence of finding a ground, our thought is caught in a perpetual state of unfulfilled quest and expectation.[62] Ground is what one finds at the bottom,[63] the original source and physis[64] of thought. Following Aristotle, what is primary in the order of being is last in the order of knowing. Philosophy moves from the perceptible to the imperceptible, from the sensible to the non-sensible.[65] For Heidegger, one should not force or make such differences, but should stand before the open-

ness of what is. Philosophy is *"a thinking that breaks the paths and opens perspectives of the knowledge that sets the norms and hierarchies, of the knowledge in which and by which a people fulfills itself historically and culturally, the knowledge that kindles and necessitates all inquiries and thereby threatens all values"*.[66] As to the use of philosophy, Heidegger remarks:

It is absolutely correct and proper to say that "You can't do anything with philosophy." It is only wrong to suppose that this is the last word on philosophy. For the rejoinder imposes itself; granted that we cannot do anything with philosophy, might not philosophy, if we concern ourselves with it, do something with us?[67]

For Heidegger, language plays an absolutely fundamental role in the search for philosophical ground; it is the house that philosophy inhabits. The meanings of words are not simply a matter of semantics. Every word has its etymological and philosophical universe. Heidegger had a great respect for language in relation to philosophical thinking, and for the way philosophy is engaged with the mystery of language.

One of the most prominent contemporary philosophers, Alain Badiou, contrary to Heidegger, wants to tear the veil of mystery from any narrative or revelation, so as to free the truth philosophy seeks.[68] Alain Badiou is one of the few contemporary philosophers who advocate a 'return of philosophy'. For Badiou, the operation of philosophy *"tears truths from the straightjacket of sense"*.[69] He writes that the truths seized by philosophy "exposes them to eternity".[70] Philosophy is in his terms a senseless but rational act of subtraction that breaks the mirror that is the surface of language. Literature operates on this surface while philosophy attempts to penetrate beneath it. For Badiou, philosophy, in a kind of surgical operation reminiscent of Descartes, separates truth from sense and thought from presence.

Reminder: The Reciprocity of Ethics and Aesthetics

At the core of the education of an architect are ethics and aesthetics[71] and the priority of ethics over aesthetics.[72] To ignore this priority would be to promulgate a vapid form of visualization. A proposition about architecture by a student or architect is ultimately a proposal about an ideal form of human conduct. Students are proposing a way of life, both for themselves and others, in the form of an architectural project.[73] A 'project' is the necessary vehicle for such inquiry, and has the virtue of poetic specificity and physicality. Here the disinterested form of aesthetic contemplation links in a remarkable way with the perennial concerns of human dignity, duty and conduct. A project's beauty must be related to its ethical stance. Aesthetic considerations are grounded in primary deontological considerations. The education of an architect appropriately grounds the visible with the ethical.[74]

4. THE HORIZON OF LITERATURE

Ezra Pound wrote that *"literature is language charged with meaning"*.[75] According to Pound, there were three primary ways that meaning can be achieved: phanopoeia, melopoeia, and

logopoeia.[76] We are indebted to Pound for reminding us that language projects images into the reader's imagination and that literature has a sound and a voice. For Pound there is the need to *"recover the art of writing to be sung"*.[77]

Literature is the very sense that we have of our literal relation to the inner world of our imagination. Literature is the hold that letters exert upon us.[78] Each letter in an alphabet makes an elemental claim made exponentially more powerful by virtue of a certain order of letters forming words and sentences. The existence of literature testifies to the unbroken chain of literalness bringing letters into a relation with our imagination. Literature is our imagination made literal.[79]

Despite the fact that Plato banished the poets from the Ideal city of the Republic, never has there been a more poetic and more literary philosopher. Plato exiled the poets from the Ideal City with a certain literary style. Literature is as interested and engaged as philosophy is disinterested. Literature is, as Sartre said, an *"appeal to the reader"*.[80] Literature has an aim and a purpose; it allows us to construct an imaginative existence that seems literal and believable. Borges said that *"[I] believe in Don Quixote as I believe in the character of a friend"*.[81] When Borges writes, he tries *"to be loyal to the dream and not to the circumstances"*.[82]

Literature is the canon of civilizations unfolding over time and the record of how we preserve, question and represent those canons.[83] Literature is the canonization of an 'intangible' tradition. Literary tradition is *"the power of that network of texts which humanity has produced and still produces, not for practical ends (such as records, commentaries on laws or scientific formulae, minutes of meetings or train schedules), but rather for its own sake, for humanity's own enjoyment"*.[84]

Umberto Eco states that the principle lessons of literature are about fate and death. The imaginative characters of literature serve to shape the ways we live our lives. He writes that *"we are clear what we mean when we say that someone has an Oedipus complex or a Gargantuan appetite, that someone behaves quixotically, is as jealous as Othello, doubts like Hamlet, is an incurable Don Juan, or is a Scrooge"*.[85] For Eco, literature provides us with metaphors which become our obsessions. Eco speaks of *"Montale's sharp shards of bottles stuck in the wall in the dazzling sun, Gozzano's good things of bad taste, Eliot's fear that is shown in a handful of dust, Leopardi's hedge, Petrarch's clear cool waters, [and] Dante's bestial meal"*.[86] For Eco, literature helps us ask who we are, what we want, where we are going, and, maybe most importantly, what we are not, and what we do not want.

The Relation between Philosophy and Literature

How is architectural education possible and on what grounds does a teacher of architecture proceed?[87] The content of architectural education is mainly based on the nature of architecture itself. However, architectural educators need to broaden and deepen this foundation.

On the one hand, there is the need for a teacher to work from an epistemological and ontological framework, and on the other hand there is the need to establish an imaginative, fictional dimension. The source of this depth and breadth is located at the intersection of two poles of thought: the philosophical[88] and the literary.[89] If the philosophical provides the capacity for disinterested inquiry, the literary provides the capacity for promoting a fictive sensibility concerned with the 'realization of life'.[90] To think of architecture as knowledge is to think about it dispassionately. To think of architecture as literature is to think about it passionately. The education of an architect, like a Platonic dialogue, exists in the overlap between and the simultaneity of two limits: the philosophical and the literary.

William Gass has written about both the commonality and acrimony existing between philosophy and literature.[91] They both share an obsession with language. The philosopher is driven by an abiding respect for the true while the writer is indifferent to it. The writer follows a sensibility for sublimity. A writer *"is not asked to construct an adequate philosophy, but a philosophically adequate world"*.[92] These worlds are *"only imaginatively possible ones"*.[93]

That which we cannot conceptualize we must poeticize and that which we cannot poeticize we must conceptualize. This idea follows the thought of the Italian philosopher Benedetto Croce, who categorized the architectonics of thought into concept and intuition.[94] Here the demonstrable clarity of logic is distinct from but not unrelated to the lyrical character of the poetic. The complex foundation of architectural education resides in the questions we have about both the considerations of architecture as logical knowledge and the truth of our poetic imagination.

5. THE HORIZON OF SENSIBILITY

There is at the moment within architectural education a focus on the study of material innovation and the activity of building.[95] Related to this interest in material and activity is a growing distaste and even suspicion for the life of the intellect. One concern is that over-intellectualization in architectural education will produce 'eyes that do not see'. A counter-concern is that a reliance on the sensual creates a mind that does not think. We have then a double condition of an overreaction against the intellect and what is viewed as an outmoded intellectualism, along with an intense retreat into a form of Epicureanism. The risk is that we are forced to make false choices and become either a rational self or an empirical self with no recourse to a unified approach. It may be too simplistic to define the conflict as one between rationalism and empiricism. It would be more productive to speak of better understanding the involvement of thinking with feeling and perceiving.[96]

To avoid the extremes of either a sterile rationalism or an overly indulgent empiricism, perhaps a reliance on the idea of sensibility[97] may provide one useful avenue to explore. There is a tendency to undervalue the role that romanticism played in constructing modern sensibilities. These sensibilities were perhaps never more profoundly or clearly expressed than in individuals such as Goethe or Balzac. Sensibility appears as an invention of the romantic

period and a final blow to any attempt at constructing a 'science of the beautiful'. We tend to focus on the darker side of the Enlightenment, not realizing the effects of positive ideas such as sensibility.

Sensibility can lead us to a position which lies between the intellect and the senses, or what C.S. Lewis defines as gumption plus perception.[98] The question is: what is sensibility and how can it be taught? George Santayana's The Sense of Beauty provides a ground for exploring these questions. Santayana had a profound mistrust for a 'science of the beautiful'; therefore his ideas about beauty do not attempt to explain the metaphysical depth of the inexplicable, but remain at the active surface of human responsiveness to the existence of beautiful things and our deep feelings towards them.[99] At the core of his approach is the idea that one need not didactically or historically explain what beauty is, or what feeling is, but rather take an approach that focuses on the felt qualities of things, both in nature and those that we make. It is a kind of philosophy of human sentience and the values that suffuse it.

As Santayana writes, *"A sunset is not criticized, it is felt and enjoyed."*[100] The pleasure we feel in seeing a sunset he would term as 'disinterested' and without motive. He writes, *"Every real pleasure is in one sense disinterested. It is not sought with ulterior motives, and what fills the mind is no calculation, but the image of the object or event, suffused with emotion."*[101] Santayana wants to hold in abeyance the epistemological and ethical from our appreciative capacity.[102] This gives us the freedom to appreciate and admire the beauty of something and take fuller responsibility for it. On this point he writes, *"If we were less learned and less just, we might be more efficient. If our appreciation were less general, it might be more real, and if we trained our imagination into exclusiveness, it might attain to character"*.[103]

At the moment we seem to be educating architects towards what Santayana called an insensibility to sensuous beauty. Santayana termed this an indifference to primary and fundamental effects.[104] This cultivated indifference to the sensual can have devastating educational consequences.[105] Santayana's program for educating sensibility would be to vary the observational skills of students, expand their capacity for disinterested discrimination and thereby deepen their values. This approach would cultivate in students an intimacy with respect to effects. A lack of intimacy has serious consequences and 'ex-communicates' one from the experience of beauty felt. Santayana would not be against the current interest in the materialization of architecture, but only that we fail to see the 'beauty of material' as questions of form and expression.

Ben Jonson, in his Timber: Or, Discoveries, makes an eloquent argument for the importance of the idea of sense for the poet.[106] He writes that many writers perplex their readers with barbaric phrases of *"meere Non-sense"*[107] and that *"sense is...the life and soule of language, without which all words are dead"*.[108] He adds, *"sense is wrought out of experience, the knowledge of human life, and actions."*[109]

CONCLUSION

Disinterest in an Age of Interest

The late Robin Evans ends his remarkable essay on the Barcelona Pavilion with a section entitled "Distraction".[110] Invoking Sartre, he writes not of the attraction of beauty but rather the distraction of beauty and its overwhelming disinterested sadness. According to Evans, the "paradoxical" beauties and symmetries of the pavilion helped contemporaries forget the politics and violence of the time. Speaking in more general terms about the role of art, he writes *"that the distractions supplied by art have been essential to the development of our equilibrium, our humanity, our enlightenment"*.[111] On the architectural qualities of the pavilion he writes:

By virtue of its optical properties, and its disembodied physicality, the pavilion always draws us away from consciousness of it as a thing, and draws us towards consciousness of the way we see it. Sensation, forced in the foreground, pushes consciousness into apperception. The pavilion is a perfect vehicle for what Kant calls aesthetic judgment, where consciousness of our own perception dominates all other forms of interest and intelligence. But, he insists, out of this apparently purposeless activity, we construct our own destiny...Oblivious to the tremors that beset the present, we intimate a pattern for a potential future.[112]

His interpretation of the Barcelona Pavilion is perhaps an apt symbol for our present moment. We are caught in the matrix of the brilliant polish, reflectivity and shimmer of the surface and breadth of things. We no longer dwell in the height or depth of things; rather we live at the poetic skin of the appearance of things – at the very topos of sensibility.[113] We are in need of a philosophy that makes sense. Such a philosophy involves a movement or displacement from the intelligible to the sensible, and a reversal of the ancient privileging of the intelligible over the sensible. It is important to find what is intelligible in the sensible and the phenomenal. The divided line of Plato[114] has been reoriented to what Alberti would term *"a more sensate wisdom"*.[115] The physis of architecture needs to be recovered and made part of the study of architecture.[116] In this way we might better grasp the phenomenal horizon of architecture.

As regards the architecture curriculum and the activity of teaching, there are three primary areas that may serve to improve architectural education in light of the five horizons. We should reintroduce the study of nature as an arcadian physis and its corollary the city into the architectural curriculum. We should enable our students to get closer to the feeling of beauty and its pleasures. Finally, we should renew our commitment as teachers of architecture to study the best teachers that have emerged in our field.

There is a need to establish a strategy of active resistance of architectural education to the external forces that affect it.[117] The primary means for developing this strategy are the critique and reestablishment of the complex horizons of thought involved in the teaching of archi-

tecture. The final call for sensibility is an attempt to fuse the five horizons into single vision. How can we best cultivate an atmosphere of disinterested awareness about the sense of the pleasure of architecture and instill this sympathy in a generation of students and faculty almost subsumed by the growth of and unfettered access to information?[118] In the end the feeling and belief we have for what we know are the most important things to remember.

Five Questions

A series of simple questions could be posed about the prosaic forces of information technology, the global economy, sustainability, accountability and transparency that are acting upon architectural education. These forces are so pervasive that they have become almost invisible. We should not advocate ignoring these forces, but rather seek to understand them more fully so we can act more efficiently. The following five questions may serve as a reminder of what is at stake if we merely accept these forces uncritically. Our answers to these questions may help us find the right direction in a time of confusion. Where is the knowledge in information technology? Where is the oikos in the global economy? Where is the sustenance in sustainability? Where is the responsibility in accountability? Where is the translucency in transparency? Addressing such questions may allow us to recover the potential that resides in the way we understand what it means, despite the dangers, to engage our very contemporaniety. We need to choose our distractions well, so that we can answer the question: how do we find shared horizons in an age of distraction?

AFTERWORD: THE RECOVERY OF A FALLEN HORIZON

The idea of horizon is important to the constructive thought of the architect Sverre Fehn. The fall from grace of the horizon Fehn detected has important implications for both the making and teaching of architecture. When the world was understood to be flat it had an imagined end, and the horizon marked this condition. When this picture gave way to the notion of the world as a globe, *"the horizon ceased to be the end of the world"*.[119] The development of artificial perspective further facilitated the appropriation and loss of crucial archaic and existential dimensions of horizon. The idea of a natural horizon as a room providing safe harbor for other rooms was lost. For Fehn the essence of the idea of horizon is the roots of a tree "*as they burst through the ground into the light*".[120]

NOTES

1 These five horizons were selected for the broad range of issues they raise and the interrelations between them. The foundation or presupposition for these five horizons is the idea of horizon itself and the fragile ground that allows the freedom of a horizon to appear. The horizon is where our ability to find the ultimate ground ends and the threshold of our incapacities with respect to our own phenomenality begins. We may find that although the horizon itself may act as a foundation, the foundation is supported by an impenetrable transparency. Socrates' admonition to 'know thyself' is an acknowledgement of the difficulty that individuals have with respect to their own self-transparency.

2 Prof. Steven Thompson, personal communication (undated).

3 These five forces have become so much a part of the contemporary scene that there may be a tendency to take them for granted and to assume their ascendancy. The idea of transparency has typically been studied with respect to specific disciplines, as in Rowe and Slutsky's influential essays involving spatiality in painting and architecture. The work of Rowe and Slutsky could be characterized as the development of a specialized formal vocabulary related to the perception and cognition of various spatial conditions. Today there is a need to vigorously re-open the question of transparency as a fundamental and perhaps inaccessible ground of phenomenality across the disciplines of praxis. The phrase I have elected to use – the politics of transparency – is a way of formulating the general problem of our lack of knowledge of transparency and our incapacities with respect to it. Here transparency is invigorated to include and subsume all forms of opacity and obscurity, obliterating what had been understood as fundamental differences between the thought of Descartes and Husserl and causing a re-reading of the basic terms of engagement for such problems. Descartes' clarity and Husserls' obscurity may in fact share a common and to an extent inaccessible source: transparency. For the idea of transparency considered from a neurophilosophical standpoint, see Thomas Metzinger, The Self-Model Theory of Subjectivity, (Cambridge, Massachusetts: The MIT Press, 2004).

4 The word horizon has been selected as a guiding concept for this research. It has the virtue of being relevant to both the act of vision and intellection. One cannot form a 'perspective' without establishing a 'horizon'. The primary reference to the idea of horizon is the thought of Hans-Georg Gadamer (see endnote 5) and Heidegger's readings of Nietzsche. Gadamer credits Nietzsche and Husserl for giving the concept of horizon a philosophical dimension. Husserl detected the fundamental horizontality of the individual's conscious encounter with the past and the present. He termed this a 'vital horizon'. See, Edmund Husserl, The Crises of European Sciences and Transcendental Phenomenology: An Introduction to Phenomenological Philosophy, translated by David Carr, (Evanston: Northwestern University Press, 1970), 149.

5 Hans-Georg Gadamer, Truth and Method, Second, Revised Edition, translation revised by Joel Weinsheimer and Donald G. Marshall, (New York: Continuum, 2003), 302. This was originally published in 1960 under the title, Warheit und Methode.

6 Hans-Georg Gadamer, Truth and Method, 302.

7 For the concept of fusion of horizons see, Hans-Georg Gadamer, Truth and Method, 306-307.

8 Martin Heidegger, Nietzsche, Volume Three, edited, David Farrell Krell, (San Francisco: HarperCollins Publishers, 1991), 87.

9 Martin Heidegger, Nietzsche, 86.

10 The idea of disinterest can be located within the larger framework of an ethical life in which the autonomy and self-sufficiency of an individual is a crucial aspect of a good life. I refer the reader to Aristotle's Nichomachean Ethics for the full development and relationship of these ideas.

11 Raymond Bernard Blankey, Meister Eckhart: A Modern Translation (New York: Harper & Brothers, 1941), 91. This quotation and those that follow are from the translation of Meister Eckhardt's writing entitled "About Disinterest".

12 Blankey, Meister Eckhart, 87.

13 Blankey, Meister Eckhart, 90.

14 Prof. Olivio Ferrari, personal communication (undated). Professor Olivio Ferrari taught at Virginia Tech from 1965 until his death in 1994 and was instrumental in bringing national and international prominence to the architecture programs at Virginia Tech. This statement was said to me with a smile on Professor Ferrari's face. It was a surprising and highly illuminating thought. It suggested to me that even if a teacher had great erudition and a strong set of beliefs, the ability to convey them to a student was the most important issue of teaching. This is a question of how one teaches rather than what one teaches. Not so much as a technical discussion of pedagogic methods but rather the atmosphere a teacher must provide. A good teacher conjures an atmosphere. For a better sense of the 'magic of teaching' see the reminiscences of Prof. Olivio Ferrari's former colleagues and students in Ferrari: Portfolio, (Blacksburg, Virginia: College of Architecture and Urban Studies, March 1996) with introductory remarks by Prof. Robert Dunay.

15 Olivio Ferrari, quoted in Ferrari: Portfolio.

16 Prof. William Galloway. Personal communication (December, 2004). The idea of "tricking" a student into architecture can be attributed to Prof. William Brown (former Chair of the Graduate Program in Architecture at Virginia Tech). Prof. Brown once commented to me that "a studio is like a house for the students". Here again the idea of cultivating a good atmosphere is important.

17 The relationship between talent and tradition is brilliantly explained in T. S. Eliot's essay, "Tradition and the Individual Talent" in Frank Kermode, editor, Selected Prose of T.S. Eliot (New York: Harcourt Brace & Company, 1975), 37-44.

18 In this regard the writings of the contemporary architect and educator Bernard Tschumi come to mind. See Bernard Tschumi, Architecture and Disjunction (Cambridge, Mass.: The MIT Press, 1994).

19 For a discussion about the rise and influence of the triad 'history/theory/criticism' within architectural education, see The History, Theory and Criticism of Architecture, Marcus Whiffen, editor, Papers from the 1964 AIA-ACSA Teacher Seminar. Held at Cranbrook Academy of Art, 1964. (Cambridge, Massachusetts: The M.I.T. Press, 1965). This little volume includes papers by major figures such as Peter Collins, Bruno Zevi, Sibyl Moholy-Nagy, Stanford Anderson and Reyner Banham. In 1966 the first editions of Robert Venturi's, Complexity and Contradiction and Aldo Rossi's The Architecture of the City appeared. These texts were decidedly historical, theoretical and critical in nature. Less known but influential in the area of theory was Victor Hammer's A Theory of Architecture, published in1952. In the late 60's and early 70's the formation of the Institute for Architecture and Urban Studies in New York and the now defunct journal Oppositions made important contributions to establishing a theoretical and critical discourse in architecture and architectural education. In this regard one should mention the journals Via, Perspecta, Assemblage and Daidalos.

20 The idea of history/theory/criticism has recontextualized many disciplines in addition to architecture, particularly literary theory. One can no longer study the history of a discipline without studying its theory and criticism. This approach has allowed many disciplines to elaborate on the finer grains of autonomy residing within each discipline. This approach may have reached an end condition in terms of its efficacy. History has been questioned for its grand narratives, theory for its totalizing tendencies, criticism for its conservative protection of the canon. One senses a movement away from history/theory/criticism per se towards an ideology of history/theory/criticism.

21 José Ortega Y Gasset, History as a System and other Essays Toward a Philosophy of History (New York: W.W. Norton & Company, 1961), 221.

22 Ortega y Gasset, History as a System, 214.

23 As regards the distinction between nomothetic and idiographic, I am indebted to Prof. Sal Choudhury for leading me to the thought of Wilhelm Windleband (1848-1915). See Wilhelm Windeband, History

and Natural Science, Guy Oakes, translation, History and Theory: February (1980): 165-85. In this rectorial address, Windleband replaces the distinction between the natural sciences (Naturwissenschaften) and the sciences of the mind (Geistwissenschaften) with that between those sciences that are nomothetic and idiographic. The nomothetic is knowledge that is law-abiding and the idiographic is knowledge that is particular and unique. What is invariably the case is termed nomothetic and what was once the case is termed idiographic. The nomothetic natural sciences follow laws and the idiographic historical sciences find a once-occurring structure of validity. The nomothetic establishes a theoretical abstraction and the idiographic is based on visible and intelligible perceptuality. The same subject can have idiographic and nomothetic dimensions. In architecture one begins idiographically and ends nomothetically. See Frank Weiner, "Value + Creativity: Windleband's Idiographic from an Architect's Perspective", C. Calhoun Lemon Colloquium on Philosophy and Values, Clemson University, April 8-10, 1999.

24 The phrase 'tangled skein' is taken from Henry Adams, The Education of Henry Adams (New York: The Modern Library, 1931), 302.

25 One cannot teach history without philosophy. The beauty of this relationship is between mutability and immutability.

26 For a contemporary view of theory see Michael Payne and John Schad, editors, life.after.theory (New York: Continuum, 2003). This book includes valuable interviews with Frank Kermode and Jacques Derrida. See also The States of "Theory": History, Art, and Critical Discourse, David Carroll, editor (New York: Columbia University Press, 1990.

27 Cennino d'Andrea Cennini, The Craftsman's Handbook: "Il Libro dell Arte", translated by Daniel V. Thompson, Jr. (New York: Dover Publications, Inc., 1960), 1-2. This passage was called to my attention by Prof. Steven Thompson.

28 Medard Boss, editor, Martin Heidegger: Zollikon Seminars (Evanston, Illinois: Northwestern University Press, 2001), 199.

29 Medard Boss, Martin Heidegger, 199.

30 See, Indra Kagis McEwen, Socrates' Ancestor: An Essay on Architectural Beginnings (Cambridge, Massechusetts: The MIT Press, 1994).

31 This is a reference that Heidegger makes to the thought of Kant, in Medard Boss, Martin Heidegger, 26.

32 Vitruvius is the key early thinker on the education of architects. Vitruvius placed educational concerns at the beginning of his treatise while Alberti located his ideas about education towards the end of his treatise. Closer to our own time, the late John Hejduk's thoughts on the education of architects are worthy of study. Hejduk's publications on the education of architects are extensive. I point the reader to two works in particular, Education of an Architect: A Point of View (1971, reissued in 1999 by Monacelli Press) and Bart Goldhoorn, editor, Schools of Architecture (Netherlands: Netherlands Architecture Institute, Publishers, 1996), 8-22. This book contains the text and images from an untitled lecture delivered by John Hejduk in the autumn of 1996 at the congress of the International Union of Architects held in Barcelona, Spain.

33 Vitruvius, The Ten Books on Architecture, translated by Morris Hicky Morgan (New York: Dover Publications, 1960), 5-13. Hicky's translation was originally published in 1914. Vitruvius's list of subjects locates the education of an architect within what I would call a university of knowledge. The relevant passage reads as follows: "Let him 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 the heavens" (5-6).

34 See Indra Kagis McEwen, Vitruvius: Writing the Body of Architecture (Cambridge, Massachusetts: The MIT Press, 2003).

35 This issue was raised by Prof. Alberto Perez-Gomez a jury member in the 2003-2005 EAAE Prize workshop held in Copenhagen November 25th-27th, 2004.

36 The reminder not to dismissing the importance of what has occurred in architectural theory and education since Alberti was shared with me by Prof. Alberto Perez-Gomez. Perhaps one could say that Durand is the antagonistic 'hinge' between Alberti and the present. See Jean-Nicolas-Louis-Durand, Précis of the Lectures on Architecture, translated by David Britt (Los Angeles: The Getty Research Institute, 2000).

37 It may be possible to legitimately claim Vitruvius invented the student of architecture and therefore the education of an architect well before the inception of formal schools of architecture.

38 Ben Jonson, Timber: or, Discoveries, in C. H. Herford Percy and Evelyn Simpson, editors, Ben Jonson, Volume VIII (Oxford: Oxford University Press, 1947), 620 (lines 1873-1876). This work by Jonson was first published in 1640. According to A. W. Johnson in his book, Ben Johnson: Poetry and Architecture (Oxford: Claredon Press, 1994), Jonson possessed two copies of Vitruvius's Ten Books on Architecture in his personal library and actually underlined the passage where Vitruvius lists the subjects an architect should know. Clearly Jonson had a great sympathy and admiration for Vitruvius's position on education.

39 Leon Battista Alberti, On the Art of Building in Ten Books, translated by Joseph Rykwert, Neil Leach and Robert Travenor, (Cambridge, Mass.: The MIT Press, 1989), 317.

40 See Leon Battista Alberti, On Painting, translated by John R. Spencer (New Haven: Yale University Press, 1976).

41 Vitruvius, The Ten Books on Architecture, 5-13.

42 Vitruvius , 5.

43 Vitruvius , 17.

44 Alberti, On the Art of Building in Ten Books, 7.

45 Alberti, On the Art of Building in Ten Books, 8-32.

46 See, Ramona Naddaff, Exiling the Poets: The Production of Censorship in Plato's Republic (Chicago: The University of Chicago Press, 2002).

47 Manfredo Tafuri, Theories and History of Architecture, Giorgio Verrecchia, translation (New York: Harper & Row, Publishers, 1976), 231.

48 Tafuri, Theories and History of Architecture, 231.

49 Tafuri, Theories and History of Architecture, 1.

50 Prof. Steven Thompson, personal communication (undated).

51 See, Charles Burchard, "A Curriculum Geared to the Times", AIA Journal (May 1967): 101-105. See also, Charles Burchard, "The Next Horizon", AIA Journal (October 1973): 46-7.

52 Frank Kermode, The Sense of an Ending: Studies in the theory of fiction, with a new epilogue (Oxford: Oxford University Press, 2000). Originally published in 1966.

53 The late Colin Rowe, who spent most of his career teaching at Cornell, was perhaps the most articulate and influential proponent of the place of history in relation to the design. One should also mention Bruno Zevi in this context. For the extent and breadth of Rowe's numerous writings, see Colin Rowe, As I Was Saying: Recollections and Miscellaneous Essays (Cambridge, Massachusetts: The MIT Press, 1996), 3 volumes. For a more general treatment of the subject of teaching history, see Gwendolyn Wright and Janet Parks, editors, The History of History in American Schools of Architecture 1865-1975 (New York: The Hoyne Temple Buell Center for the Study of American Architecture and Princeton Architectural Press, 1990).

54 See Gropius, Scope of Total Architecture (New York: Collier Books, 1970), 45 and 57. Gropius makes the argument that history can self-consciously hinder or stifle design exploration in the initial stages of education.

55 One could take this idea further and claim that representation has been overtaken by simulation.

56 The idea of reversibility has implications beyond this particular example. One could look at the entire curriculum and reverse the order of subjects taught. For example, 'basic design', one of the most subtle and esoteric of all subjects, could be taught last, and one could begin with more practical subjects.

57 Hans-Georg Gadamer, The Beginning of Philosophy, Rod Coltman, translation (New York: Continuum Publishing Company, 1998), 106.

58 Gadamer, The Beginning of Philosophy, 58.

59 Gadamer, The Beginning of Philosophy, 57.

60 Medard Boss, editor, Martin Heidegger: Zollikon Seminars (Evanston, Illinois: Northwestern University Press, 2001), 6-7.

61 Martin Heidegger, Martin Heidegger: An Introduction to Metaphysics, Ralph Mannheim, translator (New Haven: Yale University Press, 1987), 24.

62 The Best of Meister Eckhart, edited by Halcyon Backhouse (New York: Crossroad, 1993), 25.

63 Martin Heidegger, Martin Heidegger: An Introduction to Metaphysics, 2-3.

64 In his Introduction to Metaphysics, Heidegger attempts to recover a sense of the original Greek meaning of the term physis not as the nature of modern science, but the ancient awareness of physis as a power of emergence and endurance. This paraphrase hardly does justice to what is one of Heidegger's real philosophical accomplishments, reminding both scientists and philosophers of the complex and subtle ground of nature with respect to philosophy.

65 Medard Boss, editor, Martin Heidegger: Zollikon Seminars, 6-7.

66 Martin Heidegger, Martin Heidegger: An Introduction to Metaphysics, 10.

67 Martin Heidegger, Martin Heidegger: An Introduction to Metaphysics, 12.

68 Alain Badiou, Infinite Thought: Truth and the return of philosophy, Oliver Fedman and Justin Clemens, translators (London: Continuum, 2004), 92.

69 Badiou, Infinite Thought, 166.

70 Badiou, Infinite Thought, 166.

71 Ludwig Wittgenstein, Tractatus Logico-Philosophicus, C.K. Odgen, translator (London: Routledge & Paul LTD, 1988), 183. Originally published in 1921. For the relation of architecture and ethics, see Mario Botta, The Ethics of Building (Basel: Birkhauser Verlag, 1997). Historically the most important work is John Ruskin, The Seven Lamps of Architecture (New York: Dover Publications, 1989). Reprint of the second edition of 1880.

72 This idea is from a lecture delivered by Prof. David Leatherbarrow at Virginia Polytechnic Institute and State University in the spring of 1996. In this lecture Prof. Leatherbarrow defined an architectural plan "as an ideal form of human conduct".

73 Prof. Sal Choudhury, personal communication (undated). In this view a project is a necessary pretext for larger questions about life.

74 Prof. Mark Schneider, personal communication (undated).

75 Ezra Pound, ABC of Reading (New York: New Directions, 1987), 28.

76 Pound, ABC of Reading, 37.

77 Pound, ABC of Reading, 206.

78 A colleague remarked to me that "letters have their feet on the ground and their heads in the clouds". Prof. Mark Schneider, personal communication (summer 2004).

79 The words 'literature' and 'literal' share a common root.

80 Jean-Paul Sartre, What is Literature? Bernard Frechtman, translation (New York: Philosophical Library Inc., 1949), 46.

81 Jorges Luis Borges, This Craft of Verse, The Charles Eliot Norton Lectures 1967-1968 (Cambridge, Massachusetts: 2000), 93.

82 Borges, 115. The idea that architecture can be understood as a dreaming in matter was shared with me by Vic Moose.

83 For the idea of the canon in relation to literature, see Frank Kermode, Pleasure and Change: The Aesthetics of the Canon, The Berkely Tanner Lectures (Oxford: Oxford University Press, 2004). Prof. Steven Thompson brought this fine book to my attention.

84 Umberto Eco, On Literature, Martin McLaughlin, translator (New York: Harcourt, Inc. 2004), 1.

85 Eco, On Literature, 10-11.

86 Eco, On Literature, 11.

87 Prof. Sal Choudhury, personal communication (undated).

88 Concerning the importance of philosophy in the education of an architect and architecture, Kenneth Frampton has written that "all graduate students ought to receive some instruction in philosophy during their architectural education...it is philosophy that affords the evaluative ground on which to construct a truly public realm and discourse, without which no architecture worthy of the name can come into being". He adds that "architecture has more in common with philosophy than any other poetic discourse". These passages are quoted from Kenneth Frampton, "Topaz Medallion Address at the ACSA Annual Meeting," Journal of Architectural Education 45, no. 4. (July 1992), 195- 196. See also Ludwig Wittgenstein, Culture and Value, where he aphoristically speaks of the similarity of architecture and philosophy. Wittgenstein writes that "architecture like philosophy is really a working on one's self".

89 For the relationship between architecture and literature, see Via, No.8, 1986. The teacher John Hejduk was noteworthy for his reliance on a literary sensibility in educating architects.

90 The phrase 'realization of life' is a reference to the work and thought of the poet Rabindranath Tagore. See his Sadhana: The Realization of Life (New York: The Macmillan Company, 1915). Tagore brilliantly articulates the differences between the life-world of the West via Greece and that of the East via India. He distinguishes between the Western tendency toward acquisition and the Eastern tendency towards realization. Here the 'desire to know' is contrasted with the desire to be. Literature is in a unique position to gauge the tenor of the realization of life.

91 William H. Gass, Fiction and the Figures of Life (Boston: David R. Godine, 1971) and The World Within the Word (New York: Basic Books, 1976).

92 Gass, Fiction and the Figures of Life, 9.

93 Gass, Fiction and the Figures of Life, 9.

94 See, Benedetto Croce, The Aesthetic as the Science of Expression and of the Linguistic in General, translated by Colin Lyas (Cambridge: Cambridge University Press, 1992).

95 One of the most significant experiments in many US schools of architecture over the last decade has been the so-called "design-build" phenomenon. Much of this laudable activity, which involves students directly in the act of building, was the result of the remarkable and inspired work of the 'Rural Studio' at Auburn University founded by the late Sam Mockbee. Through a number of built projects, Mockbee was able to address fundamental social issues such as rural poverty while maintaining the highest standards of architectural form. It is important given the widespread influence of design-build projects to better understand the educational intent and impact of such projects.

96 Prof. Steven Thompson, personal communication (undated).

97 I am indebted to Prof. Steven Thompson for pointing out to me the importance of sensibility in the education of an architect, rather than an adherence to an aesthetic approach. Here one may compare Kant's magisterial Critique of Aesthetic Judgment with his smaller work, Observations on the Feeling of the Beautiful and Sublime. For the idea of sense as the paradox of direction, see Gilles Deleuze, The

Logic of Sense, translated by Mark Lester (New York: Columbia University Press, 1990). This was originally published in 1969 under the title, Logique du sens. For the complexities of formal aesthetics with respect to the education of architects, Prof. Hans Christian Rott has provided me with invaluable insights on many occasions.

98 C.S. Lewis, Studies in Words (Cambridge: Cambridge University Press, 1967), 133. I refer the reader to Chapter 6, "Sense" and Chapter 5, "Wit".

99 For the idea of surface effects in relation to sense, see Deleuze, The Logic of Sense. Deleuze takes the classical category of appearance and reorients it towards what he terms a "science of surface effects". Sense does not exist outright but rather inheres or subsists at the surface of things. On page 22 he writes, "Sense is both expressible or the expressed of the proposition, and the attribute of the state of affairs. It turns one side towards things and the other side toward propositions.... It [sense] is exactly the boundary between propositions and things". Sense is the "minimum of being that befits inherences". For Deleuze the critical task is the "production of sense". See pages 72-73.

100 George Santayana, The Sense of Beauty: Being the Outlines of Aesthetic Theory (Cambridge, Massachusetts, 1988), 13. The original was published in 1896. I was reminded of Heidegger's thought, "The rose is without 'why' (gelassenheit) and that life can be meaningful without the 'why'".

101 Santayana, The Sense of Beauty, 27.

102 This position is not without its dilemmas, as it separates knowledge and ethics from questions of beauty.

103 Santayana, The Sense of Beauty, 30.

104 In this regard Santayana seems to have much in common with Corbusier and Ozenfant and their ideas on Purism. See Le Corbusier and Amadée Ozenfant, "Purism" in, Architecture and Design 1890-1939: An International Anthology of Original Articles, edited by Tim Benton and Charlotte Benton with Dennis Sharp, (New York: Watson-Guptill Publications, 1975), 89 – 91.

105 I am indebted to Prof. Hans Christian Rott for pointing out the condition of alienation from the object of beauty that is prevalent in many students today. This problem of a distancing from the sense of beauty is an important issue for contemporary educators to address.

106 Ben Jonson in his Timber: Or, Discoveries, 635, understands the poet to be a 'maker', following the Greek definition of the word poet.

107 Ben Jonson, Timber: Or, Discoveries, 620.

108 Ben Jonson, Timber: Or Discoveries, 621. The idea of sense as that which captures a feeling for the fertility of natural life is reflected in the words of Hugh of St. Victor quoted by Ivan Illich: "All nature is pregnant with sense, and nothing in all the universe is sterile". This passage is quoted from Ivan Illich, In the Vineyard of the Text, 123.

109 Ben Jonson, Timber: Or, Discoveries, 621.

110 Robin Evans, Translations from Drawing to Building and Other Essays (Cambridge: Massachusetts, 1997), 266-272.

111 Evans, 269.

112 Evans, 270.

113 Deleuze, The Logic of Sense, 72.

114 For an interpretation of Plato's famous divided line in Book VI, see Harold Bloom, translator, The Republic of Plato (Harper Collins Publishers, 1991), 464 (note 39).

115 Leon Battista Alberti, On Painting, 43.

116 Physis – today reductively called 'nature'– was defined by Aristotle as "the principle and cause of motion and rest for the things in which it is immediately present". Aristotle extended the idea of physis from the realm of animate things to include inanimate things. Animate things had an active principle of movement and inanimate things had a passive principle of movement. With respect to the archi-

tectural curriculum, coursework on the ancient and modern science and philosophy of nature (natural philosophy) is a critical component that is absent from most professional programs in architecture. Here courses in 'sustainability' would be more firmly grounded in the study of nature. The corollary to courses on nature would be the study of the city. For the complimentary relation of nature and city, see Joseph Grange, The City: An Urban Cosmology (1999) and Nature: An Environmental Cosmoslogy (1997). For a 'modern' view of nature, see Alfred North Whitehead, Concept of Nature (1920). Finally, the poets' relation to the rural arcadian landscape has perhaps never been more finely expressed than in the ancient works of Virgil.

117 I am adopting Kenneth Frampton's use of the term resistance as he applies it to the making and practice of architecture in relation to forming a comparable strategy for architectural education.

118 I am inspired by Kermode's invocation of the idea of pleasure (via Roland Barthes) with respect to the canon of literature. Here ones see the relevance of finding pleasure amidst change within the canon of architecture. In an age of distraction we may be witness to the disappearance of pleasure. Prof. Steven Thompson reminded me of the timely importance of the idea of 'canon' for architectural education.

119 Per Olaf Fjeld, Sverre Fehn: The Thought of Construction (New York: Rizzoli International Publications, 1983), 26.

120 Per Olaf Fjeld, Sverre Fehn: The Thought of Construction, 27. The image of the roots of a plant or tree bursting through the surface of the ground has also been invoked by the Danish architect Jorn Utzon, in Jorn Utzon Logbook, Vol. I, The Courtyard Houses , Mogens Prip-Buus, editor (Hellerup, Denmark: Edition Blondel, 2004),10. The spirit of this moment becomes the inspiration, literally and figuratively, for grounding the making and teaching of architecture. I refer the reader to the drawing by Professor Olivio Ferrari which appears at the beginning of this essay, and which expresses these same sentiments.

ILLUSTRATION CREDIT

The illustration that appears at the beginning of this essay is a copy of a drawing made by the late Prof. Olivio Ferrari. It is part of a series of diagrams of flowers that he made in 1966. It was originally published in Ferrari: Portfolio, (Blacksburg, Virginia: College of Architecture and Urban Studies, March 1996), 128. I would like to thank Lucy Ferrari for granting permission to use this illustration.

ACKNOWLEDGEMENTS

I would like to extend my gratitude to the European Association of Architectural Education for organizing this essay competition, and to the generous sponsorship of VELUX. The Royal Danish Academy of Fine Arts, School of Architecture should be commended for hosting an extremely productive workshop for the finalists. I would like to thank all my colleagues in the School of Architecture and Design, College of Architecture and Urban Studies, Virginia Polytechnic Institute and State University. In many ways I have received my best education through numerous informal and formal discussions occurring over the past 17 years with my colleagues. I am indebted to readers of earlier drafts of this essay: Michael O'Brien, Mark Schneider, Paul Knox, Hans Rott and Kay Edge. A number of other colleagues shared constructive comments with me that have hopefully improved the arguments I present: Scott Poole, Susan Molesky and Sal Choudhury. Finally I would like to thank Steven Thompson for his unfailing intellectual rigor, William Galloway for his ability to think under pressure and Vic Moose for intelligent discussion about the broader questions posed by this essay.

2. PRIZE THOMAS MCQUILLAN NORWAY

This is a very interesting essay because of its creative capacity to read the existing situation in and around architectural education and at the same time indicate future direction and essential topics for discussion. The content is optimistically realistic and poetic at the same time in that the author's somewhat direct statements challenge the reader and almost form a conversation. The content addresses three challenges, a set of tensions that could shape the future of architecture and architectural education: Innovative practice – Construction of buildings – Demands for compliance

Within these three challenges the essay draws a contour of a "modern world" with all its mistakes and hopes, but also a world in which architecture due to its capacity to react and transform is again an informed pursuit.

Per Olaf Fjeld, Jury Chairman

2. PRIZE

EUR 7.500

Informed Architecture: Three Tensions

THOMAS McQUILLAN

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The rise of the paradigm of an information society has clear and present challenges for the future of architectural education, including the importance of innovative practices, changes in the way buildings are constructed, and demands for compliance within larger social systems. Three basic approaches to these challenges are outlined, each with its own degree of 'assimilation' to a society of information. The inherent volatility of the pace of societal change will simultaneously trigger a technological, a hermeneutic and an autonomous architecture, each responding to particular challenges and opportunities. Each of these positions is also a critique of the others. Thus while demands for 'new knowledge' will inevitably need to be met, I also argue that the production and strengthening of 'old knowledge' will be equally important, and that the present climate in architecture may hold the promise of drawing forth a more fit and diverse discipline, by identifying and strengthening architecture's basic multiplicity.

PLAN

This paper attempts to address the challenges that informationality poses to architectural education in an unblinking manner and to respond with useful recommendations. These challenges are many and diverse – indeed perhaps mutually contradictory. In order to retain as global an outlook as possible on this landscape of hazard, the paper identifies three extreme positions of readiness, each with its own set of concerns, capabilities, vulnerabilities and baggage. Each position can be seen as a critique of the other two. My intention is to create a productive tension that can foster dialogue across a wide range of educational contexts.

INFORMED ARCHITECTURE

The explanatory models of the 'Information Society' and 'New Knowledge' have become increasingly dominant in contemporary academic discourse, though the features they describe have been developing since the 1950's. The sudden emergence of the internet as an everyday phenomenon and the omnipresence of personal computing brought these ideas firmly into the mainstream. While scholars and theorists have long been touting the challenges and opportunities of the coming information society, its widespread realization has had some unexpected results. There has been no lack of imaginative suggestions concerning the radical changes that becoming informational might mean for humanity (including immersive virtual reality and plug-in architectures). Twenty years ago, however, few envisioned that simple systems like mobile messaging, the web, and file-sharing would affect the fabric of everyday life in the (less spectacular but no less radical) ways they have.[1] Similarly, the future of architectural education will almost certainly be different than we now think.

At the outset, it is important to concede that, while the character of coming change is often recognizable in its basic features and concepts, the actual impact of this process of change is almost always different, more subtle and deeper-reaching than we imagine. With this in mind, this paper is an attempt to qualify and discuss the question of architectural education in order to provide avenues through which it may be investigated, rather than to suggest

those answers directly. This approach recommends itself for two reasons. First, the question concerns change. It would be a mistake to consider the emergence of an informational paradigm as a new stable plateau from which new but static policies could be successfully launched. The greatest import of informationality is its extreme volatility. We ought to develop flexible strategies for adaptation, rather than construct presumptive answers whose obsolescence is assured.

Secondly, the scope of the issue is extremely broad and inclusive. While terms such as 'information society' and 'new knowledge' are not strictly novel terms, their elaboration and discussion are still quite nascent, even though they are concepts whose popularity has increased exponentially in the last 15 years.[2] Further, these are ideas that have emerged in primarily scientific and economic contexts, and it is still somewhat unclear how a discipline such as architecture can respond to their challenges, rather than simply being affected by them. But in any case, it is clear that the future of architectural education will be intimately linked to the future of the discipline as a whole. In other words, the question of architectural education is fundamentally a question of architecture. This paper attempts to describe the way in which an increasingly informational society affects architecture, and to situate architectural education within that greater context.

The discussion will take the following form. Firstly, it will be useful to describe the particular features that characterize the information society, and the challenges that they pose. Secondly, the discussion will raise the problems of an architecture affected by information, and identify the salient issues in this situation. Thirdly, I advance three basic explanatory models that can be used to develop more flexible and robust responses to the challenges of an information culture and the 'new knowledge' that it promises. Finally, I situate architectural education (and research) within each of these models, and suggest the particular roles that the academy can play within an architectural whole.

FEATURES

What is the information society? Simply stated, it is that mode of social organization and production that has increasingly supplanted the prevalent modes of organization and production in an industrialized society. In this sense, it is primarily defined by the ways in which it differs from the ideas and practices that originated in industrialized contexts, and many of its precepts are transformations of earlier systems of belief: while the promise of socialism has ceded to more market-oriented politics, the relevance of Marxism has been largely superseded by globalism, and workers have been displaced by knowledge workers.[3]

In addition, the displacement of goods by information has created a degree of uncertainty in the material world on a scale unseen since ancient metaphysics. Suddenly, the emergence of a domain of 'bits' on par with that of 'atoms' has radically resituated the way in which the concept of value is understood. Thus a real-virtuality has been constructed, in which 'immaterial' bit-based networks, processors, workstations and storage farms have become in-

terlinked with 'physical' artifacts, logistical systems, workplaces and warehouses. The rise of a virtual world in no way supplants the physical world: rather, it extends, augments and amplifies it.[4]

'New knowledge', then, is an attempt to understand, codify and communicate these new relations of production. Some of the more crucial transformations that new knowledge has identified are an increased ubiquity of accountability, the progressive erasure and overlapping of traditional disciplinary boundaries, the emergence of a globally inflected culture of exchange, the destructive presence of human contrivance in our ecosystem, and the explosive social and political mobilities of individuals, ethnicities, subcultures and genders.

For the past 15 years, the rapid rise of information technologies has spurred many to endorse a rather one-sided, overblown and superficial vision of change, in which the physical world would become increasingly discarded in favor of 'cyberspaces' and 'posthumanity'. Happily, much of this hyperbole has now been set aside in a search for the real meaning and impact of an informational society. One of the clearest and earliest voices in the definition of an information society is Manuel Castells, whose Information Age Trilogy identifies three basic agents that are shaping current society: capital, networks, and identities.[5] Capital refers to the radical restructuring that has occurred in the global economy since the 1980's and especially in response to the near-total disappearance of communism in the Soviet Union and elsewhere. Networks are the systems that have enabled this restructuring of capital and emergence of a widely distributed infrastructure of personal communication. Identity is no longer seen in contrast to a social system that shapes and controls the individual, but rather as a creative force of its own, more highly empowered than before by the accessibility of both personal capital and networks, but also newly vulnerable to identity theft and surveillance. The interaction of these three agents creates an informational society in which atoms and bits are inextricably intertwined, and in which a culture of 'real-virtuality' emerges.[6]

CHALLENGES

The challenges for architecture are threefold. Firstly, the complexity of the practice of architecture has increased exponentially. Largely gone are the quiet studios of the architectural past, replaced by humming machine inventories and banks of literature specifying code compliance. Projects are typically developed and followed up by working groups within architectural offices that interact with a wide range of client representatives, local communities, regulatory bodies and media channels. On-site, the traditional image of the craftsmen whose own know-how allowed them to read architectural drawings interpretively has been displaced by the independent contractor offering a catalog of products and solutions. Nonetheless, architectural education still largely operates on the basis of a single architectural designer, struggling with the language of architecture, but otherwise seemingly unaware of these changes. The architectural practice is now under pressure to become responsive to change in order to remain competitive, not only in an economic sense, but also in terms of

its ability to pursue its ends successfully in the face of a complex and sometimes antagonistic social context. In an information society, the practice of architecture must be re-evaluated in the light of innovation.[7]

Secondly, there has been a marked change in the composition of buildings. It remains a little noted fact that architects rarely now encounter or specify materials in the traditional sense; buildings are now constructed mainly of commercial products, composed and tested according to a wide range of performative criteria, such as insulation, elasticity, fire-resistance, economy, or systems interoperability of 'smart' materials.[8] In addition, architects find that their domain of work now includes a larger portion of systems control in program and design, as buildings become interconnected with bit-based networks. And building processes themselves are now also subject to a wider range of performative criteria, such as energy-efficiency, materials and construction maintenance, and total life-cycle considerations.[9] In an information society, buildings have become the machines that Le Corbusier so presciently envisaged, albeit shorn of his ideation and passionate formal sensibilities.

Thirdly, the pressures of an information society require that its inhabitants seek market compliance. The increasing value of encoded, transmissible and accountable information has fostered the demand for a program of architectural research that can quantify and justify the role of the architectural profession in contemporary society. Architecture is no longer afforded the luxury of being a self-evident part of a living culture, and must increasingly explain itself to laypersons in both the sphere of politics and the context of everyday life. As a result, educational institutions everywhere are scrambling to translate the tacit 'know-how' of centuries of architectural thought and practice into an explicit body of knowledge that can guarantee its continued survival, by emphasizing relevant research. While twenty years ago architectural schools sought to re-establish the phenomenological basis of meaningful architecture, today they are dominated by research into shopping, data-driven morphologies and infrastructure transformation. In an information society, architecture has become a 'profession' among others, struggling to give an account of its meaning and value in order to comply with the demand for accountability, while competing in an increasingly selectionist economy.

These three challenges, then, will shape the future of architecture and architectural education: the pressure for innovative practice, the change in the construction of buildings, and the demand for compliance. In the following, I will sketch three basic strategies by which architectural education may interact and profit from these challenges. These models should not be seen as mutually exclusive – rather they describe three basic tensions that may be productively combined. In this way, each describes an extreme position. In each case, architectural education is seen in the context of architecture as a whole. Additionally, each of the three approaches attempts to cast the problem in the light of informing rather than affecting; in other words, how can architecture and architectural education become informed by an information society rather than simply being forced into a reactive posture. The three

models discuss varying degrees of convergence with an information society, in which a technologically informed architecture seeks to become isomorphic with the society in which it works, an immediately informed architecture operates in a context of difference and negotiation, and autonomously informed architecture asserts it right to offer resistance in a society increasingly characterized by flows.

1. TECHNOLOGICALLY INFORMED ARCHITECTURE

The three basic challenges sketched above describe a relation between an archaic discipline and a technologically developed society. As such, one very clear alternative suggests itself: architecture can accept the demands of contemporary society by attempting to view itself as synthetic with this culture. Obviously, architecture is an implicitly technological discipline, if technology is taken in its most basic sense: as the systematic study of making and doing. In this light, architecture might even be seen as the technological discipline par excellence, as the etymology of the word suggests: chief (archi-) contriver (tektôn). But its technological aspects are both deeper-reaching and more conflicted than this etymology might suggest.

Traditionally, of course, architecture has maintained a distance from the technological, as a simple means that does not have the capacity to embrace the full register of meaning that is architecture's true province. Many innovative architects have been somewhat more willing to elide this distinction, seeing in technology the original promise of architectural work. At the same time it has been commonplace to reduce technology to the status of functional and static means, and thereby deny it the status of signifying. For many a theorist, the promise of a technologically informed view of architecture is simply an extinct line of inquiry.

But this attitude is beginning to change, and it is in great part this change that has ushered the information age into the sphere of architecture. It is completely uncontroversial to state that nearly all of the major developments in contemporary architecture in the last 15 years have been conceptually technological. In addition, studies into the condition of technology have increasingly abandoned earlier conceptions of technology as something rational and non-situated. With the re-evaluation of the modern project, the role and significance of technology is also revealing an unexpected richness. While it was common until quite recently to equate technology with applied rationality and science, it has become increasingly clear that technology is both more primitive and more inclusive than these, and that in many senses, technology can be said to be the basic foundation from which both sprang. This re-evaluation of technology is still controversial, but much relevant and penetrating work is being accomplished.[10]

In architecture, however, this renewed interest in the broad methodological and epistemological features of technology as the systematic study of making and doing is still limited to the 'contrivers', that is, the inventors who are pushing the limits of architectural experimentation, but whose immersion in their work has prevented them from articulating the results

of these studies. Moreover, theoretical and historical work has only recently begun to treat the implications of the emerging technological paradigm. Much research and discussion is still rooted in the phenomenological precepts of Heidegger, especially as popularized by Christian Norberg-Schulz.

As such, it may be interesting to revisit Heidegger's The Question Concerning Technology.[11] This 1955 lecture has attained a notable status in the humanities, though it has been largely ignored in scientific circles. Heidegger's project to uncover authenticity can be read without undue distortion as an attempt to rescue mankind from its dangerous tendency of becoming technological. In this way, his perspective of technology is a hostile one. He fears that the increasingly technological character of society is robbing us of the complexities of authentic being by reducing everything to the status of a collection of raw materials (Bestand) in a world of pure unmediated causality. Technology thus operates by enframing all being within its scientific matrix, and reducing value to productive, utilitarian value.

For Heidegger, the danger of contemporary technology is its tendency to degrade the concept of cause. In order to illustrate the distinction between craft (techn) and technology, he compares two 'vessels': a silver chalice and a hydroelectric dam on the Rhine river. The first is a poetic assembling of the four classic Aristotelean causes: a causa materialis, a material cause by which matter becomes 'co-responsible' for the chalice; a causa formalis, a formal cause through which it participates with an image of 'chaliceness'; a causa finalis, a teleological cause that determines the boundaries of its use; and a causa efficiens, that is the maker of the chalice. These four agents collaborate on the fabrication of the chalice, each retaining its own authentic context and co-responsibility for the object itself. In this way, the chalice is an opportunity for these causes to be gathered and to rid a clearing onto an 'indebted and responsible' authenticity.[12]

Compare this, then to the brutal imposition of a hydroelectric dam into the flow of the Rhine. Through this act, the natural flow of this river has been transformed and exploited to harness its power to other ends. Turbines are set into motion and their rotation generates the electricity that is cabled into the machines and lights of the contemporary town.[13] As such, the majestic flow of that great river has been made banal: its movement merely a pretext for the generation of abstract power whose final context of use is no longer aware of, let alone 'co-responsible' for its origins. Hence our present condition, individually responsible for an ecosystem that we nonetheless seem powerless to control.

At the same time, the challenge of identifying the crucial conditions for distinguishing craft (techn) and modern technology has remained recalcitrant. Heidegger's argument (that modern technology 'enframes' in a way not present in techn) remains rarefied and resistant to demonstration.[14] But his own inventive 'contrivances with language' suggest that his opposition to technology may indicate more an unwilling prejudice than a reliable insight. Indeed, it is becoming more likely that his understanding of archaic techn can be valuable

in understanding high techn , or contemporary technology. This is perhaps the most significant result of the re-evaluation of the post-Enlightenment project: that technology cannot be reduced to the rational, the instrumental, the ahistorical, or the deterministic. Technology partakes of and is nourished by both poetic speech and historicity, both the fear of mortality and radical contingency.

Understanding current (rather than 'modern') technology as the current state of creative practice allows us to re-activate Heidegger's multiple 'causes', freed from the obsession to reduce that practice to a simple linearity of cause and effect. Perhaps the most significant advances made in the realm of causation are the findings of so-called 'second-order cybernetics', in which causality is understood as a circular process in which internal forces are as important as those originating from the outside, and whose control manifests the signs of purpose. Architecture's spatial aspect, by which it determines relations between interiors and exteriors at a multitude of scales, lends itself to this notion of causation in which selectionist factors such as environment, homeostasis, variation and culling operate.[15]

At one extreme of scale, technology has explored engineering 'the bottom of the world', at the atomic level of nanotechnologies and genetics, while at the opposing end of the spectrum 'out of this world', it has enmeshed the planet in a series of concentric shells of transport, communication, remote sensing, and global surveillance. Between these two extremes is the traditional domain of architecture, which is becoming intertwined with these developments though communications, 'smart' materials, ubiquitous computing, environmental systems, transport and research. If we are able to compartmentalize an essentialist prejudice against human products and begin to see ourselves as fundamentally natural (in other words, evolved), we may begin to see the beauty and utility of technology when practiced responsibly and reflectively. Considering architecture a technology means striving to make current practice and education synthetic with contemporary life, and at the same time allowing architecture to rejuvenate its capacity to produce new knowledge. In this way, the discipline of architecture could embrace growth, renewal and innovation.

The Role of Architectural Education in a Technologically Informed Context

The role of architectural education in this approach is to deepen and update the systematic study of doing and making in architecture. In order to do so, it will be necessary to re-examine architecture in the light of recent technological thinking, and to begin to assemble a body of knowledge about its heritage of techniques and processes. Some areas to be researched include a historical study of the relations between construction and concept, the ways in which architecture manifests social and technological change or sparks it, and the change in the meaning of privacy in a regime of informational surveillance, among a host of others. Too, architectural education needs to begin to discuss more fully the almost complete transformation of the design from a manual process to one that is increasingly machine-generated and product manifest. In addition, it is becoming pressing to develop a philosophy of new building that can relate the actuality of current construction to the un-

derlying aims of an existentially aware practice. But the most important update to current architectural instruction is the acknowledgment that technology is a fundamental root of architectural thought, and that its exploration is essential.

2. IMMEDIATELY INFORMED ARCHITECTURE

In the technologically informed architecture described above, emphasis is squarely laid on achieving a convergence with contemporary culture and giving priority to practice (that is, the production, study and discussion of artifacts at whatever level). However, it gives rise to two main worries. The first is that it will not be able to adequately account for much of architectural history, where the distinction between technology as means and significance as ends is often encountered. As such it is limited to the study and production of artifacts sui generis, without treating historiography. The second is that a technologically informed architecture will thereby be unable to adequately study its own metanarratives, and will require an external and perhaps antagonistic interlocutor.

In contrast to the ideal of convergence that underwrites a technologically informed architecture, another form of architectural research would be needed to seek to map and articulate discontinuities and asymmetries between artifacts, intentions, receptions, and histories. Obviously, architecture can lay claim to a richness of history and theory that is unique in its duration and breadth. The increasing equivalence in contemporary parlance of information and meaning is a salient challenge for this rich body of 'old' knowledge. In much the same way that technology's previous status as a limiting and instrumental trope has begun to erode as a growing number of thinkers plumb its depths, the role of history and theory is currently overcoming the facileness imposed upon it by a generation of nebulous postmodernist thought.

But while this renewal, in the form of a more properly hermeneutic approach, has shown great promise in the development of normative guidelines for the explication, maintenance and practice of architecture, it has been limited by its inherent (and self-avowed) secondarity.[16] As such, it has had difficulties stimulating innovative work, and has remained tied to a reactive posture after the fact. The rise of a culture of information demands of traditional hermeneutics that it go beyond unraveling the onion to pursue actionable strategies for the reinsertion of its findings into the fray. In other words, it needs to put history on the table.

Hermeneutics is always and by definition agenda-driven, presupposing as it does an underlying set of ethical, political and personal positions from which it speaks. The unfolding and reconstruction of these positions is the hallmark of modern hermeneutics, though it has remained relatively silent to the reception of these findings in an exoteric context. The challenge raised by the demands of 'new knowledge' is that hermeneutics reinvent itself, reflecting not only upon its subject and itself, but also critically upon its role in the remorseless arena of getting things done.

In order thus to collaborate on invention and become privy to decisions, hermeneutics might embrace its opposition: what Gregory Ulmer terms heuretics.[17] Heuretics takes up where hermeneutics leaves off, by emphasizing the importance of invention. Where hermeneutics seeks to reconstruct, interpret and communicate the meaning of the architectural artifact, heuretics attempts to make something with the artifact, by extending, cross-fertilizing or opposing it in new work. The key to heuretics is the centrality of the generative impulse, which takes precedence over understanding. In this way, it assumes an initial position of ignorance, rather than of knowledge, in its quest for learning and teaching by production. Indeed, perhaps the most pivotal feature of 'new knowledge' is that it is not knowledge at all properly speaking, but learning. Weight is shifted from the objectivity of a 'body of knowledge' towards the activity of generating and disseminating learning through creative experimentation.

It may be possible to marry these twinning powers, the disassembly of hermeneutics with the bricolage[18] of heuretics, by developing a concept of immediation. This is compiled from the words media, mediation and immediate, all three of which share the same etymology, but whose denotations have diverged sharply. The word immediation is itself a product of the process of immediation. Media refers to the substance or agent that hosts a message, mediation emphasizes the interventive aspect of coming between and negotiating between two positions, and immediate suggests the closure of this space of negotiation in order to produce present action. So immediation means both entering in media res,[19] that is, into the continuities that are the world of the work, and also seeing in that world the materials for the construction of new ones. In other words, the concept of immediation invokes both intervention and invention. In order to do so, it needs to bridge or narrow the gaps between historical unfolding and present action by becoming complicit with this invention. It would thus glean from its hermeneutic circle the generative materials for heuretic experimentation.

The Role of Architectural Education in an Immediately Informed Context

Whereas the technologically informed architecture described above sought full convergence with its society, an immediately informed architecture attempts to respect disciplinary boundaries and the importance of difference. In an immediately informed architecture, the academy holds a special place, as a space slightly buffered from the constraints of economy and the barefacedness of popular culture. This minor distanciation allows the academy a more reflective role, as described in the practice of hermeneutics above, while it also affords it near-neutrality as a negotiator. Architectural education and research, then, play an important role in the context of architecture as a whole by creating a series of linkages between agents who might otherwise remain isolated or antagonistic. The academy can become an instance of discussion, publication and instruction that brings together students, practitioners, clients, the public sector, media channels and research councils.

The process of immediation occurs by creating narratives and ideas that can inform the relationships between these diverse participants, allowing their points of view to be heard. Of course this requires that the academy becomes more flexible and inventive than it has traditionally been, and that it fosters the practice of generating and disseminating learning through creative experimentation. In many ways, however, this tendency towards an increased porosity in the academic context is already underway in many schools of architecture, where postgraduate programs act both to attract a professional and public sector audience as well as contributing a strong source of external funding. Perhaps the most intriguing possibility here is the possible integration of parts of undergraduate and professional postgraduate education, creating a synthetic environment in which students, professionals, civic authorities and researchers interact and are informed. While the principle in itself is not new, the methods needed to achieve it in an information society will need to be.

3. AUTONOMOUSLY INFORMED ARCHITECTURE

Against the two degrees of cooperation described above in the terms of a technologically and immediately informed architectural discourse, it is now time to turn to the third camp in this argument: that of resistance.

In a very real sense, architecture remains beyond comprehension, and it is its deeply rooted inscrutability that provides it with much of its visceral power. However much we might desire to read into it the meanings and events that it can host, the built artifact always guards within itself a pure passive mute presence. For many architects, it is just this muteness that makes the act of building so compelling, and their refusal to participate in breaking that silence by declining to supply explicit explanations is integral to the creative power of architecture, and its fundamental poiesis.

In the regime of compliance and accountability that are the signatures of an information age, it can be unsettlingly easy to disregard the fundamental mystery of architecture. But it is worth noting that despite more than two millennia of architectural theory and history, the underlying agency and significance of building architecture seemingly still conceals real secrets that inspection cannot extract. It becomes clear that for all its knowledge, know-how, and 'new knowledge', architecture possesses a fundamental unintelligibility. This may sound mystifying, but it is in reality a simple admission of ignorance: in order to speak more clearly about its intelligibility, it is necessary to acknowledge the areas of architecture in which we work but from which we seem unable to export communicable knowledge. By definition, these areas are notoriously difficult to discuss since they escape precise definition and rely on poetic utterance.

The realm of unintelligibility is secured by both creativity and mortality. Creativity, in the sense of poiesis, is an engagement with the not yet known. Obviously, any form of creativity can be said to be a transformation, extension or reversal of existing ideational matter, but this is simply to beg the question, since it is what is not present in the existent that defines

the creative act. Importantly, innovation at a social level is dependent upon creativity at an individual level. But the creative act is always at odds with society, whose structure is based on mutual convention. In this way, creativity both feeds upon and contributes to the resistance to society. In addition, it is this break from convention that provides the substance of 'new knowledge', after the fact. Thus creativity remains 'before intelligibility'. In an opposing way, mortality remains impervious to thought: its threat brings the vacuum of the unknowable into the life of every human being. And while there is a class of problems that are presently unanswered but whose ultimate answerability is not seriously in doubt, it is doubtless that personal knowledge of death produces no wisdom, since it is swallowed by death itself. Thus, mortality remains 'after intelligibility'.

As such, to the degree to which architecture participates in this unknowable event, it itself engages in the unknowable. Despite the urgency and attractiveness of 'new knowledge', it is important that architects become fully aware of the threat that this urgency imposes. It is nothing other than a demand for explanation and accountability. Seen from this angle, the archaic discipline of architecture is under siege. A choice is becoming increasingly unavoidable: either surrender the privileged realm of inscrutability, or begin mounting a defense of its esoteric territory.

The most important cache that the discipline of architecture has to guard is its ability to create physical enigma. Like a work of art, architecture only superficially engages in its own physical presence, or does so at the risk of banality; rather, architecture is a discipline of realizations that begins in the constitutive stages of conception and continues through the building of this conception. But its real work does not end there, for it is not in its 'completion' that it is fully realized, but instead in the way that it continues to host the processes of personal and social realization within its domain. Architecture also comprises the self-realization of its inhabitants. And it is in the way that it stimulates its inhabitants that it can be said to be successful. The 'problem' of architecture is its solution. And its muteness is a precondition for the realization of its meaning.

The importance of the enigmatic in art is underlined by Adorno in his 1970 Aesthetic Theory.[20] He notes that *"all artworks – and art altogether – are enigmas; since antiquity this has been an irritation to the theory of art."* For him, all works of art tread a razor's edge between the culture and society from which their ideas and materials are drawn, and the inherent protest that invention and creation truly are. Art – and by extension architecture – threatens and is threatened by society, while it thereby also breaks new ground, develops new attitudes and permits the development of new knowledge. And this is essential: architecture must continue to pose the questions whose answers are the very stuff of knowledge.

The Role of Architectural Education in an Autonomously Informed Context

Obviously, though, the maintenance and deepening of this autonomy is fraught with both social and political difficulties. But in these difficulties lie the resistant power from which to

strengthen and develop architecture's esoteric realm. The role of architectural education in this approach is twofold. First, it will need to study itself. In order to reassert the primacy of architectural thinking as a trade and form of life, a deeper understanding of the study and practice of architecture is essential. Contemporary architectural education is largely a fragmented modular system in which very little exposure to or understanding of the heritage of architectural work is achieved. Coursework in architectural history is conventionally limited to periods and concepts, while architectural theory is quite often a study of everything but the theories of architects. In order to strengthen the disciplinary meniscus, a greater documentation and understanding is required of the lives of architects, their precepts and blind spots, their works and publications, their method of practice and technique of instruction. Architecture must begin to know itself more fully.

Secondly, this process of self-reflection should occur in the studio as well as in the classroom. It is an unfortunate result of the transition in educational programs that the longer, intense, studio-based environment of the past is now being replaced by the less rigorous bachelor/masters structure in compliance with other disciplines. If architectural education is to resist assimilation, it needs to reverse this trend. The studio is a privileged area for the discussion of both the intelligible and the unintelligible aspects of architecture, since as a space of personal work it commits all of its occupants to a position of responsibility in ways that the classroom cannot. The studio provides a space in which ideas, positions and artifacts can be made rather than simply being described.

It might seem that an autonomously informed architecture has little place in an information society, flying in the face as it does of prevailing trends. But ultimately, its resistance can be a powerful force for innovation within a culture that is increasingly forgetting the difficulty of creation; and the alternative is the loss of architecture as we know it.

CLOSING

The features and challenges of an information society are clear, but the response of architecture and architectural education has not been. The three approaches described above are conceived from the standpoint of the basic successes, tensions and contradictions that increasing dependence on information as a paradigm has produced. They are intended to provide a set of positions from which to further develop the role of architecture in contemporary life. In this way, none of them indicates a unitary model for education. The future shape of architectural education will likely be fashioned by these three basic approaches in cooperation: convergence being assisted by immediation, immediation drawing from autonomy, and so on. It is pressing that the challenges of an informational society become seriously integrated into architectural education, and that the extreme diversity and volatility of this integration is preserved. The architecture of real-virtuality is varied, and this variation is a potent source for research and education. Perhaps in this way, a more diverse and fit discipline may be able to renew itself at every level.

NOTES

1 In a recent case in Sweden, a priest is said to have used SMS messages to instruct his lover to murder his wife. The murderer apparently believed that the anonymous text messages were sent from God. Weblinks for this case have come and gone rapidly in recent months, so for more info, try this Google search: http://www.google.no/search?as_q=fossmo+sms&num=10&hl=en&lr=lang_en

2 For an overview of 'new knowledge', see Gibbons et. al. 1994

3 For a discussion of information and knowledge societies and their history, see Stehr 1994. A vivid example of how 'knowledge work' is affecting economic thought is the increasing outsourcing of technology jobs to low-wage countries, such as India and China.

4 "The trial separation of atoms and bits is now over." Mitchell 2003

5 Castells 1996

6 The term 'real-virtuality' is Castells'.

7 Innovation is here used in the sense that it has received under the influence of Everett Rogers' 1962 Diffusion of Innovations: "An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption". Innovation is seen to drive economies. At the present moment, funding of innovation research is escalating sharply in G8 nations, and is beginning to shape other research agendas, such as urbanism.

8 Indeed, architecture itself is increasingly being marketed as a product, viz: Office of Metropolitan Architecture's work for Prada, or Frank Gehry's work for Guggenheim and Disney.

9 See for example the United States Environmental Protection Agency's website at www.epa.gov/opptintr/acctg/ or the international Environmental Management Accounting site at www.emawebsite.org.

10 One of the most complete treatments of the complexities of technological discourse is provided by Andrew Feenberg. In a sustained attack on what he calls 'essentialism' (in other words, the tendency to approach technology reductively, autonomously, ahistorically), he draws attention to the fact that, "rational though it may be, technology engulfs its creators, threatening both spiritual and material survival" [Feenberg 1999: viii]. By describing the political implications surrounding the events of May 1968, technology's power relations with democracy and the impurity of its rationality, he argues convincingly for an understanding of technology that can access its awesome power while remaining cognizant of our role as its creators. In short: technology is vitally human, though perhaps not humanist. See Feenberg 1999, 1995, 1991. For technology seen from an evolutionary (and thus extra-rational) perspective, see Ziman 2000.

11 Heidegger 1977

12 Heidegger 1977: 6

13 Heidegger 1977: 16

14 The Question Concerning Technology marks a change from Heidegger's pre-war The Origin of the Work of Art, in which he seems to allow for a less reductive role for 'equipment' in understanding the relations between artifacts and meaning: "Enframing [...] is thus defined: the gathering of the bringing-forth, or the letting-come-forth-here into the rift-design as bounding outline (peras)." In discussing his change of heart with respect to the role of enframing, he notes in his 1956 'Addendum' to The Origin of the Work of Art: "there remains the quandary of always having to speak in the language most opportune for each of the various stations along his way". See Heidegger 1993: 209, 212.

15 Céline Lafontaine's L'empire cybernetique provides a useful overview of the development of cybernetics and its political and philosophical underpinnings. She discusses the way in which the nascence of cybernetic thought is tied to the technologies of war and liberalist economic theory, while demonstrating the connections inhering between this postwar American practice and French structuralist, poststructuralist and postmodernist thought, in the work of thinkers such as Levi-Strauss, Lyotard, Deleuze and Foucault. See Lafontaine 2004.

16 For a classic account of hermeneutics, see Gadamer 1993. A more recent, synthetic account is Ricoeur 1974. Hermeneutics' ability to rehabilitate and include the notion of 'prejudice' in its field of activity is of immeasurable value.

17 Ulmer 1994

18 "A dialogue with the materials and means of execution." Lévi-Strauss 1974: 29

19 Literally: in the middle of things. The term seems to derive from Horace, who used it to signify a compositional principle whereby a narrative begins in the middle of a sequence of events. The Latin word res is wonderfully capacious, denoting a wide range of 'somethings': thing, object, being, a matter, affair, event, fact, circumstance, occurrence, deed, condition, case. Cf. Lewis & Short 1879

20 Adorno 1997: 120

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The text opens with a quote from a Carson McCuller novel that sets a very particular but at the same time broad platform for a discussion on corporeal engagement in architectural education. The author calls attention to this lack appearing on many levels in today's architectural education.

How can sensitivity be taught, and open up for another type of dialog between body and form? References to Merleau-Ponty's work form a large part of the basis of this essay, which in some ways could be seen as its weakness, but at the same time the author introduces the reader to a personal and passionate engagement in relation to the given topic.

"On the hither side of depth, positioned at the explosion of the information age", the author calls for an education where we are poised to develop an architectural pedagogy that draws from embodied experience.

Per Olaf Fjeld, Jury Chairman

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On the Hither Side of Depth

A Pedagogy of Engagement

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So the afternoon before it happened was like the other August afternoons. Frankie had hung around the kitchen, then toward dark she had gone out into the yard. The evening sky was pale and empty and the light from the kitchen window made a yellow square reflection in the darkening yard. The scuppernong arbor behind the house was purple and dark in the twilight. She walked slowly.
Frankie was too tall this summer to walk beneath the arbor as she had always done before; this year she had to hang around and pick from the edges like the grown people. She stared into the tangle of dark vines, and there was the smell of crushed scuppernongs and dust. Standing beside the arbor, with dark coming on, Frankie was afraid. She did not know what caused this fear, but she was afraid.[1]

In The Member of the Wedding, Carson McCullers writes about the intimate experience of a place. The experience includes hopes, fears, time of day, movement, color, coming of age, space, enclosure, and memory. Through McCullers's description, we as readers are immediately drawn into the experience of the space, not into its shape or appearance. Space is the empty container of experience; it invites and enables experience. When we leave a place, we remember not the place itself, but our experience of it. Echoes, smells, sudden changes in temperature when we pass from light to shadow, heat radiating from a sunlit wall, enframed or hidden views, a feeling of mystery, all contribute to our experience of architecture, and they all stem from the depths of our embodiment.
When we forget embodiment in conceptualizing a place, we produce concretized ideas, geometric constructs, structural grids – the empty container. Such containers tend to be placeless, geometric, and abstract. In designing thus, we distance ourselves from experience and "make love like an intellectual," a phrase coined by Milan Kundera in The Book of Laughter and Forgetting to describe a lack of immersion in one's immediate surroundings.[2] Just as Kundera notes the irony of detaching oneself during the most intimate of acts, it is ironic that architectural pedagogy stresses conceptual design methods to accommodate the intimate experience of inhabiting space.

At the beginning of the new millennium, the global culture is cobbled together – and simultaneously fragmented – by an unmanageable and rapidly growing body of technology, information, and disposable artifacts. Intimate experience, in which time seems to slow or stop altogether, is increasingly rare as the flow of information continually accelerates and the interconnected information web replaces the connection we "feel in our bones" with our material surroundings. Answers and consumer goods of all sorts are immediately and effortlessly at our fingertips. Authentic, troublesome human relationships seem less worth the effort as chat rooms offer up an inexhaustible supply of virtual companions. And a careful, well-thought-out framework of ethics? Who has time?
In this milieu, architectural pedagogy must confront a number of essential questions. How do we integrate the speed and evanescence of the information age while making architecture that is primarily material and spatial? How do we find a ground for meaningful and ethical engagement with the larger world, both socially and environmentally? In the seemingly

effortless world of consumerism, what is the role of difficulty and sustained effort? In an age where information reigns, how do we become comfortable with uncertainty? In a world whose most salient characteristic is rapid change, how do we find a stable foundation for architectural creation? In a fast-paced and visually dominated global environment, how do we understand and design for the intimate experience of a place? In order to engage with these questions, architectural pedagogy must turn to embodied experience.

This paper describes the problems inherent in architectural pedagogy stemming from the mind-body split brought about by the Enlightenment and exacerbated by the information age, and makes the case for a pedagogy based in corporeal engagement. It describes several important aspects of embodied experience, drawing on the work of French phenomenologist Maurice Merleau-Ponty, and suggests what questions an architectural education stressing corporeal engagement might begin to ask. It then looks particularly at the issue of architectural representation, focusing on the role of the computer and the special challenges and opportunities presented by our interconnected and incorporeal information society. The paper suggests reasons and methods for directing architectural pedagogy towards greater involvement in the larger world, using both conceptual and perceptual design tools in concert with an attitude of engagement.

DOMESTICATING THE SENSUOUS WORLD

The gravest problem facing the field of architecture is lack of engagement with the surrounding world. Following a general trend of the Enlightenment to design educational programs emphasizing logic, clarity, and dispassionate manipulation of ideas and elements, we have become insular. Although we are connected worldwide through the internet, we are increasingly insulated from our immediate surroundings as we bury ourselves within the virtual world it brings to our desktop. Yet the internet merely advances the longtime aim of modern technology to push away the corporeal world in favor of mental constructs that we can "get our heads around" and manage more easily. The modern era's corporeal disengagement is a long-developing consequence of western rationalism's mind-body split.

Vision and language have traditionally been the primary vehicles through which western culture seeks to domesticate the sensuous world, and architectural pedagogy has long been complicit in this effort, training architects to produce buildings to be read and interpreted rather than experienced. Neoclassical geometric and proportional methods of composition, modern references to machine imagery, and postmodern historical pastiche all work to produce architectural designs we can understand through the visual relationships of form or the linguistic relationships of image. Architecture is so often designed to present itself compositionally to the gaze, aided and encouraged by our image-rich technology. Exotic shapes and eye-catching symbolic elements encourage us to visually consume and conceptualize architecture before ever corporeally experiencing it. They are meant to be taken up as images – short-circuiting embodied experience and producing instant meaning – rather than taken in spatially and materially over time. The proliferation of information technology is both a symptom and a furtherance of the neglect of our own embodiment in pursuing

knowledge. Increasingly, our designs take form through scaleless and disembodied processes of computer modeling, and we draw inspiration from placeless and contextless images gathered haphazardly from the internet.

The world's material and spatial qualities constantly escape and exceed the conceptual confines we construct, but with the body denied as a means for understanding, material presence is nonsensical excess. We need to understand, however, that every conceptual thought and rational instrument we possess springs from our embodiment. There are many compelling reasons for corporeal reengagement. Among them are systemic modern (and now postmodern) alienation from others and from the earth, the dissatisfying and passive consumerism of the information age, and widespread despoilment of the material environment due to our wish for mastery over it. Reengagement will require living and thinking in the body and allowing embodied experience to become a source of both knowledge and ethics.[3] An architecture that celebrates multi-sensory involvement, offers different amounts of detail to the view at different distances, and gives careful attention to evanescent qualities of light, shadow, and color stresses corporeal engagement and recognizes the primacy of our connections with the material world.

When used with the right questions in mind, even information technology contains within itself the seeds for collaboration with embodied knowledge. As we seek to broaden architectural pedagogy from the act of training architects to the wider and more societally integrated aim of teaching architecture, we have an opportunity to explore corporeal engagement not only as a basis for architectural analysis and design, but also as a model for an intimate and meaningful relationship with the larger world.

INTERSUBJECTIVITY AND EMBODIED PERCEPTION

French phenomenologist Maurice Merleau-Ponty offers a model for interacting with the world that subverts rational attempts to short-circuit the knowledge we gain by corporeal experience. He offers embodied perception as the basis for interaction wherein we, as open and receptive subjects, are continually transformed and create from within this constantly regenerative state. Within the fluxing web of interrelationships he calls the Flesh, we continually redefine ourselves by relating to the world around us. We do so on the basis of intercorporeity – that is, our material likeness to (and thus kinship with) the world. When thinking from the body, we act with mind and body in concert from a condition of immersion. In this model, we are open circuits, completed in sensory contact with the world, and this relationship is not one we can fully control.

In examining something as simple as a clay bowl, we can see the marks of its daily use and feel the intricacies of its textures. It reflects and absorbs light in the same way as the earth from which it was made. Yet we can never entirely know the bowl, never perceive it completely. From any angle, some of its surfaces are hidden from view, and the inner thickness of its walls is perceptually inaccessible.[4] Any thing or place with which we interact communicates the fundamental interconnectedness of things within the Flesh and the futility of attempting to understand any of them completely.

We engage the world through what Merleau-Ponty terms carnal adherence, our flesh bumping up against the flesh of the world through sensory and spatial interaction. In his reciprocal structuring of the world, our senses are complements to the sensuous: our eyes are the obverse of visual things as our hands and bodies are the obverse of material things. In addition, our moving bodies are complements to the spatiality of the world. Our embodied existence thus complements and responds to the fundamental qualities of architecture. Architecture is at its heart material and spatial, and we interact with it through embodied existence that intertwines movement, vision, touch, hearing, and temperature and pressure sensitivity. Carnal adherence takes place body to body, and not through the intellectual grasping of the mind. In opening ourselves to the sensuousness and spatiality of architecture, we can grasp the integrally experienced moment that rests beneath the mind-body split.

Perception, then, is an exchange between sentient and sensible, an unselfconscious "letting be," an openness to the world. We do not possess what we sense, but we "dispossess ... ourselves in favour of it."[5] Paradoxically, in losing ourselves we also find ourselves. The intersubjective experience and design of architecture is both self-exploration and exploration of the connective structure of the world, as we sense our relational existence within a larger whole of which we are an integral part. Perception in general, and perception of architecture in particular, is "flesh in touch with itself."[6] Thus, in experiencing and designing architecture with attention to embodied perception, we find a means for self-realization and a ground for ethical awareness based in empathetic connection.

In perceiving, the body becomes "a set of colors and surfaces inhabited by a touch, a vision."[7] This description calls to mind an experience of architecture wherein we become so lost in the colors or textures of a place that we become entangled with them, feeling their sharpness, smoothness, vastness, or indeterminacy in the depths of our being. We can feel the immovable density of a stone pillar. Our spirits expand in a windowed tower and contract in a confined, cellular space. Our bodies pick up the rhythm of a colonnade, and our eyes arrest and fix on a central focal point. In highly attuned perception, our body and mind go out to the perceived, which in turn seems to rush forward to meet us in our own interior. In this unselfconscious and seamless intercourse with the world, we exist in a state of intersubjectivity, where outward-directed relationship subsumes any tendency toward isolation. With an attitude of openness, "the mind goes out to wander" among perceived things in a non-appropriative state of immersion that contrasts with the instrumentalizing tendencies of modernism.

To Merleau-Ponty, phenomena must be experienced – "taken up... melded with the body and lived" – rather than imagined or "merely thought about," and our experiences take place for the most part precognitively, with us unselfconsciously immersed in a world to which we are sensibly attuned. Carol Bigwood refers to this immersion as a "silent, noncognitive, intimate bonding of our body" with the world, as when we become perceptually lost within the vast blueness of the sky. In her poetic description,

[I] enter into a sensuous rhythm of existence that is already there and that is peculiar to the sky in its blue depths.... My living situation becomes one of blue. I can feel the blue's profundity and become immersed in it because of a bodily openness that lets the sky pulse through me and, in the same trembling stroke, lets my bodily sensing breathe life into the blue sky. [Now] the sky and myself are only abstract moments of a single incarnate communication, [a] bodily-skyly sensibility that tremulously runs through me and that is neither passively received nor actively willed....[8]

In such experiences, we open to the perceived world to the point of losing our perceptual exteriority, and gain the possibility of being transformed by the encounter. In sensing, our boundaries become porous and indeterminate as odors inhabit our noses and lungs, sounds vibrate through the surfaces of our eardrums, and sights play upside down on our retinal walls. We exist in our fingertips as they touch architectural surfaces. We exist in our skin as it responds to temperature changes. We exist through our ears, sensing solidity, hollowness, vastness, and closeness through sound reflection. We exist in our kinaesthetic bodies, moving from one space to the next. We exist in our eyes as they take in the visual qualities of the space. In all these ways the mind goes out to wander among things, entwining our perceptive body with the world.

This focus on relationship inverts Descartes's categories of primary and secondary qualities. In Cartesian representation, form and outline are primary, constant qualities that we can grasp and hold conceptually, opposed to secondary qualities such as color, which are constantly in flux. But in a world whose most fundamental characteristic is its fluxing relationships, these "secondary" qualities become central. Intersubjective perception of architecture always exceeds intellection and vision, for architecture's sensuousness espouses our vision, touch, hearing, smell, skin senses, kinaesthetic and proprioceptive senses (movement). With this enveloping of our total sensing bodies, architecture encourages intersubjectivity at its most fundamental level, and it is imperative that we teach designers to create with embodiment in mind.

Architectural design techniques and tools, in helping designers identify functional requirements and adjacencies, organize structure, compose elevations, and orchestrate plan sequences, are essential to the design process, which must pull together many complex threads into an understandable whole. However, the designer easily loses sight of any qualities that are difficult to represent and manipulate using the given tools. Plans, sections, physical models, and perspectival virtual models excel in working with Descartes's primary qualities, giving us the means to manipulate solid and void, structural grids, dimensions and proportions, and anything measurable and exact, including the movement of sunlight. But they fail utterly in communicating the perception-dependent secondary qualities central to corporeal engagement. Thus it is important to retain these qualities in our intentions and imagination. In an architectural drawing, it is easy to represent the elements of a door – its sill, jamb, thickness, and swing – but virtually impossible to render the experience of walking through it. This common experience is indelibly etched within the body of every designer, but few choose to access this corporeal knowledge when pursuing a design.

Our students work in the unselfconscious state that characterizes intersubjectivity, becoming lost in the space of their emerging designs. For this reason, we must make sure that the emerging space takes the body and the sensuous world into account. Creating a plan or section drawing that includes neither the site nor the human body encourages designers to place and size a window based on graphic concerns such as geometric composition. Working in elevation expands this tendency exponentially, because even the representation of space is absent in its focus on wall surface as object. Computer modeling introduces the capability of viewing emerging designs perspectivally, but with its virtually limitless depth it aggravates the tendency for the designer's mind to "go out to wander" no further than the confines of the screen and the illusive depth portrayed there.

We must teach our students to position themselves both temporally and spatially beyond the confines of the drawing sheet or computer screen. As designers, they need to develop an intimate relationship not with the world of the page or screen, nor even with the forms and surfaces portrayed on them, but with the potential corporeal and multi-sensory experience of the emerging spaces. What does the window's frame feel like to the hand? How does it catch the light? How does the light entering through the window heighten or dim our perception of the interior space of the room? How is the same window perceived from the outside, in relationship with the mass and voids of the larger façade, as one walks towards it? How do surrounding trees or buildings alter the experience? In short, what is the embodied context of the window? No amount of axonometry will answer these questions, and even perspectival representations will be unequal to the task without the designer imaginatively inhabiting the created space and focusing on intentions for the experience of spatial qualities. In asking these questions, the designer asks what the experience will be like for the future inhabitants of a design. Such engagement allows the architect to design for the intimate experience of space rather than simply providing its empty, aesthetic container.
In Phenomenology of Perception, Merleau-Ponty writes of the infinitesimal lag between our experience of a thing and our conceptualization of it. Intersubjective experience thrives within this interval, which designers can draw out by avoiding easy intellectual consumption of their designs through vision or language. Elaine Scarry contends that language reaches its limits when confronted with the profoundly abstract or the profoundly concrete.[9] Architecture's immediacy stems from its profound concreteness, its conceptually inaccessible materiality and spatiality that we experience through moving and sensing. Secondary qualities of light and surface are often resistant to language in a way that shape and symbolism are not. Repetition and abstraction allow the architectural surface to become background to a foreground of light and shadow play, and strong material qualities encourage an intersubjective visual and tactile experience of the architecture rather than a conceptual summing up. If we teach with these aims in mind and let them augment traditional design concerns, we will have a pedagogy of engagement.

The inscrutable materiality and spatiality of architecture will always in some way exceed our intellectual grasp, and architectural pedagogy needs not only to acknowledge this excess,

but also to approach architectural design and analysis in ways that draw inspiration from it. Although any experience is ultimately processed and made accessible through the mediation of language, it is the nature of language to eclipse embodied experience. To counter this tendency, we can teach design from the perspective of engaged sensory interaction – taking into account what it might be like to move through a space while simultaneously seeing, smelling, hearing, and feeling it. We can undertake to draw out the lag before conceptualization by incorporating elements that escape naming, and we can offer designs whose aggressive materiality and complex, lived spaces invite our responsive sensory interaction.

ARCHITECTURAL DESIGN AS CARNAL ECHO

With the intersubjective emphasis on unselfconscious perception of the world, we might draw the conclusion that the task of architectural representation is perceptual realism. Nothing could be further from the truth, however, and it is important to realize that architectural representation is not meant to be a replica of the world, but a manifestation of embodied creativity.

In "Eye and Mind," Merleau-Ponty criticizes traditional western philosophy's idea of art as representation or index, a linguistic icon that calls to mind an idea of the represented thing. This formulation of art ascribes creative power only to the mind. He proposes instead an idea of painting as carnal echo, a formulation that locates this generative power in the active relationship between human beings and the surrounding world. In this formulation, a painter opens himself or herself up to the world through vision. Through the channel of vision, the world enters the painter, inhabits the painter's interior, and mixes with the painter's carnality – his or her embodied consciousness. In mixing with the painter until it is no longer clear which is the painter and which is the world, the things of the world achieve a sort of doubling, existing simultaneously in the world and "at the heart of vision." The resultant mixture of painter and world is then expressed, literally pushed out, back into the world as a physical artifact, a painting.[10] The painting's formative process makes it no sterile representation of things in the world, but progeny, the offspring of our carnal union with the world and the things in it. Painting as carnal echo ascribes generative power not to the mind, but to the body, the cauldron in which the part of the Flesh that is the painter and a visible part outside the painter are combined.

Painting manifests our visual relationship with things in the world, an interactive process of beckoning and interrogation wherein things actively solicit our involvement. In a reciprocal arrangement, a mountain "makes itself seen" while the painter "interrogates it with his gaze." A painter channels, takes dictation, lives, as Merleau-Ponty puts it, "in fascination" and in profound lack that s/he seeks to remedy.[11] This interaction goes to the very heart of being, and painting is an exemplar of the ecstatic process in which, through opening ourselves to the world, we can transcend the traditional western subject-object division. We disappear as finite subjects and become instead a dynamic relationship, transforming the subject-object division into a subject-subject intertwining that is the fundamental characteristic of the Flesh.

Vision is bound up in movement, and spatiality is at the heart of embodiment. It is here that creative activity as Merleau-Ponty envisions it connects with architectural design. Architectural design as carnal echo occurs when, through the channel of multi-sensory movement, the spatial and material world enters the body of the designer and mixes with his or her embodied consciousness. The progeny of this mixture is architectural design that manifests our embodied experience of space.

It is important to consider architectural expression not as an egoistic act, but as openness to the world, as a willingness to let the world give form to the space. Expression has been construed in Cartesianism as externalizing our own thoughts and talents, visiting our genius upon the world. Instead, designed space is the residue of the intertwining of the architect's carnality and the beckoning world, a cooperative effort between self and world. Rather than viewing architectural composition as a means of using rational and aesthetic principles to order the physical world, an intersubjective approach suggests architectural design as an intimate encounter.

As carnal echo, painting's power is based neither in language nor in representation. Instead of offering up indexical replicas of its subject matter, painting offers us a much deeper gift, allowing our gaze to be captivated by particular instances of seeing. In the same manner, architectural design broadens and extends our perception of things, layering an "imaginary texture" upon ordinary perception.[12] We go out to meet the thing, becoming present to the larger world in a way we never can by merely observing it.
The sensuous experience of space is so immediate and profound that it escapes the realm of language and remains embedded in parts of our bodies that lie outside the conscious mind, in our muscular and cellular memory. When we lose ourselves in spatial experience, we accumulate a deep knowledge that can find its way back out intuitively in architectural design. Many of the unexplainable creative leaps in design may come from this deep level of knowledge, aided by unexpected connections between seemingly unrelated elements of the Flesh.

The architect's way of experiencing the world reveals connections or likenesses between things not readily apprehended by a mere observer, as when an abrupt turn in a stair recalls or suggests the qualities of a mountain path or a circuitous alley. As carnal echo, the act of design brings these relationships to light, as aspects of a spatial experience call forth recollections or imagination of other experiences that are seemingly unrelated. The promiscuity, or wanton intercourse, among perceived things leads us to recognize the resemblances between them, to posit analogies, to make the imaginative connections that energize architectural design. The visual references of postmodern architecture miss the point because they depend more on linguistic reference than on experiential likeness, which is so often independent of form and outline. Experiential likeness has more to do with secondary qualities or the potential for movement around an object or within a place, rather than with its form. For example, the twisting circulation paths of the Palace of Minos reiterate the

circuitous navigation through the mountainous Cretan landscape without restating the landscape's form.

Abstraction in architectural design, which may at first seem to divorce the expression of a thing or place from its likeness, can actually heighten experiential likeness as it reveals aspects that intertwine with corporeal experience. Such abstraction may involve color, texture, proportion, density, and spatial relationships. For instance, reflected light or the color of a wall surface may present likeness to the color of the sunset in a more powerful way than a mural representation of the sunset could achieve. It allows likeness to flourish with less interference from "realistic" representation.

Given something nameable to focus on, our tendency is always to allow symbolism to override raw perception, and corporeal engagement can be eroded by a rush to conceptualization in designs that rely too heavily on linguistic meaning. Alternatively, a designer can choose to express the qualities of embodied experience. For example, a designer may create a place that reproduces a Greek temple by copying its orders and entablature. Conversely, s/he may look beyond the temple's form to ferret out its experiential qualities and design a place that interacts with the moving sun in the same poetic way as the Parthenon's fluted columns.[13]

A designer can lay out a building as a regular or irregular geometric composition, or can consciously express the way geometry interacts with a moving body. S/he can set out a visual tableau or design a visual and spatial sequence that changes as we move alongside or towards it. S/he can display a building pictorially to the gaze or subvert the gaze with a series of oblique views, bent axes, and changing horizons. S/he can represent through visual icons or allow our imagination to exploit the tolerance of a thing's resemblance.

Even though it is the nature of language to eclipse corporeal experience, language is irrevocably present in the act of design. The world's intelligibility unfolds through language as our bodies encode and then decode the world's meaningful structure.[14] Meaning exists within the Flesh and within the body, and, although it must "detach itself" from the body to attach itself to language,[15] it stems from the Flesh in the same way as embodied experience. Language does not exist apart from the world, but derives from the world. It can never displace the things it purports to represent, but it too is a carnal echo that relates the body and the larger world.

Architectural equivalents to language include geometry, proportion, and formal composition. These are mental/mathematical constructions that allow us to avoid considering embodied experience in design by providing formulaic guidelines for laying out space and surfaces. Yet these conceptions relate to the embodied experience of qualities such as rhythm, regularity, and repetition in spatial intervals and enclosure.

We eventually do layer meaning, through language, onto every experience, but the deepest meaning of any intersubjective encounter is simply that we have encountered. And the encounter is never more evident than when we are asking questions of a material, a site, or a space through playful, open-ended exploration.

ARCHITECTURAL REPRESENTATION, INFORMATION TECHNOLOGY, AND THE EXPERIENCE OF LIVED DEPTH

Merleau-Ponty discusses space through the phenomenon of lived depth. He criticizes perspective drawing, which positions us "always on the hither side of depth" and axonometric projection, which places us always "beyond it." From a static perspectival point of view, we see depth collapsed into nothingness, signaled by overlapped figures; axonometrically we see it from everywhere at once, signaled by floating objects that relate neither to us nor to each other. Lived depth stems from the thickness of space as played out in relationship with the "null point" of the body, the sum of which both perspective drawing and axonometric projection fail to acknowledge.[16]

In an intersubjective relationship with the world, the body is the origin point of spatiality, irrevocably altering space by its location and movement within it.[17] We are immersed in space, which plays out in relationship to our bodies, and few things reveal this relationship as thoroughly as architecture. In experiencing a place, the sensuous elements of architecture along with the space, air, and light between the perceiver and the perceived are active – charged, thick with relationship. Surfaces open up and forms realign as we move perceptively through space. In this relational structuring of space, form and outline – indeed, all static aspects of the architecture – become secondary, subsumed in a primary, enveloping spatial relationship that encloses and relates the individual elements of a place to the motile participant.

The architect sets out depth as a charged dimension in which our relationships to walls, columns, openings, and materials is ever-changing. Although vision and visibility are important aspects of experiencing architecture, they are swallowed up by the whole-body experiences of moving, smelling, hearing, and feeling, and vision itself is transformed by the changing perspectives experienced through motion.

Virtual modeling offers the possibility of walk-through simulations in which the designer can "move" perspectivally through a sequence of spaces in an emerging design. This capability responds to the phenomenon of the "null point" of the body by continually shifting orientation and vanishing points as the virtual traveler moves along a linear path or pivots in space. Merleau-Ponty's frustration at being trapped on the "hither side" of depth seems to be answered here, as overlapped figures separate to allow us to approach and pass through. Movement is part of the experience, causing elements to realign and alter visually in relation to other elements.

The walk-through fails only in its inability to effectively portray secondary qualities and the charged thickness of the air. Computer modeling software depicts the measurable Cartesian primary qualities of form, edge, dimension, and distance. It offers palettes of color and texture, but their middling degree of realism offers too much detail for successful abstraction and too little for perceptual credibility. Nor can it simulate a multi-sensory, whole-body experience; instead the experience is entirely visual. Furthermore, the visual experience of the virtual walk-through lacks the breadth of focus and peripheral vision of the embodied eye.

As is the case with more traditional design tools, the capabilities of information technology are decidedly mixed. The computer projects images; it does not reflect conditions. It allows designers to use animation, yet fails to animate the space or experience. The computer can show important solid-void relationships of a building, but it can tell us nothing about the echo of footsteps. It can calculate structural loads, but it cannot represent the physically and psychologically cold feeling of a concrete column. It can map sunlight across the surfaces of a space over the course of a day or a year, but it cannot capture the accompanying subtle changes in color and warmth.

The shortcomings of digital representation arise from its tendencies towards short-circuiting. First, digital drawing short-circuits and reorients the embodied experience of drawing by hand. In hand drawing, the body inhabits the image as the hand and arm make the same movements to record a thing's image as they would make to caress the surface or outline of the thing itself. The processes of computer drawing, based in binary polarities and language operations, derive from a logic of object manipulation rather than engaged perception and thus are corporeally counter-intuitive, placing the body and the intellect at odds. Furthermore, in hand drawing the line has a certain tolerance as it is being drawn – it can wander slightly, thin or thicken, waver or straighten in response to the non-verbalized intentions of the designer. There is no such tolerance in a digitally drawn line that assumes a menu-derived thickness, lengthens itself to a numerically specified length, and snaps to a virtual grid.
Second, the quickly assumed certainties of digital drawing and designing short-circuit the work of imagining embodied experience. Digital design's quick formal operations, its limited menu of surface textures, its prejudice towards replication of elements and dimensions, and its orientation around defined edges all provide shortcuts for the difficult and uncertain work of creative design. A student's digitally aided design too often gives an appearance of completion that surpasses its depth of thought. As architecture students attempt to get "complete" representation to do the work of imagination, they become spectators rather than participants in their own designs – disengaging and making love, as Kundera characterizes it, like an intellectual.

All forms of architectural representation have the potential to rush design ideas too quickly to certainty, but the embodied act of hand drawing more easily allows the percepts of the body to inform the concepts of the mind. Furthermore, these false certainties are not accidental tendencies of digital drawing, but are integral to its very nature. They parallel the fascination with quick acquisition and the increasing detachment from experience that characterize all aspects of the information age. Thus architectural pedagogy faces an important challenge to critically enframe the exciting possibilities of the digital age within a larger attitude of corporeal and social engagement.
Used with an attitude of engagement, the computer can become a useful tool for corporeally engaged design. Its changing perspectival views, more accurate in proportion than hand drawing, so easily generated and therefore so much likelier to inform a design, provide the empty container for the designer's imaginative inhabitation of the emerging space. Since a

designer can quickly make changes without laboriously reworking an entire drawing, virtual modeling encourages experimentation. Within a pedagogical framework of corporeal engagement, a student can critique the false certainties offered by digital modeling. As the designer's intentions and imagination are layered onto the space of the virtual model, it becomes one of a series of interrelated tools for understanding the experience of the space.

Movement through time and space is arguably our most fundamental mode of interaction with the world, and information technology has irrevocably changed our experience of it. The internet collapses time and space, bringing us images instantaneously from around the world. We are at once connected to and disconnected from everything as we google towards a piece of information as if rocketing through a wormhole. The internet imitates the Flesh in an almost uncanny way. Like the Flesh, it is an encompassing milieu in which everything is interconnected. Like the Flesh, it offers continual opportunities for interaction. But it is incorporeal, overwhelmingly visual and language-based, and offers none of the proprioceptive or multi-sensory components of embodied experience.
The principal danger of information technology is its seductive tendency to stand in for embodied experience, and we must constantly teach our students to question and augment the information it presents. Instead of the near-instantaneous speed of accessing information via computer, we should ask our students to concern themselves with the infinitesimal lag between corporeal experience and its conceptualization. We should ask them to occupy themselves with duration rather than rapidity and to open themselves and their designs beyond the intellect. Instead of rushing towards certainty, we should encourage our students to dwell enthusiastically in the uncomfortable state of not knowing – long enough to confront and struggle with the problems of making their architecture sensuous, ethical, thoughtful, and humane.

In The Member of the Wedding, McCullers does not exhaustively describe the space of Frankie's experience, but rivets our attention to details that reveal her emotional and physical connections with it. Architectural design and representation can concern themselves with the details that reveal the active presence – the "beckoning" – of material, spatial, and sensuous architecture. Atmospheric, abstracted models can reveal the aggressive color and texture of a wall. Charcoal light studies allow the designer to stop and consider how the movement of light and shadow transforms a space. Gestural, tonal perspectives drawn from a model held close to the designer's eyes can portray the sensation of being surrounded by the space. Large-scale models can facilitate the designer's imaginative presence within its emerging spaces. Even full-scale joints or details can help a designer to better understand the corporeal presence of the design, while collages and watercolors can communicate the sometimes incomprehensible rush of sensation an architectural experience provides. These corporeally based design methods can provide a powerful critique of the way we as teachers and students give form to our ideas.

CONCLUSION

In teaching architecture from the standpoint of sensory and spatial engagement, we provide architecture students with the means to explore the depths of their embodied selves as well as their relationship with the larger world. Moreover, we provide an ethical framework wherein we acknowledge, through our shared corporeity, a fundamental kinship with other people and things. Thus an architectural pedagogy in which we remember embodied experience suggests an ethic of care towards a world in which we see more self than other. It augments electronic connectivity with a connection that engages both mind and body.

Space experienced corporeally is dynamic and interactive in nature. In what may be his only description of architectural space, Merleau-Ponty writes of sunlight reflecting off tiles beneath the surface of a pool to sparkle and dance upon a nearby stand of cypress trees.[18] He describes the tiles on the pool floor shimmering through the medium of water and the water's constantly changing reflection of light onto the nearby trees. In this space, the play of light and shadow across surfaces takes precedence over the static shapes and proportional relationships of architectural form. The space is animated by trees with their highly textured surfaces and deep pockets of shadow, their position and proportion changing constantly in response to movements of sun and wind. Its reflective tiles are seen through a medium constantly in motion, as the shifting water directs sunlight and reflects images first one place and then another, breaking them into innumerable bits of light and color.
It is just this play of light against surface, along with a host of other secondary qualities, that enlivens any architectural space. Architectural design is a way of engaging the world that springs out of the architect's embodied fascination with color, light, movement, and space. In becoming absorbed within the creative act of designing architecture, we lose ourselves within the world's abundance, joining memories of past experiences with our intentions for the designed space's future inhabitation. Thus, in designing, we lose any sense of a distinct past, present, and future and experience vertical time – "simply being there in the world"[19] in a deeply integrated way.

Information technology has irrevocably changed the way we engage with the world, and with it the way we teach and design architecture. As educators, we must rise to the task of critiquing its imbalances through the corrective lens of embodied experience, and we must look beyond the narrow confines of information technology in setting our pedagogical direction. Positioned at the explosion of the information age, we are poised to develop an architectural pedagogy that draws from embodied experience. If we do so, our students can use technology effectively without being subsumed into its seductive, incorporeal world. Instead of "making love like an intellectual" and designing empty spatial containers, our students can design for an intimate experience of space that engages both body and mind.

NOTES

I wish to thank my colleagues at Mississippi State University, particularly David Lewis, my Ph.D. supervisor at the Architectural Association, Neil Leach, and the jurors and participants at the November 2003 EAAE Workshop for helping me to critically examine these ideas.

1 Condensed and arranged from Carson McCullers, The Member of the Wedding, Boston, Houghton Mifflin Co., 1946, 6-7.

2 Milan Kundera, The Book of Laughter and Forgetting, New York, A.A. Knopf, 1980, 6.

3 For a thorough discussion of the ethical implications of our carnal kinship with the material world, see David Abram, The Spell of the Sensuous: Perception and Language in a More-than-Human World, New York, Pantheon Books, 1996.

4 Abram, Spell of the Sensuous, 50-52.

5 Maurice Merleau-Ponty, Themes from Lectures at the Collège de France, 1952-60, 130 in Rudi Visker, "Raw Being and Violent Discourse: Foucault, Merleau-Ponty, and the (Dis-)Order of things," in Patrick Burke and Jan van der Veken, eds., Merleau-Ponty in Contemporary Perspectives, Dordrecht, Kluwer Academic Publishers, 1993, 120.

6 Martin C. Dillon, "Merleau-Ponty and the Reversibility Thesis," in Henry Pietersma, ed., Merleau-Ponty: Critical Essays, Washington, D.C., University Press of America (and Center for Advanced Research in Phenomenology), 1989, 92.

7 Maurice Merleau-Ponty, Phenomenology of Perception, trans. Colin Smith, London, Routledge & Kegan Paul Ltd, 1962, 214, 207.

8 Carol Bigwood, "Renaturalizing the Body (with the Help of Merleau-Ponty)." Hypatia vol. 6 no. 3 (Fall 1991): 57, 61-2, drawing from Merleau-Ponty, Phenomenology of Perception, 211-6.

9 Elaine Scarry, The Body in Pain: The Making and Unmaking of the World, New York, Oxford University Press, 1985, "Introduction," esp. 3-4.

10 Maurice Merleau-Ponty, "Eye and Mind," in The Merleau-Ponty Aesthetics Reader: Philosophy and Painting, ed. Galen A. Johnson, Evanston, Ill., 1993, 132, 124, 128-9, 136.

11 Merleau-Ponty, "Eye and Mind," 129.

12 Merleau-Ponty, "Eye and Mind," 126. He also states this idea differently, writing that painting gives vision "the imaginary texture of the real" to clothe it within.

13 See David C. Lewis, "The Aesthetic Experience of Ambiguity: Athenian Acropolis," in Michael H. Mitias, ed., Architecture and Civilization, Rodopi Press, 1999.

14 Shaun Gallagher, "Introduction: The Hermeneutics of Ambiguity," in Thomas W. Busch and Shaun Gallagher, eds., Merleau-Ponty, Hermeneutics, and Postmodernism, Albany, State University of New York Press, 1992, 3-4.

15 Martin C. Dillon, "The Unconscious: Language and World," in Burke and van der Veken, 81.

16 Merleau-Ponty, "Eye and Mind," 133, 138.

17 Merleau-Ponty, "Eye and Mind," 138. We are also inhabited by space, our bodies filled with dynamic cellular processes and atoms made up almost exclusively of space.

18 Merleau-Ponty, "Eye and Mind," 142.

19 Galen A. Johnson, "Ontology and Painting: 'Eye and Mind,'" in Johnson, 51.

3. PRIZE KIM SORVIG USA

Teaching the Paradoxes of Design is rooted in a form of optimistic realism. This straight-forward and thorough paper presents an analysis of the problems architectural education faces within the intricate spatial relationship between virtual and real. The essay generates a discussion and suggests ways in which this relationship could strengthen the future of architectural education in a very positive and inventive way. As the e-world expands, architecture is increasingly likely to become an art of reality, and the author sees this as a tremendous opportunity for architecture and its teachers.

Per Olaf Fjeld, Jury Chairman

3. PRIZE

EUR 3.000

Virtual and Real: Teaching the Paradoxes of Design

KIM SORVIG

University of New Mexico, USA

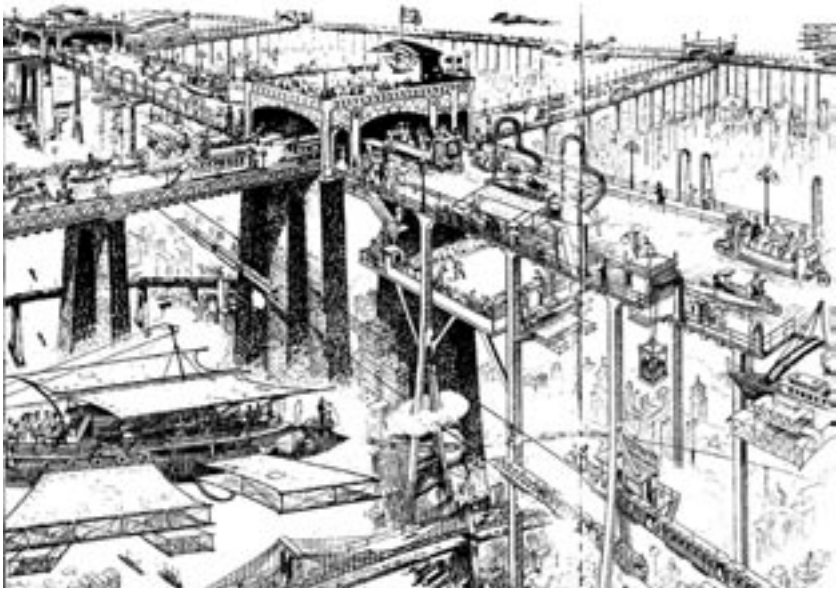


Figure 1.

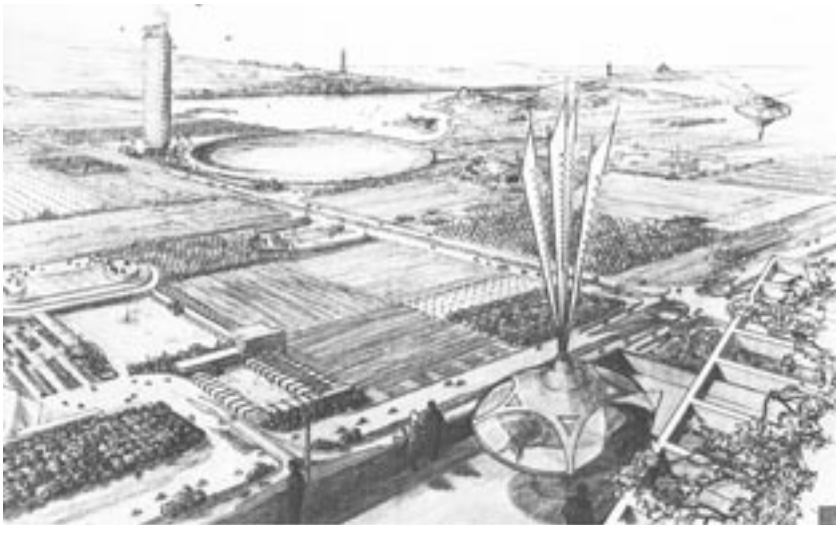


Figure 2.

VIRTUAL AND REAL: TEACHING THE PARADOXES OF DESIGN

Will an increasingly electronic world become ever more ethereal and fantastic, less and less constrained by the mundane? Popular futurists routinely claim so. They are no doubt the same people who predicted the paperless office, only to see computers generate paper at unheard-of rates.

"Western" society seems to expect the future to be virtual – floating, otherworldly, immaterial, an analog for heaven, disconnected from all earthly realities.[1] This social desire for an otherworldly future has influenced many architects, especially those who define themselves as modern or postmodern. The attempt to "look virtual" is a persistent trend (Figures 1+2), reflected both in science fiction and in design styles.[2] But virtuality influences design in ways more complex than mere style.

In some fields the intangible and virtual may someday completely replace the tangible. The typewriter, for instance, is already almost extinct. In many other fields, digital and mechanical technology co-exist, each adapted to particular purposes. Computer marketing encourages, even hypes, the belief in a totally virtual, place-independent future.

In architecture, however, the virtual and the real have a unique relationship (Figure 3). Our profession simulates things that do not exist, in order to bring them into existence. This odd equilibrium between real and unreal will likely make the profession's response to the "information society" unusual. In this paper, I wish to make the argument that as the e-world expands, architecture is most likely to become increasingly an art of reality – and that this is a tremendous opportunity for designers and design educators.

Envisioning architecture as an art of reality is in no way intended to denigrate the visionary, fanciful, and abstract aspects of the discipline, nor to devalue the remarkable tools of electronic computation and communication. Like many designers, I live and breathe computers, and enjoy their use. Even if I did not, railing against these new tools serves little purpose.

Rather, humans make and use tools, and are thus responsible for finding their best uses. That means thinking carefully about the job each tool can do, and when the tool is appropriate. There is a saying among info-technology consultants: Most people will say they need a drill, when what they actually need is a hole.

It is surprisingly easy to confuse the tool, the know-how, with the goal. Instead of focusing solely on know-how, it is critical in times of changing technology to discover and teach know-why and know-whether. Both "why" and "whether" are questions whose answers derive from the world of experience that is ordinarily (and loosely) known as reality.

Forgetting the why-and-whether questions in the hurly-burly of professional practice is understandable: getting the job done is crucial, and readymade system solutions make asking "why" seem obstructive. Students and educators have the great privilege of confronting the why and whether of their profession in the relative safety of the studio or classroom. Yet even in education, because there is so much technical knowledge to be covered, questions like, "Why do we design?" and, "Should we design?" are often shunted aside.

Figure 3.

Paradoxically, as much of the world moves toward an e-future described glowingly as free, place-independent, and disembodied, know-why about our design professions will require reaffirming our roots in realism.

X

Deconstructivism teaches the very valuable lesson that personal and cultural assumptions are nearly inseparable from experiential reality. As such, writers and teachers have recognized that acknowledging personal history is a requirement for honest communication. The "impersonal" writing expected of academics has never been particularly well-suited to expressing design concepts. Thus, before going any further, I wish to clarify some terms, and note some relevant experiential background.

This essay is truly that: an essay. In addition to denoting a written composition, the word "essay" means to try or attempt; it is related to the word "assay," quality-testing of a metal, drug, or other substance. Its linguistic roots are in the weighing-out of matters (the Latin exigere, source of the deconstructivist "exegesis" of texts). Like design, the essay arrives at conclusions by testing concepts against each other, weighing them on the scales of personal experience. In this, essays are far better suited to design discourse than what scientists or historians rely on: authoritative, documented Fact (often little more than documented assertions by Others). The essay, a carefully-reasoned composition expressing the author's views on a self-contained topic, is almost a lost art in an academia dominated by the sciences. [3]

Because the concepts presented in this essay apply equally to architecture, landscape architecture, urban design, planning, and even aspects of civil and industrial engineering, in the remainder of this paper I will use the term Design, rather than Architecture, in the broad sense. Although architecture historically included all these arts, today it rankles among those other professions when architecture subsumes them. I do not wish to perpetuate that divisiveness; thus the general term, design, the activity of thinking graphically. Design is what these professions share, and, I hope, an appropriate tent under which to include everyone.

Most designers arrive at their calling by routes that are unusually varied and personal, and my background is no exception. For nearly a third of my life, I have been fortunate to live in countries other than the one where I was born, giving me the opportunity to observe and participate in vernacular construction, as well as to visit what widely different cultures esteem

essay, *n.* 1) short, analytical, descriptive or interprete prose, esp. from personal viewpoint *vt.* 2) to try out or attempt 3) to test, esp. a material; to assay

design, *vt.* 1) to plan and make something skillfully and artistically 2) to create detailed plans 3) to intend for a purpose *n.* 4) drawings to show how something is to be made 5) decorative patterns 6) the process of doing 1-5 above

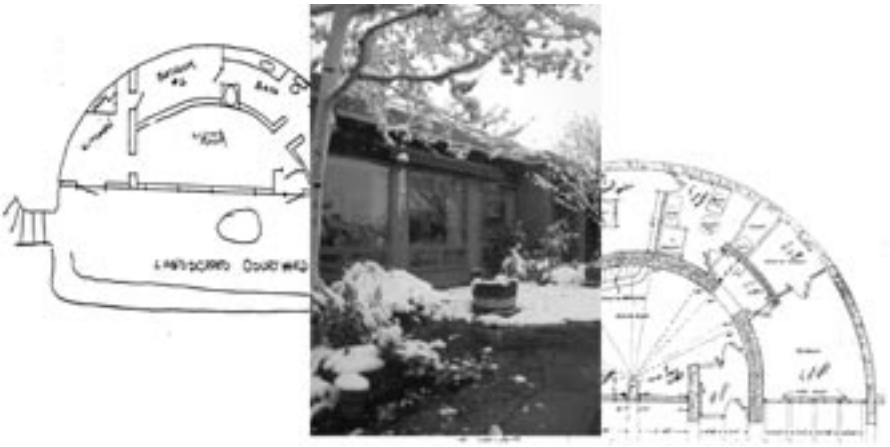
as "high" design. Several years in very traditional settings in Japan and Norway forcibly drove home to me that no specific architecture could be explained without a strong awareness of both cultural and environmental conditions. Likewise, although the places and buildings I visited all had their messages, those built for message alone were few, and truly exceptional.

These formative experiences are reinforced by family background: my grandfathers were both carpenters, one full-time, the other part-time, and my childhood was spent tearing down old buildings and "helping" construct my parents' home, which my mother designed herself. I have worked both sides of the proverbial fence, in construction as well as in design. Recently, I have been building my own offices, working largely single-handed and testing "green" building methods as I go. My teaching duties have involved students of architecture, landscape architecture, and planning.

My multidisciplinary and often hands-on background is germane to this essay, forming the basis for a key belief: the greater the virtual or fantastic element in design, the better the designer's grasp of reality must be. Design is about marrying fantastic innovation with the so-called real world, and unlike most other arts, design can seldom completely set aside its realistic concerns, although the avant-garde always tries.

Experience convinces me that why we design is to build, to create tangibly, and that whether we build in one way or another is directed at social and personal needs that, though not always tangible, are nonetheless real.[4] The ways in which reality-experience is incorporated into the dreaming processes of design fascinate me. Recognition that reality and simulation are inseparable poles of design leads me to predict that the ascendance of the e-world will make the design profession increasingly an art of reality – contrary to current appearances.

Figure 4.
Designers simulate what does not exist in order to bring it into existence.



real, *adj.* 1) physically existing 2) verifiable 3) not imaginary 4) genuine 5) essential 6) undisputed	**virtual**, *adj.* 1) in effect but not in fact 2) hypothetical 3) simulated by computer

On the subject of what "real" means, I am decidedly using a working definition. Useful though deconstructivist analysis can be, I cannot one-sidedly accept the credo that there is nothing but social constructs. Very little that we experience is uncolored by conceptualized filters – but something is there to be filtered, mysterious though it ultimately remains. In this essay, at least, please allow me to use "reality" in the common way: those tangible things and social forces that do not change just for wishing it so, but only with focused and creative effort. This is the reality that increasing virtuality encourages us to confront.

Similarly, "virtual" is another word for which only working definitions can be given. The word's history is long and complex.[5] Especially in computer usage, it is a synonym for "simulated." The ordinary world is full of simulation and virtual experience, such as watching the image of an event on television. In many settings, a simulated or virtual item is a cheap substitute, artificial, even fake; "virtual reality" in the futurist's sense means a convincing substitute for three-dimensional reality – but still a substitute. In design, virtuality is primarily a tool for bringing dreams into tangible form.[6]

The designer's use of virtual simulation as a tool highlights another key distinction, that between imagination and simulation. Imagination was recently defined in Science as "the process by which scenarios and situations not currently available to perception are formed in the mind.... One advantage of imagination is that possible situations can be practiced internally (simulated) before they are actually performed." In this sense, imagination is the original simulation, done without any tools.[7] Simulation, in its more common meaning of drawing or modeling, involves tools that externalize the imagination, making it possible to preserve imaginary experiences long enough to critique and revise, and to communicate to others. Although these concepts are intimately intertwined, I will attempt to use the terms "virtual" and "simulation" to refer to the tools, and "imagination" to refer to the much more mysterious faculty by which we originate possibilities and interpret simulations.

X

It is easy to imagine a world so wired that virtual, online experience is paramount. In such a world, designers may well be the last people to deal with bricks-and-mortar facilities. Designers (including engineers) will be the ones who must provide the roof over the cybercafé (Figure 5), the secure structures within which the machinery of the virtual is sheltered from climatic realities. In doing so, they will be the people who most directly confront what appears to be the other certainty for our immediate future: an increasing scarcity of re-

Figure 5.

Figure 6.

sources. The more a web-surfing culture cocoons itself in digital interactions, the more designers will have to struggle with providing the physical infrastructure in a world of material shortages, ingenious recycling, and unusual energy systems. If society avoids these realities, designers as specialists will increasingly be expected to deal with them, often in background mode.

A parallel issue arises with regard to the social aspects of design. The virtual world is almost entirely free to exclude "inappropriate" realities, undesirable people or beliefs or memories, and to create a plausible but libelous version of experience. Currently, for example, homeless Americans and Iraqi war dead are denied any place in US broadcast media. Erasing history from real places is more difficult. Those who deal honestly with the making of tangible things recognize that the built environment records layered histories (Figure 6), and serves an ethical function by giving voice to matters excluded from official records. If the idea of design as an art of "reality" sounds merely conservative or repressive, please reconsider: dealing with tangible reality frequently undermines repressive myth-making.[8]

Thus the question of how the information society's demands will shape what is required of designers has a complex and contradictory answer: while expecting our designs to "look virtual" and demanding that we master many electronic tools, from CAD to online construction management, e-society is also likely to abdicate the knowledge of real places, requiring designers to know and love reality even more deeply.

How will the design professions respond to, and even survive, these paradoxical pressures?

The results will depend on how the design professions define themselves, much of which occurs during design education. Educators will be challenged as never before to define goals and methods clearly in this changing world. The risk is real: a society truly focused on electronic experiences could well define physical design as obsolete, assigning the task of creating physical spaces to endlessly replicated construction "systems," a nightmarish e-functionalist world. This trend is already nascent in the corporate cubicle-and-warehouse approach.

The most common designer response to e-dominance today seems to be a combination of, "How can I master the e-tools?" and, "How can I make my designs e-stylish, shape-shifting and immaterial?" While valid, these are somewhat limited "know-how" responses. Two other questions may be more important to the future of the profession and to professional education:

- Why do designers use e-tools?
- How can we know whether to use them in a given circumstance?

Suggesting answers to these questions is a challenge and an opportunity for design educators of all specialties, and asks us to be as clear as we can about the purposes of design.

X

Digital tools are affecting the design profession, as well as the fine arts, in such a multitude of ways that it would be presumptuous to try to address them all. The array of pragmatic changes is vast: calculating structural loads or stormwater volumes almost instantly, sharing plans and critical-path schedules on a project website, or storing extremely detailed as-built drawings compactly on DVD. Similarly, the ability to animate renderings and walk or fly through places that do not yet exist expands the psychological aspects of design. Electronic communication facilitates teamwork, which requires broader real-world knowledge. Of these many effects of the digital revolution on design, I want to focus on one. Among design's defining characteristics is that it uses simulation to produce real-world commodities, such as buildings or landscapes. Although simulations – drawings, models, mockups – far predate the computer, e-tools are dramatically expanding the possibilities.

This expanded ability to simulate experience is, to me, the most significant opportunity and challenge for design educators arising out of new information technology. Will the simulated and virtual become our overriding motive, inspiring the dematerialized future in which some theorists believe so passionately? This is in fact the current fashion among many of the students with whom I interact. They are caught up in the vogue for taking deconstructivism literally – for making buildings that look like they are unstable and disembodied. Students who see Koolhaas's rickety towers or follies can easily believe that solid construction is merely old-fashioned, and aspire to completely insubstantial designs.

Yet this trend toward immaterial and virtual places collides with reality at two points: the enthusiasm of many students (often the same ones who love virtuality) for sustainable or "green" building, which is eminently reality-oriented; and the desire to build, physically, even the most effervescent and evanescent designs.

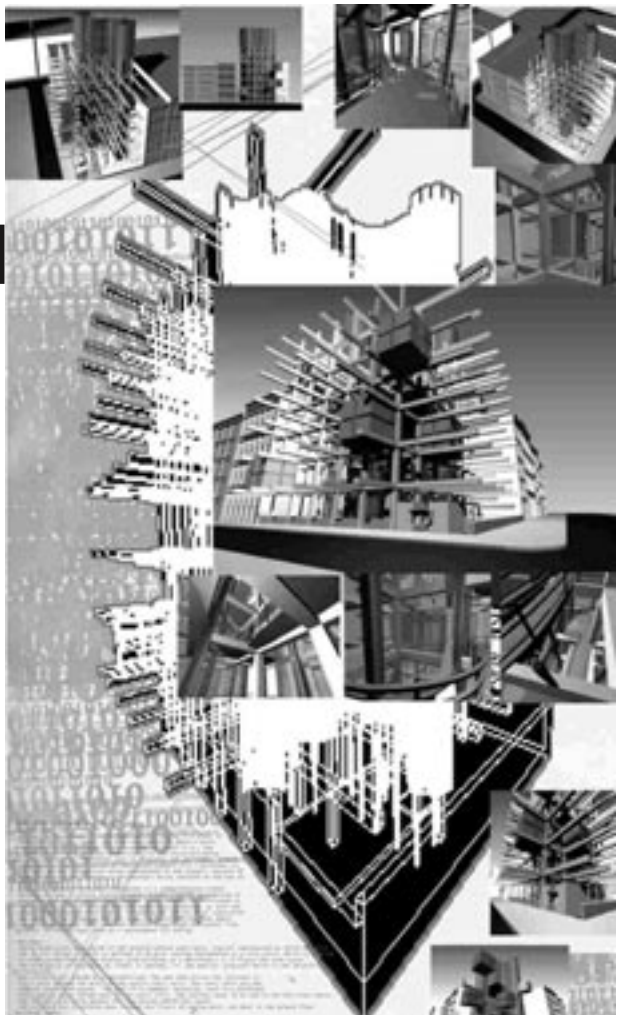


Figure 7.

Figure 8.

These intersections are not a new situation caused by the digital revolution, nor are they avoidable by perfecting the virtual world. They are in the nature of design as a process of envisioning what does not exist, and bringing it into existence.

Design can of course be used legitimately for purposes other than reality-making. Peter Eisenmann's deliberately not-for-construction projects are well-known. Nonetheless, design is most generally for the purpose of making – building a structure, planting a garden, digging a stormwater-retention basin, or casting a toy or a machine part.

In the case of architecture and its most closely related arts, the things we make are large and relatively permanent. Buildings and landscapes must endure both environmental and human punishments. By contrast, paintings, performances, movies, multi-media projects, and printed literature are almost always rigorously protected from those punishments. It is in fact architecture that provides the buffer against climate that permits most of the other arts to exist in their modern forms. Architecture is (relatively) enduring so that more fragile beauties can survive.

The necessity of constructed endurance is the taproot of architecture, but today it is barely a minor branch in many design curricula. Students are encouraged to think of their role as that of a Romantic poet whose imagination escapes all the bonds of reality. The creative mind can envision so much more than what can actually be built; recent design, especially in architecture but also in landscape architecture, has often been driven by an attempt to transcend the uninspiring facts of actual construction. But as those limits are pushed, they push back.

The widespread admiration for Frank Gehry comes from his apparent success in "breaking all the rules" of practicality. And yet, in order to achieve his wild forms, Gehry and his office have had to master a new level of real-world constructability, one so complex that it requires aircraft-design software to actualize (Figure 8).

Gehry's process is instructive. It begins with tangible models from Gehry's own hand, often made of scrap. Digitized by staff, these become electronic models, manipulated mathematically. To test the electronic simulation's accuracy, it is used as the basis for a new physical model, made using CAD-CAM machinery. If the two physical models match, the digital model is approved. It is then used to calculate structural supports, and to produce the shop drawings that communicate the vision to the contractor. Among Gehry's greatest admirers are the construction workers who fabricate the mind-boggling steel of his buildings.

To me, Gehry's work (whether one loves or loathes it) exemplifies relationships among fantasy, virtual tool-sets, and reality that warrant serious exploration.[9] Those relationships, summarized, directly relate to the question of e-society and the future of design:

- In the design of the built environment, the greater the influence of fantasy and creative imagination, the more mastery of reality (material and experiential) is required for success.
- The most sophisticated design methods alternate between tangible explorations and virtual ones in a carefully conceived cycle of development.[10]

Electronic tools have a two-edged relationship to mastering material realities. In simulation and in communication about material processes, e-tools can be invaluable. The more unusual and inventive the design, the more valuable a good simulation becomes. Virtual representations help avoid material mistakes and unintended experiential results. Yet simulations are only as good as the user's experience of the reality that they represent. Carelessly used, virtual reality can obscure material and experiential realities.

X

Current fascination with virtual electronic environments makes it easy to forget that design has many other methods of simulation, many of them as old as humanity. It is worthwhile to put these in context, especially for those charged with educating new designers.

Design is a long and carefully developed methodology for integrating flights of fancy with structural and social necessity. Simulations are its stock in trade, its prime method of reality-checking, a link between the imaginable and the possible.

Electronic simulations, such as three-dimensional renderings of texture and lighting, are the latest evolution in an exceptional tradition (Figures 9-12). Drawings are perhaps the earliest of all simulations, possibly preceding spoken language as a way of externalizing the mind's activities. Even very simple drawings, including some preserved from prehistoric times, combine realistic representation with the ability to depict things that never were, things that might possibly be. Drawings have always offered a graphic "essay," a way to test possibilities, to simulate an idea so that it can be tested against the known world.

Several special types of drawing provided quantum leaps in design technology. The scaled drawing or map allows accurate testing of dimensions, distances, and spatial relationships. Perspective permits simulated visual experience of places, and scaled perspective can make that simulation a fact-checking tool. Overlay sketching, on tracing paper or other media, allows ideas to suggest themselves by trial and error, rough gestures refined by successive revisions without losing the good parts of previous iterations.

Photography, as used in design at least, combines elements of scale drawing and perspective, along with speed and ease of recording. Animation, whether based on photos or drawings, allows the simulation of time and movement. Models and full-scale mockups offer materiality and multiple viewpoints. Cubist and deconstructivist graphic styles suggest multisensory experiences.

Electronic graphics potentially combine all these modes of simulation into one medium, in which photographically accurate scale renditions can be viewed in motion and from any angle. In addition, what computer scientists call simulation, or modeling, is a new means of creating artificial universes.[11] Programmable "agents" can be given simple rules of behavior, and the results of millions of rule-based interactions can be visualized. An agent in such a simulation could be a visitor to a museum, whose rule-set involves what the person is interested in, and how long their attention span is. The simulated result could show how a thousand such agents would cluster in space and time, with varied pressures on the museum facility.[12] The results of agent-based modeling correlate well with complex real-world

Figure 9.

Figure 10.

Figure 11.

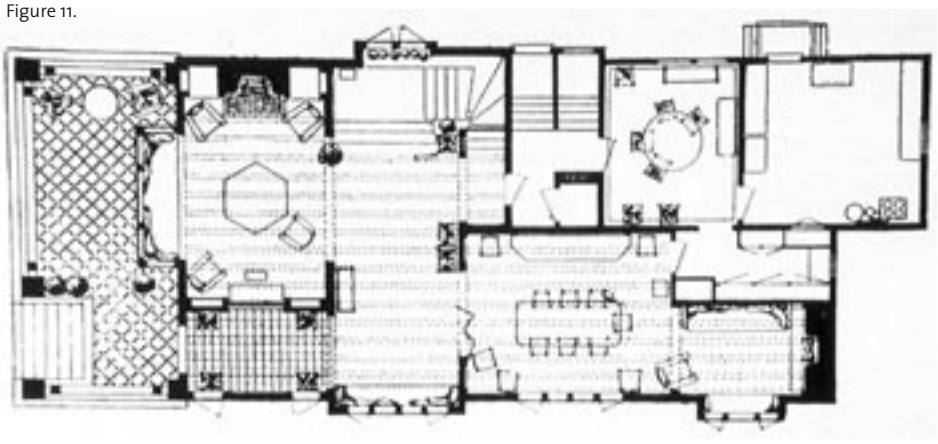


Figure 12.

situations, and suggest answers to questions that defy ordinary mathematical calculation. Such simulations seem likely to play a role in future design, and to extend once again the designer's ability to simulate reality in order to evaluate proposed changes.

Putting electronic simulation in context as a design tool is valuable for two reasons, both important to educators. First, digital tools, for all their fashionability, must be weighed against other tools. For example, a design student (or professional) who knows how to create a roughly scaled sketch perspective can simulate the proposed massing of a building or landscape on paper much more quickly and flexibly than on-screen. Producing a digital wireframe of the same concept (also valuable) is slower, and puts the user in a more analytical frame of mind, which can stiffen and abstract the designer's thinking at a point when flexibility and embodiment is called for.[13] Knowing which tool to use (or to teach) can encourage creative experimentation and flexibility. Using the wrong tool – in this case, the computer, which is the right tool in other situations – can inhibit those desirable qualities.[14]

x

A second reason for putting electronic virtual simulation tools into historical context is to illuminate the advantages and disadvantages of simulation as a concept. Some of these, especially the disadvantages, are easily overlooked in our enthusiasm for all things electronic.

To understand the advantages and drawbacks of simulation, it is useful to compare two major ways of approaching construction: building from a plan or design, versus the "designerless" vernacular method of building. I have done both, and it is clear that each has its benefits, even though only one is generally taught in design schools.

"Designed" buildings, landscapes, and cities are worked out on paper or on the screen, that is, they are simulated, in advance, and then built from the plans. Vernacular buildings and landscapes are often, though not exclusively, built by acquiring materials as needed and shaping the construction to make use of what is available. The vernacular builder has an idea or plan, of course, but the extensive simulations used by professional designers are not carried out. Designers, understandably biased, often miss the unique characteristics of construction without simulation.

Simulation on paper, with models and mock-ups, or using computers, allows experimental changes to be tested prior to committing "real" resources. Changing a drawing or model is easy, compared to changes during actual construction. Within the limits of the simulation, potential conflicts and problems can be foreseen and worked around. Patterns that are noticed in simulation may encourage standardization of constructed parts, which can be immensely efficient. Successive simulations (e.g. a set of dated overlay sketches) can provide a record of stages of design thinking, reverting to an earlier stage if the newest idea does not work out.

Against these advantages, simulation has several potential disadvantages, which experienced designers learn to manage or overcome. The fact that drawings and models are easy to change, and e-drawings and e-models even easier, is both an advantage and a drawback.

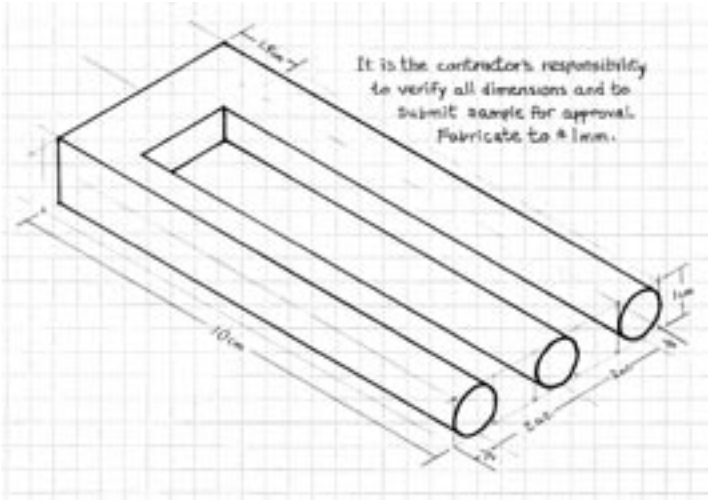


Figure 13.

The same ease of change that makes design development flow can also falsify the product. There cannot be any designer who has never unintentionally drawn an Escheresque impossibility (Figure 13). Slight distortions in perspective renderings (for example, a view more like a wide-angle lens than what the human eye actually sees) can utterly distort a design. This is sometimes deliberately done to sell a project to the public, and sometimes accidentally occurs. In both cases the built result is usually disappointing, even disastrous.

Computer-based drawings and simulations are more labor-intensive, in upfront investment of time, than hand sketching. As a result, computer methods are generally poor at capturing fleeting, impressionistic ideas. The investment in accurate CAD drawing pays off as ideas become fixed, but sometimes at the cost of creative flexibility. Similarly, electronic simulation provides an ideal excuse for perfectionist fiddling, at the expense of more substantive revisions.

Perhaps the most important problem with any type of simulation is that it always portrays a limited subset of the reality it represents. Conventional drawings, for example, omit the third dimension entirely, or use conventions like axonometric or perspective to suggest it. Computer wire-frames represent three-dimensional objects, but omit materiality, permitting two objects to occupy the same space.

It is for this reason that simulations are only as good as the designer's ability to fill in the blanks. With computers linked in popular thought to mathematical accuracy, there is the risk of transferring the myth that "the camera never lies" to digital tools. It requires great depth of hands-on, tangible experience to interpret drawings, models, renderings, or other simulations well.

By contrast, the vernacular method of building, from what one has on hand, is worth considering although seldom taught in schools. Because the arrangement of materials into a constructed whole is done on-site and with the actual materials in view, it is harder to overlook critical parameters than when drawing a comparable design. One aspect often ignored

Figure 14.

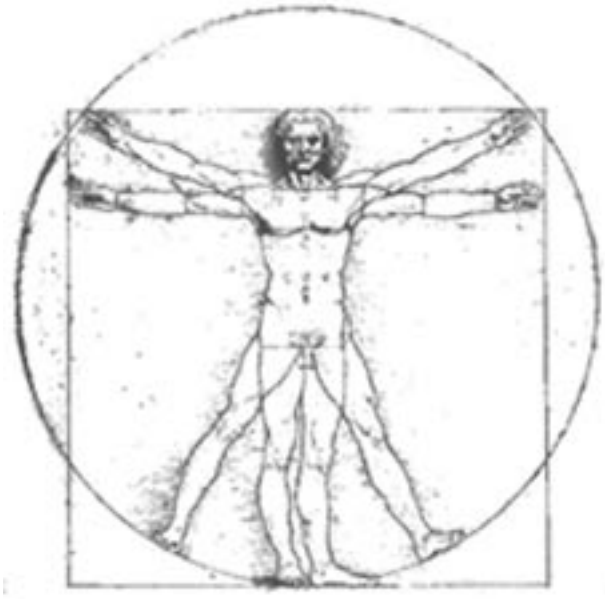


Figure 15.

by designers is "constructability" – the ability to follow a sequence of procedures to produce a designed result. It is easy to design a structural joint that could be assembled in isolation, but cannot be fitted into the space available within the context of building the whole structure. Working directly with the materials keeps this question ("How the *#^! am I going to get that nailed in there?") firmly in mind.

Simulation in advance requires assumptions about materials, particularly the assumption that materials will be regular. Vernacular building is much more able to deal with irregular and unique materials. For example, an accurate, pre-construction drawing of a whole-log structure (the frame of a Norwegian stavkirke or a medieval English barn), or of the rockwork in a Japanese garden, would have been nearly impossible to produce, and of little practical value to the builder anyhow. Vernacular builders often "design" by moving the actual material as close to its desired place as possible, and shaping it iteratively until it fits. In a world of scarce, re-used or recycled materials, this ability to adapt to what is available, and to blend with living sites (Figure 14), is increasingly valuable. Yet in general it is a dying art, with standardized, dimensional materials assumed as the basis of design, and full designs on paper required by custom and by law.

In theory, Gehry's method of digitizing tangible objects and then designing with the digital results could be applied to recycled materials. How practical this would be is open to debate. It suggests, however, that new permutations need not always pit digital against traditional approaches.

The humane quality of vernacular building is widely admired. That this quality results directly from "physical improvisation," from playing with actual materials until a result emerges, is also well-known. The converse idea is less often considered – that standardized materials and advance planning may actually impede the experience of unified and organic space.

Similarly, for many people, the work of tangible improvisation is more satisfying than the work of design by simulation. Here the distinction between imagining and simulating often blurs. Vernacular builders and many contractors have great skill in "essaying" a possible construction with remarkable accuracy, using strictly internal imagination. If an old-timer "eyeballs" the size of a piece to be fitted, or warns that a support "doesn't look strong enough," I would personally take that opinion over most computer calculations. The use of "pure" imagination in this way is also what skilled designers do before they draw or model. Frank Lloyd Wright is reported to have imagined many of his buildings in full detail before starting a single sketch.[15] The design profession's emphasis on external simulations can obscure the ultimate creative source; vernacular methods serve as a reminder that imagination is more fundamental than simulation.

One important link between imagination and reality is the involvement of the human body. It is widely accepted that when humans imagine a sight or an activity, their muscles and neurons play out all the signals and movements of the real experience, but without full-scale physical movements.[16] Imagine running, and your leg muscles are sending and receiving the same signals as if you actually ran, but damped down so you don't leap out of your seat while imagining. Thus, the idea of imagination as "purely mental" and separable from tan-

gible reality is ultimately false. Imagination requires the body, just as design simulation links an imaginary space with actual construction (Figure 15).

Vernacular, non-designed approaches to building have their disadvantages too, and these are also instructive. Improvised designs can easily become jury-rigged and substandard; avoiding this requires commitment and craftsmanship by the designer-builder. It is easy to accept the first solution that presents itself – to attach the window-frame to the nearest post because it is convenient, without considering how it looks, or how placement will affect solar gain. This occurs in simulation as well, but it is easier to reconsider before it gets built. "Designerless" construction sometimes is so focused on simply producing a structure that it ignores contextual or next-scale issues, producing a functionalist hodgepodge. (The iconoclastic "originality" that drives so much professional design is even more likely to produce a hodgepodge, however.)

The pros and cons of design "simulation" shed some light on the two questions I raised earlier: why designers use electronic tools, and when using such tools is most appropriate. These are matters which design educators must teach, lest the stampede to virtual reality decide them for us by default.

X

It is widely assumed (and somewhat feared) that the "information society" and its tools will automate much of what designers do. To some extent, this is true – dimensioning drawings or producing bills of quantities by hand are things of the past, project communication and as-built documentation are vastly simplified, and few aspects of design work are untouched by computers and communications technology.

However, the counterpoint to this trend is, I believe, equally valid and important. For many of the reasons I have sketched above, greater reliance on complex simulation technology brings with it a hidden demand for increased, rather than decreased, knowledge of the materials, processes, and assemblages that are simulated – including realistic knowledge of how people use and perceive physical environments. This knowledge – or more correctly, experience and professional judgement – is far from being automated. Judgment is, in fact, something design education needs to emphasize.

Again, I do not mean to suggest that design teachers should neglect or deny the technical know-how required to use CAD, GIS, web-based design data, or other electronic tools. Rather, the focus needs to be on integration, which is the core of design. The essential methods of design involve a cycle of work that gathers data about the proposed project, allows "informed fantasy" to flourish, then checks for "ground truth," and returns to the imaginative mode, using what has been learned during the reality check as inspiration for the next cycle of creative thought.

To envision design as an inspired, utterly irrational and poetic process (which is unfortunately a common model in design schools) is to miss the true marvel of this unique process.[17] Likewise, to think of design as mere functional problem-solving (another rather common approach), diminishes what our professions do. Oddly, computers are used as justification

for both of these opposing viewpoints. Wildly impractical collages (buildings designed as pastiches of half-structures and images) are very popular on American campuses just now, and the cut-and-paste capacities of the computer support this fad to the utmost. Conversely, more and more manufacturers offer architectural product details on CD or website, and thus the digital revolution supports those inclined to standardize design into a plug-and-play kit of parts.

There is, then, no necessary relationship between digital electronic tools and the quality of design. This is precisely why design education has such a great opportunity to influence how, why, and whether designers meet the demands of the information society.

What is unique about design, at its best, is that it so deeply integrates the designer's "left brain" and "right brain" abilities. Few other professions come close to requiring equal integration of the imaginary and the practical. The stereotypical Fine Artist – representing the "right brain" – employs unparalleled creativity, but could never solve a structural or budgetary problem, or meet the pragmatic demands of a design client. Likewise, the caricatured Engineer, whose work is almost entirely computational and practical ("left brain"), cannot comprehend aesthetic or experiential matters. These are clichés, and both artists and engineers have alter egos – but their professional life does not require them to integrate these opposites to the same degree that designers must.

To recap, if the purpose of (most) design is to make or build tangibly, and if the process of designing/building is at its best when it integrates creative vision and realistic experience, then the education of designers in the information age must steer the "new knowledge" to serve these purposes. There are a number of pedagogical approaches that could help to accomplish this type of design education.

X

Pedagogy involves two aspects: key conceptual approaches, and class/curriculum structure. I want to suggest several key approaches and concepts that I hope may help design education adapt to a role as realists in a virtual age.

- First and foremost, teach students to think clearly and critically about the notions of virtuality and reality. Many of the distinctions noted in this essay are important points of departure. Simulation tools, total-immersion entertainment systems, long-distance teleconferencing, and auto-adaptive rooms are all termed "virtual." Amidst this confusion, students and practitioners who are clear about the differences will have serious advantages.
- Re-emphasize the fact that everything happens in Place. Even people whose experience is focused into a dreamworld (through electronics, hypnosis, drugs, or psychosis) are physically located somewhere. People inattentive to their physical surroundings require extra care in designing those surroundings, e.g. design for Alzheimer's patient housing. Electronic communication bypasses Place in one sense, but its infrastructure requires space too. Virtual experience is produced by equipment requiring tangible protection. Teach students to question claims that total virtuality can be achieved.

- Explore the similarities and distinctions between imagination, simulation, and tangible improvisation as methods of creative form-making. Experiment with real-virtual-real cycles in the design process. Design teaching needs to take note of perceptual research, particularly that which links mental processes like imagination with "embodiment." Exercises involving completely internal imaginative skills, hand sketching, tangible models, and design-build work are all important avenues to this awareness. Movement training, such as martial arts, dance, or kinesthesiology are less direct paths to this end.
- Ensure that students understand, from theory and experience, that real-world construction has its own consequences and requirements, as does the natural world of the "site." Incorporate constructability, maintainability, and resource-cost sustainability in design teaching, not only as constraints, but as inspirations. Recognize human labor (with or without machinery) as a link to the quality of constructed spaces, and to their resource costs.

These suggestions are in no way a comprehensive manifesto. It will require the creativity of many design educators and students to embody these concepts in a way that adapts to future needs.

X

The curriculum in a thoroughly information-age design school will, I hope and predict, include more actual making of designed objects than is common today. It is a common lament that design students graduate without knowing which end to grasp a hammer or spade, and then proceed to lord it over construction workers who have vast stores of knowledge about such matters. The information society may offer opportunities to improve this situation.

- Studio teaching, at its best, is an attempt to simulate design-office practice, client interaction, and real-world projects. Electronic methods can either enhance this realism, or contribute to studios at their worst – ivory-tower hot-houses in which charette pressure and romanticization of "creativity" defeat any attempt at social, budgetary, environmental, or structural realism. This choice rests primarily with individual studio teachers.[18]
- Distance learning and computer-based training offer two pragmatic ways to bring the realities of construction process into the classroom. Although student internship with a contractor might be even more valuable, on-screen methods can show students how buildings are actually made, more easily and affordably than field trips.
- Design-build courses are extensively used at some schools, and not at all in others. I believe that the advent of the e-world will make this kind of tangible instruction increasingly valuable, in demand by students and their prospective employers.
- Design-in-detail courses, which look at the transition from large-scale layout to buildable or plantable structure, will also have increased value – aided, in many cases, by sophisticated libraries of digital case studies.[19]
- "Constructability" is a field of specialization in a few engineering schools today. It should

be part of every designer's education, as should the related issue of maintainability.

- Virtual methods could be used to acquaint students with design and construction failures, for example safely simulating material failure and job-site accidents.[20]
- Life-cycle costing is a critical tool for realistic designers, especially those concerned with sustainable design. It is currently relegated to the sidelines in most design teaching, and needs greater emphasis.
- "Green building" is a trend approaching mainstream status quite rapidly. It involves practitioners in evaluating materials and methods in a variety of new ways: embodied energy analysis, toxicity in manufacture or use, durability and recyclability, and so on. Again, computer databases, web communication among pioneers of these ideas, and advanced simulation methods aid the designer in achieving realism.
- Ecological design is becoming increasingly imperative as the balance between population, resources, and available space changes.[21] Globalization, driven in part by electronic linkage, is a major factor in these changes. Designers will increasingly be called upon to cope with scarce resources; some information technologies (such as the demand for wireless infrastructure) may create some scarcities, while other aspects of digital life (e.g. telecommuting) offer solutions. An understanding of basic ecological principles is one aspect of "realism" that is almost certain to increase a designer's professional prospects today and into the future.
- Post-occupancy evaluation, and design based on what can be learned from it, is infrequent today. Evaluating actual performance of buildings and outdoor places can be improved using remote sensing, electronic user surveys, and many other information technologies. Design schools have an important role in expanding and disseminating this information.

These are only a few among the many possible suggestions for arming e-students with reality experience.

The seasoned educator or school administrator will immediately worry: where can we find the space in an already crowded curriculum for any "new knowledge"? I believe that information technology and computer-based training methods may actually help solve this dilemma. Careful consideration of course content often reveals subjects that can be significantly streamlined by e-tools. For example, few professionals today would dare calculate structural loads by hand; similarly, there is little need to learn how to estimate topographic surfaces manually. Some older technical skills might be replaced by hands-on grounding in real-world systems; leave the calculations to the computers. Computer-based training modules might also replace some classroom instruction in basic subjects, freeing time for person-to-person and hands-on training in some of the areas outlined above.

X

It is ironic, perhaps, that the growing dominance of electronic tools provides compelling reasons to teach more about physical materials and construction. Let me emphasize again that this is not to oppose digital skills in the curriculum – far from it.

Successful use of digital (and other) simulation requires clear experience with the realities that are simulated. Without realistic experience to guide its use, simulation loses value. The very realism that some design educators today scorn as inartistic will increase in importance for every step society and the profession take into a virtual world. Materials and methods of construction, behavioral aspects of designing for people, sustainability implications of design choices, climatic and ecological influences – all can be convincingly simulated, but how is the designer to judge whether the simulation is buildable or sustainable, except by applying judgment based on experience?

Simulation is by definition a type of fiction that allows you to visualize what does not exist. Students in the information age need to learn to differentiate between fictions that are applicable to creating new realities, and fictions that appear plausible but reflect faulty assumptions.

A great deal of hype accompanies society's belief that the geography of the future will be a shape-shifting Matrix Revisited cyberspace. Undoubtedly, one reason for the popularity of the notion of a cyber-future is that it insulates the believer from the fearful threats of war and environmental disaster. The opposite vision, of the gritty survivalist wasteland of Mad Max, is frightening (and certainly makes design all but irrelevant). If the world arrives at such a collapse, it will be in large part because we used up our resources pursuing simulacra that could never be. As architect and author Ed Mazria notes, the design and construction professions consume some 40 percent of all resources used annually in the world, and have the potential to tip the future in one direction or the other.[22]

The arts of reality offer a counterbalance to excessive fascination with simulation and virtuality. Designers, better than almost any others, juggle the real and the unreal, the tangible and the virtual. Design education in the information age must diligently maintain and adjust that dynamic equilibrium to keep our professions from becoming irrelevant. It is, paradoxically, the advent of virtual lifestyles that calls on us to reaffirm the joys of making and materiality.

Figure 16.

NOTES

1 Corn, Joseph, et al. 1984, Yesterday's Tomorrows: Past Visions of the American Future, Smithsonian Inst. & Summit Books. The Judeo-Christian anticipation of the next world and rejection of this world are clearly related to the expectation that the secular future will escape materiality. Postmodern theory, which focuses on conceptual constructs and discourses to the frequent exclusion of physicality, often seems deeply bound to Judeo-Christian otherworldliness, despite claiming to challenge "Western" orthodoxy.

2 Two excellent 2004 exhibits at Copenhagen's Kunstindustrimuseet (Design Industry Museum, a.k.a. Museum of Decorative Arts) link utopianism (religious or political), the expectation of transcending space through speedy technology, and the stylistic tendency toward lightness and smoothness in modernism. The exhibits (and their published catalogs) are titled Utopi og virkelighed i det 20. århundredes kunsthåndværk og design (Utopia and reality in the twentieth century's crafts and design) and Fartens og langsomhedens former (Forms of speed and slowness). Available from the museum at Bredgade 68, DK 1260 Kobenhavn K, Denmark. Exhibits include English text, but catalogs are in Danish only; title translations are my own.

3 In organizing the competition for which this paper is submitted, the EAAE has used a structure that parallels the spirit of essay-writing: interactions among entrants and jurors have been a learning experience, rather than a strictly anonymous, impersonal, rationalistic selection process. The "essay" approach fits the design world – design, writing, competitions, pedagogy, and practice – extremely well.

4 As Per Olaf Fjeld put it in his workshop's opening remarks, "Architecture remains earthbound, and a profession."

5 Etymological notes (American Heritage Dictionary 1976 and Encarta Dictionary 1999):
Boxed definitions abbreviate main listings from the above dictionaries.
"Virtual" derives from "virtue," in its archaic sense of power or effectiveness; that which is virtual has some of the effectiveness but not all the substance of reality. Ultimately, the root of virtual is the Latin "vir," meaning man and implying competence and power, as in "virile." Despite the gender assumption, this derivation strongly suggests that imagining (the most basic form of virtual thinking) is central to being human.
The dictionaries cited above reflect a surge in popularity of the word "virtual." The 1976 source lists only four senses of the term; twenty years later Encarta gives the word four sub-definitions, with 10 listed phrases or uses. All of the newly added definitions relate to computer simulation.
"Virtual" is a concept that is just as slippery as "real," yet writers and speakers use "virtual" and its synonyms without any of the doubts commonly raised if someone claims to discuss what is real.

6 Some buildings and landscapes today combine sensors, automatic mechanical systems, sound reproduction, and color or image projection to create environments that change in response to user activity. Bill Gates' home is a much-publicized example, fascinating, and perhaps the wave of the future. Such tangible environments with variable properties are far from the total-immersion simulations often called virtual reality. They are also far different than the virtual simulation tools of design. Calling such responsive rooms virtual is debatable; in any case they are outside the scope of this essay.

7 Emery, N. & Clayton, N. "The Mentality of Crows: Convergent Evolution of Intelligence in Corvids and Apes," Science, 10 Dec 2004, vol. 306, pp. 1903-1907. Imagination, as the capacity for mental simulation going beyond the limited reality of what is in the immediate perceptual field, is gaining recognition among scientists as a key component of intelligence, both human and animal. Emery and Clayton's article is a good example, and reviews a great deal of literature on this subject.

8 In practice, designers and historians dealing with this "polyphonic" approach to place history tend to be among the profession's radicals; examples include Simon Schama, Dagmar Richter, and James

Corner. Confronting the physical record, rather than just the written one, is in many ways more likely to lead to an ethical view of design, as well; here proponents range from the late Ian McHarg to Alberto Perez-Gomez and David Abrams (The Spell of the Sensuous: Perception and Language in a More-than-Human World, Pantheon 1996).

9 Gehry's grasp of environmental, resource, and urban/regional context realities may be questionable, but his making of built form is still remarkable. There are, as always, many realities to deal with.

10 To me, this is an applied example of Juhani Pallasmaa's observations on "the dualistic essence of architecture, both subjective and pragmatic."

11 "Adventures of Complexity, Towards a System Approach in Architectural Design," EAAE 2002 first-prize winner by Jörg Rainer Noennig, discusses some of the emerging techniques of such modeling. I am investigating such tools in collaboration with computer scientists from FRIAM and The Santa Fe Institute.

12 For an example of this specific use of agent-based modeling, see www.crowddynamics.com

13 Compare Gehry's rough-model digitization method, a type of 3-D sketching, described above. Gehry's forms are quite clearly not achievable if one starts with computer drafting, nor by pure calculation. When I say that one tool is "best" for a particular use, I do not mean to preclude the kind of hybrid and intermodal exchange used by Gehry's office. In fact, I see this digital/hand, virtual/real approach as eminently desirable, a whole greater than its parts.

14 "The pencil versus the computer" was a subject of much debate at the 2004 EAAE workshop in Copenhagen. Juror Dagmar Richter foresees the complete decline of all physical drawing tools ("the pencil") as inevitable results of computing's economic power and convenience, and characterizes any valorization of pre-digital tools as die-hard nostalgia. With due respect for a fellow gadfly, I must side with the several conference attendees who consider hand drawing an important parallel to computer representation. CAD's clear advantages for production work are unarguable, and all-digital methods are undeniably in vogue. But to assume that economics are inevitably reductionist is to abdicate the designer's role as a visionary, and risks self-fulfilling prophecy. Predictions of other economically-inevitable technological extinctions (paperless office, never-travel telecommuting, etc.) have proven premature. Cars coexist with low-tech travel (foot, bicycle, pack-horse, dogsled) and with high-tech non-cars like public transit. Similarly, handwriting coexists with keyboards for uses ranging from the hasty note under the door to the legal signature.

Handwriting and drawing have several advantages not easily displaced by digital technologies: true machine-independence; permanence (physically and vis-à-vis software incompatibility); and truly egalitarian cost/access ratios (especially if all computer and peripheral costs are compared). Hand drawing's direct link to imagination and embodied experience (see notes 7 and 16) can be incorporated in stylus and digitablet systems, but cost-effectiveness remains questionable. Thus I conclude that the design educator is well-justified in taking a proactive stance that introduces students to a toolkit including both digital and non-digital modes of design representation.

15 Practitioners of Tibetan Buddhism are well-known for similar skills, used both as meditations and as the basis for their intricate mandala artforms. Many artists, especially muralists like Diego Rivera who work at such large scales that the whole artwork cannot be seen from the distance at which work is done, also report complete previsualization of their works. Conventional design training, focused on immediate simulations, seldom attempts to awaken even the beginnings of these somewhat esoteric skills.

16 The virtual resembles the real, as Alberto Perez-Gomez noted at the workshop, "precisely because we have and are bodies." That we think with our whole bodies is increasingly well-documented, and is influential in design. The theory is usually called "embodied perception," based on the work of the twentieth-century French philosopher Maurice Merleau-Ponty, especially his Phenomenology of

Perception. For a readable overview of psychological research on this topic, see Andy Clark's Being There: Putting Brain, Body, and World Together Again, 1998 Bradford Books.

Design sketching (as opposed to sketching from life) is generally based on imagined objects rather than objects that can be observed while sketching. As such, design sketching appears to rely in part on the damped-down bodily experiences associated with imagination, and in this sense uses bodily experience as a reality-check and source of inspiration.

17 As pointed out in "Knowledge Skills and Arrogance: Educating for collaborative practice" (2002's other first-prize EAAE essay by Rosie Parnell), the attempt by architects to define their expertise in terms that are isolated from public reality and incomprehensible to non-architects has led to the appearance of arrogance, alienation from possible clients, and actual loss of work and prestige for the profession.

18 The "studio model" is controversial, an item of devotion to some, and of derision to others. That critique is a topic beyond this essay. Some digital innovations might help revitalize the studio.

19 "A Maintenance Contract for the Architect's Degree," which achieved a Mention in EAAE 2002 for Ann Heylighen, emphasizes the reality function of the case study, defining it as "a concrete project for the built environment... designed for a specific context." Heylighen's proposal for a case-study database is especially interesting since it hearkens to architecture's roots in the design/build traditions of craft guilds, where reality experience was gained first-hand.

20 I am indebted to a workshop participant (whose name I never learned) for this fascinating suggestion.

21 This concern was in welcome evidence among all the competition jurors. Per Olaf Fjeld stated the issue eloquently: "Architecture used in ignorance is a major destructive force against the earth." My hope is that better understanding and use of the virtual-real interactions of design will improve our ability to reverse damage done by past development and to tread more lightly in the future.

22 A good summary of Mazria's work is Hawthorne, C., "Turning Down the Global Thermostat," Metropolis Magazine, October 2003, pp. 102-107, 149-152. A list of Mazria's many publications can be found at www.mazria.com.

IMAGE SOURCES

Except as noted, images are believed to be in the public domain. Figure:

1 Harry G Dart, 1910, from Yesterday's Tomorrows (see note 1)

2 Broadacre City, 1936. Drawings by Frank Lloyd Wright, Copyright © 1958, 2005 The Frank Lloyd Wright Foundation, used by courtesy of The Frank Lloyd Wright Archives, Scottsdale, AZ.

3 California State University, Dept. of Construction Management; used by permission

4 K. Sorvig

5 Online image, www.head2headgames.com, plus cartooning by author

6 US Postal Service Vietnam Veterans Memorial commemorative stamp

7 Online imag109e, www. architecture.njit.edu

8 Architecture + process: Gehry talks, 1999 Rizzoli, M Friedman (ed.); images p. 53; used by permission of Gehry Partners; last image by K. Sorvig. (Model images are Guggenheim Bilbao; final image is Disney Hall.)

9 Lascaux cave paintings

10 Dürer perspective

11 Craftsman-style house plan

12 Air photograph, source unknown

13 K. Sorvig

14 K. Sorvig

15 Leonardo da Vinci

16 Photo by Karen Maasen, undated; Marcel Schurman greeting cards, CA; used by permission

MENTION DENIZ INCEDAYI TURKEY

MENTION

ARCHITECT AS A FACILITATOR

The Changing Education (of Architecture)

DENIZ INCEDAYI

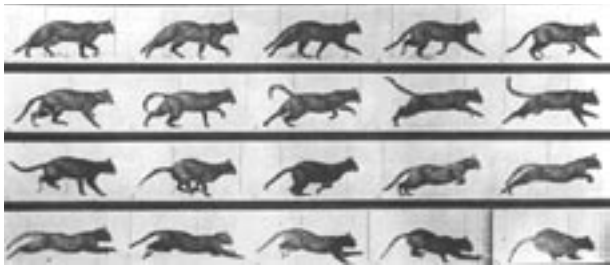
Mimar Sinan Fine Arts University, Turkey

CHANGING WORLD/CHANGING HUMAN BEING

As is well-known, the search for a solution to the economic crisis of the 1970s has led the economies of the developed world to restructure and reposition themselves to adapt to advanced communication and information technologies, and triggered the dynamics of the globalisation process. While this process is generally perceived as the 'integration of national markets', in a definition borrowed from the field of commerce, the advances in production and communication have inevitably extended into all fields of life and transformed the concept of space, giving it a different content from it had in the past.[1]

Transformations experienced both in the relations and organisation of production, and in the field of communication, are necessitating a new economic and social system determined by multiple influences, that is, by network relations. Harvey, in his study Limits of Capital (1982), examines urban transformations through the processes of capital accumulation and describes new trends developing in metropolises.[2] These developments, which have led to the transformation of the city, or, in more general terms, the transformation of space, have brought new approaches and efforts onto the agenda of urban design. The concepts of 'limit' and 'limitations' are losing their importance: the system has come to be defined in terms of 'units' instead of 'areas' and 'groups', and a new social structure and new social relations have become subjects for discussion. Concepts like 'local' and 'global' are now dealt with multidimensionally, and their dialectical relationship is open to debate.

1. Leandro's Tower, Istanbul



2. Sequence photographs of a running cat, Eadweard Muybridge, 1879

3. Berlin, "Symphony of a Great City", Walter Ruttmann, 1927

4. Confectioner's in Istanbul, 1992

In this context, architectural activity has passed beyond the scale of 'building' or 'limited space', and is more inclined to examine the relationship between 'subject' and 'object'. Attempts to reformulate the subject and its relationship to the object have become the order of the day, not only in the field of architecture but also in other fields of the arts and sciences. The works of Roland Barthes,3 the critiques of architecture and urban planning by American installation artist Dan Graham4, and the feminist theorist Donna Haraway's "Manifesto for Cyborgs"5 may be cited as leading examples of such reformulations.[6]

Architectural practise is being transformed into an instrument of social integration, when evaluated within the context of multidimensional and interdisciplinary relationships between 'subject' and 'object'. Within this perspective, we may even say that architecture has reached beyond the activities of the architect.[7]

Global developments in different fields (e.g. economy, culture, sociology, psychology, information technologies) have had a huge impact on the city, and, in a more general sense, on space, and created new trends of production and consumption. Architects have started to debate social knowledge in theory and practice within their professional domain, as well as policies and strategies. Undoubtedly, this transformation process has changed the role of the indi-

5. From Bulletin No.1, UIA 2005, Istanbul Congress

6. Soyak Housing, Istanbul, Oguz Meriç, 1997

vidual within society, and requires the construction of a new model of the relationship between the individual and society.

At this juncture, it becomes more important to be able to utilise and direct the flow of knowledge and possibilities of communication brought about by the globalisation process in order to develop architectural skills ('know-how'). Questioning the form of 'participation' and 'interdisciplinarity' in environmental design, and consequently, in architectural education, has to become a permanent feature, and has to appear as a new dimension of the design process.

This article aims to discuss the new mission of the architect in this transformation process, and to propose an ideology of design that might support integration with contemporary society. The education methods and conditions that might provide support in this regard are examined, and the importance of creating an integral approach to the process of reproducing the environment within the professional education is emphasised. In other words, the social functions of education policies are underlined. The aim is to debate the transformation of the environment in a rapidly changing world, and the attitude of the architect faced with this process.

THE CHANGING ARCHITECT

Design is a complex activity, as it encompasses a wide field of knowledge, a wide range of disciplines, and the interaction between these disciplines. Even though different design objects have different characteristics and priorities, architectural/urban design is a field in which technique intertwines with social dimensions. This is due to the fact that while the object of design is space, its subject is the human being:

Space is the most important dimension that separates architecture from all other 3-dimensional production and design fields. The human aspect is introduced with the concept of space. The knowledge of human beings and society has to combine with the knowledge of design for this reason at the least. However, the knowledge of human beings cannot be reduced to ergonomics, user needs or housing statistics. Space cannot be conceived without human beings, nor human beings without space.[8]

This inevitably brings onto the agenda the question of how human beings are involved in the design process. Methods need to be developed for linking human and social knowledge with the design process.

The approaches and policies that develop within a culture, and that come to characterise it, form an important infrastructure for the process of the production of the 'built environment'. City dwellers are losing their sensitivity rather than developing it; moreover they are even being transformed into the means of cultural erosion as the concept of 'aesthetics' loses its content and notional integrity and cultural and environmental values are eroded through a speculation-driven globalisation process and economic concerns. This general insensitivity to cultural and natural heritage has led to an alienation from cultural identity that is increasing in pace with the globalisation process of the cities.

In such a setting, the following questions come to the fore:

- How can the environmental sensitivity of the prospective architect be developed using information technologies?
- How can the architect act together with society in the face of the erosion of cultural and aesthetic values?
- What is the role of the architect in a world driven towards uniformity, and how can the architect use information technologies to foster cultural plurality?

The Catalan philosopher Eugenio d'Ors wrote, "everything which is not tradition is plagiarism",[9] and emphasised that all artistic creations are unique interpretations of tradition, and can be developed through a dialogue of cultures. The most important works of art find their essence in tradition, and they are appraised in terms of the cultural continuity they represent. Urban spaces are reflections of this. Spaces (neighbourhoods, streets, squares, windows, relationships of doors to streets, etc.) are documents transferring messages of the multidimensional unity of this language. The spatial and environmental qualities of ancient cities can be explained through their cultures in a similar way.

7. Cumalıkızık, Bursa, Turkey, by Kamil Fırat

8. View of the Golden Horn from the Ayvansaray slopes in Istanbul, AraGüler, 1985

In such a process, architectural design (and consequently architectural education) cannot be appraised in a way that is limited to spatial construction and building design: it bears the burden of responsibility for exploring and transforming the human beings and societies it serves.

The role of the architect is to bring about a new vision of the profession through a social perspective, expanding the limits of the profession within this context. Future architects can expect more work compared to past generations of architects. The architect of the future would, in this view, resist cultural erosion and develop a communication with society in order to develop ideas and utopias based on social and cultural policies.

So long as the profession is not dealt with solely in terms of its physical dimensions, but in conjunction with the surrounding society and all its concerns, it will be open to change and become a link in interdisciplinary communication. This process would gradually lead the profession to gain a new form of language by utilising the new technologies, and to become integrated with the new forms of communication, which is the main aspiration of our era.

9. Cumalıkızık, Bursa, Turkey, by Kamil Fırat

10. Kalkan, Antalya, Turkey, by Kamil Fırat

THE CHANGE IN ARCHITECTURAL EDUCATION

Inquiry into the Function of Education in this Context

Given that the function of the design process is to provide a service to human beings, it must be defined as a type of social activity. The education and design process should make the professionals and prospective professionals aware of and sensitive to this fact. In other words, the education of architects should ensure that the prospective architects acquire a basic professional philosophy.

As different education programmes have many branches, defined by different knowledge fields, there cannot be a simple formula for incorporating them into the curriculum. However, one strategy for structuring education may take the form of co-ordinating disciplines that form the 'backbone' of architectural education, its fundamental tenets. The need for such planning is sorely felt in the contemporary education system.

When Le Corbusier wrote, in 1928, that "architecture will not lose its importance in time, on the contrary, it will expand into different branches and spread out",[10] he was focusing attention on the interdisciplinary and dynamic nature of the profession. Similarly, in a different

11. Satellite discs outside an apartment building, Berlin, Germany

era, Habraken wrote: "Today it is inevitable to concentrate on analysing the environment and daily life; we cannot lose time by longing for the nostalgic past or by imagining a future that would not rest on the social realities. In order to achieve the tranquillity aim of our profession, we have to attain further knowledge, hence our subject is 'built environment' that is beyond architecture. Perhaps what we have to do today is to be aware rather than discover or create.[11]

All professions and disciplines are subject to historical change, and thus they attain new qualities, contents and perspectives. Architecture is a profession that experiences this process of historical change more intensely than others. As I have tried to underline above, its subject is 'space', and consequently the 'living environment', which is an indivisible element of the 'social process'. On this basis, the form of integration, the ability to analyse and control the structure of the environment, and the attitude and responsibility assumed towards the environment by the designer has a critical importance. In this context, the need for a social consciousness[12] (environmental, historical and quality awareness) emerges, and this need overlaps with the basic aims of architectural education. The education plan and programme that might be developed by monitoring social developments in the context of world events,

and allowing other disciplines to interact with the profession, should be open to perpetual change and extensive participation. In other words, architectural education should reflect the perpetual changes of the profession. Given these characteristics, the education may be perceived as a kind of intersection of society, and may be planned:

- As an instrument of communication between the profession and society,
- As a means of sustaining cultural values,
- To make the user an active participant in designing and changing the environment,
- To further advance the integration between different disciplines and scientific fields.

With such an approach, the practice, education and theoretical scope of architecture would gain new dimensions and content.

PROPOSED METHODS IN ARCHITECTURAL EDUCATION

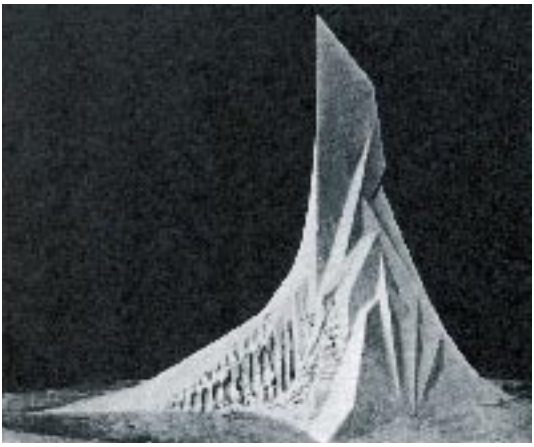
This section will attempt to explain how the approach outlined above may find a place in architectural education. With this aim in mind, the three basic fields of architectural education will be discussed: basic design, theory and architectural design studios.

a. Basic Design

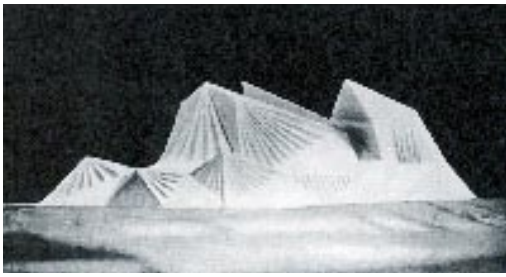
The basic design education, which is planned as an important studio training/discipline in order to trigger creativity in architectural education, has a great importance in developing the students' mindsets.

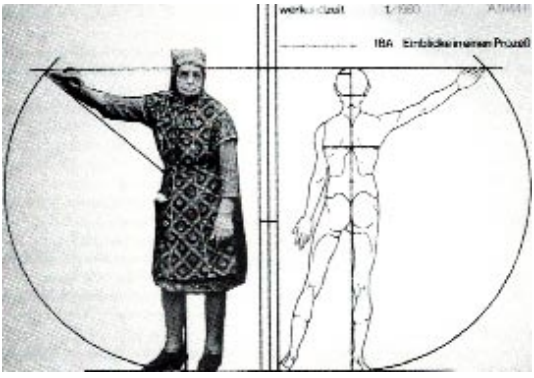
Basic design teaches not only the representation of a project purely in terms of its geometric features and/or drawings, but also its cultural, historical, theoretical and sociological background. Therefore, it should be perceived not only as a foundational discipline taught in the formative years of tuition at professional training institutions, but also as a method of education designed to develop sensitivity to visual and relational elements.[13] In essence, the theory of basic design aims to develop individuals who are sensitive to the environment and capable of designing and transforming the world on the basis of this sensitivity. Given these characteristics, it assumes a fundamental function in the education. Such a transformative skill would be further developed by supporting and intertwining the design process with other disciplines. Basic design cannot be conceived in isolation from the plastic arts, literature, music, social sciences or philosophy. Like all the other arts, the function of architecture is hidden inside its product. 'Space' becomes a work of 'architecture' with the idea it puts forward.

Therefore, establishing its connection with different disciplines and arts, and by doing so enriching its content, assumes great importance. Particularly at a philosophical level, the cultural, historical and psychological messages conveyed by architecture should be instilled in each and every prospective architect. Through this an architect takes the first steps in associating the design with a system of thought, and develops a perspective that can enable him or her to perceive the profession in a multidimensional manner.



12. "Phantasieentwurf", W. Luckhardt, 1919



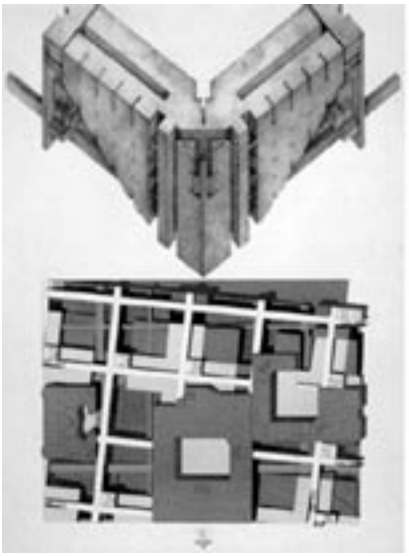


13. Titlepage of Werk und Zeit, 1980

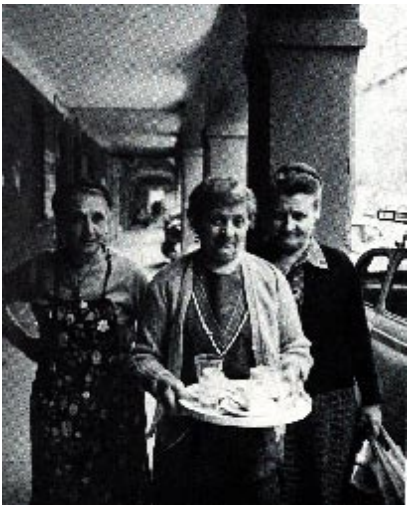
b. Theory

In the existing education programmes, theoretical teaching is generally linked with form. However, as touched upon above, architecture is also a field of social planning. Social knowledge is an inseparable part of the transformational process of architectural design. Therefore, in education, it is vital to assign an important role to the measures developed by the theories of social sciences for processes of spatial transformation.

Adopting such an understanding in the education programmes primarily requires including the social disciplines in the programme. Such an initiative may be seen as a preparatory grounding for prospective architects. These subjects should be taught in such a way that students are able to relate them to architecture and space. Experts in the social disciplines may be able to shed light on the relationship between their profession and spatial design, and open new paths of thought in order to support the formation of prospective architects. This would make it possible to explore the profession through the perspective of different approaches taken from other fields. It would also mean that the architect could deal with contemporary global issues by reaching across the limits of the profession or the artistic branch the architect is involved in. The difference between the intellectual and non-intel-



14. Posters from the exhibition of the international competition Lützowstrasse, Berlin, Tiergartenviertel, 1981



15. Arcades in the historic centre of Bologna, Italy, 1984

lectual would become visible through the decision to take part in a certain mode of activity.14 Certainly, such an approach should not be expected to become a widely realised strategy in education in the short term. However, what I am trying to emphasise here is the importance of exploring and inquiring into the different causes and social circumstances which enable developments in the world to influence the changes in various professions.

c. Architectural Design Studios

In architectural education, the place where the above-mentioned disciplines are transformed into a synthesis is the architectural design studio. Thus we may say that the architectural

16. "On the Wall", by Weng Fen, 2003

studios form the "backbone" of architectural education. When different subjects are included in the curriculum within the scope of the aims outlined above, the students can be given the opportunity to explore the different dimensions of the design process.
Here we may cite the process of preparing the city conservation plan for Bologna, Italy, in order to emphasise that spatial and environmental transformation is also a part of social and cultural planning. The method employed by the planner, Cervallati, to foster an understanding among the people of Bologna of their historical and cultural inheritance, may be seen as an example of social planning and development that goes beyond an architectural project. Cervelatti designed an exhibition in the historical town square that displayed the old city, and invited the people on a journey through the collective history and memory of the city. Because the main theme was the conservation and transformation of the city, the notion that historical and social values are an indivisible part of architectural space was stressed.

Not only in conservation studies, but in all architectural projects and workshops, subjects should be dealt with in their social and philosophical contexts, and the prospective architect should be encouraged to utilise different fields of knowledge (such as history, sociology and psychology) in their proposals for architectural solutions. Such an approach could be supported by projects involving experimental ideas, joint workshops on selected special fields, and so on. An important issue here is to ensure the participation of experts from different fields in the project work by way of their ideas or their actual physical presence. Debates and discussions between students and experts from the social sciences and other branches may be organised in the same vein. Undoubtedly, 'outside' criticism would provide important

input and benefits. In this way the education system might teach students to criticise and be criticised, which are important components of architectural education. Moreover, such an approach would aim to make the disciplines work together as an integrated whole, instead of functioning disparately, thus making a multidimensional approach the focal point of education.

SETTING THE FUNDAMENTAL AIMS

For architects, developing new criteria for the design process and examining the existing education system require a redefinition of certain concepts. These may be summarised as follows, in the context of the above-mentioned approaches:

- New interpretation of creativity (what is creativity? How and in which fields could it be developed?)
- New demarcations of the fields of knowledge (redefining the fields of knowledge in line with the changing circumstances of contemporary society. How could additions, subtractions or changes be implemented?)
- The concept of architecture integrated with social sciences (what are the methods for integrating architecture with social sciences?)
- The richness of the theoretical base (integral approach to multidimensional environment)
- Knowledge of education in practice (methods for communicating)
- Probing the cause-effect relationship in design (intellectuals' responsibility)
- The philosophical domain of the profession

All institutions and bodies associated with architecture, first and foremost educational institutions, could develop healthy relationships with other fields, work to create synergies, and develop common discussion and platforms using new technologies and media. At a time when international relations have become closer, discussion platforms could be formed through mutual dialogue and interaction; could expand with the input of architects and other professionals from different platforms (such as chambers of professionals, educational institutions, local authorities, non-governmental organisations, virtual platforms, etc.); and support a widespread educational policy.

Some joint principles for such activities might be the following:

- Integral approach (accept interdisciplinary interaction and the approach of a multidimensional design process)
- Sensitivity in design (an approach creating and developing sensitivity to social, environmental, economic, psychological and ethical concerns)
- Social and historical consciousness in design (an approach to conservation15 that is aware of the natural, cultural and historical values of the built environment)
- A sustainable approach (a system to develop 'sustainability' as a natural characteristic of the design process)

17 . Ano Poli, Thessaloniki, by Nikos Kalogirou, 2003

18. "Ein Platz für Marie", S.T.E.R.N, Berlin, 1999

The most important aspect to be stressed is the dynamism of the process. All approaches that strive to adapt to social changes are bound to be 'changeable'. Therefore, the educational programmes should be reformed and updated in line with changing social circumstances.

CONCLUSION

Architecture on the Agenda of Social Politics

Today, social politics is an important field of study. With its interdisciplinary nature, it is intellectually attractive and open to cultural studies. Its political importance is related to architectural and urban design. Urban politics, in the context of design policies and the changing role of the architect, forms a very important foundation for social policy research. Under the influence of the globalisation process, the changing and transforming social structures have brought with them new definitions of concepts such as 'poverty', 'local', 'global' and 'traditional', as well as differing approaches to the social realities they represent. These developments inevitably integrate the field of social politics with the field of architectural activity. This idea has a critical importance in the fields of art and architecture, as it encourages us

to create and think in relation to such issues. New dynamics developed through interdisciplinary dialogue could contribute in a fundamental way to this process.
In his Critique of Everyday Life, Henry Lefebvre writes: "*Man must be everyday or he will not be at all*".[16] This approach, as the transformation of life in its smallest, most everyday detail,[17] will help the understanding of the integration of the profession with society. It can also be helpful in evaluating the environmental process in regard to 'quality of life', not merely in terms of physical and visible phenomena, but also of the non-visible quality of sensation.

As is well-known, since the nineteenth century, thinkers in the field of aesthetics have searched for a definition of 'beauty'. Sartre said, *"beauty is a hidden conflict"*, thus referring to the dialectical interrelation between the 'subject' and 'object'. In the present context, this approach implies transferring the discussions of sociology, psychology, philosophy and history into the field of design. The designer should bear the responsibility for acting conscientiously and forming a correct and beneficial evaluation of an environment characterised by very rapidly advancing and changing technologies – particularly information technologies. The utilisation of technologies and the advances in information technology can only be viable when they are transformed into a platform of discussion that supports interdisciplinary developments, and where free thought can be expressed without hindrance.
For Husserl, *"to be a human being is to be on the way"*. His main idea is that the human being has to search for the "quality of the process" continuously, in order to discover the needs of the human.[18]

Italo Calvino, in his book Six Memos for the Next Millennium, writes: *"In an age when other fantastically speedy, widespread media are triumphing, and running the risk of flattening all communication onto a single, homogenous surface, the function of literature is communication between things that are different simply because they are different, not blunting but even sharpening the differences between them, following the true bent of written language"*.[19]

In the rapidly advancing design process, can architectural design have a function that emphasises unique values and 'differences' and transforms them into a new field of communication by reshaping them and integrating them into society?20 Prospective architects face the challenge of discovering ideas, and more importantly methods, in the architectural education, and adding them to the creative process that lies at the heart of the profession. In other words, the developing professional culture and philosophy of education should trigger a common attitude of the professional platform against the threat of a 'single type of communication' in the globalisation process.

A system whereby wider participation can be elicited may contribute to the development of a democratic culture, and create an interdisciplinary platform of interaction. The fundamental approach should be to enable the prospective architects, who should be trained to see events in a social and political context, to conceive of the profession as a process or activity of both thought and culture.

19. The dome of the Pantheon, 1998

In this context, the relations between the profession, the political choices of everyday life, and a multidimensional debate on the concept of 'development' are of vital importance for the societies of the twenty-first century.
Architects of the future should examine the human being in the context of architectural environments, using the new technologies of the information society in order to promote the social possibilities of architecture.

To arrive at the simplest truth... requires years of contemplation. Not activity. No reasoning. Not calculating. Not busy behaviour of any kind. Not reading. Not talking. Not making an effort. Not thinking. Simply bearing in mind what it is one needs to know. [21]

G. Spencer-Brown, Laws of Form,
from Harbraken, J. The Structure of the Ordinary, (ed.) Jonathan Teicher, The MIT Press, 1998.

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1 Eraydın, A., "Küresellesme-Yerellesme ve Ilevleri Farklılasan Kentler", ("Globalization-Localization and the Cities' Changing Functions"), Prof. Dr. Cevat Geray'a Armagan, Mülkiyeliler Birligi Yayınları: 25, Ankara, 2001.

2 Kaygalak, S., "Sembolik Sermaye, Yoksulluk ve Kent" ("Symbolic Capital, Poverty and the City"), Prof. Dr. Cevat Geray'a Armagan, Mülkiyeliler Birligi Yayınları: 25, Ankara, 2001.

3 Barthes, R., Image-Music-Text, London, Flamingo, 1977.

4 Willis, B., (ed.), Rock My Religion, D. Graham, Cambridge, Mass. Press, 1993.

5 Haraway, D., "Manifesto for Cyborgs: Science, Technology and Socialist Feminism in the 1980's", Socialist Review 80 (1985).

6 Hill, J., (ed.), Occupying Architecture, Between the Architect and the User, Routledge London and New York, 1998.

7 Here we may remember Kant's 'social beyond society' ideal, where the focus is put on the 'genuine' and 'creative' person in the context of social improvement. He also argued that social improvement necessitates an integral interrelation of works

8 Teymur, N., "Tasa(r)lanacak Bir Dünya Için Temel Tasarım Egitimi", Önsöz, ("Basic Design Studies for a World to be Designed", Introduction), Temel Tasarım/Temel Egitim, der. N. Teymur, T. Aytaç-Dural, ODTÜ Mimarlık Fakültesi Yayınları, Ankara, 1998.

9 Pallsamaa, J., "Between Uniqueness and Uniformity", Ung Dansk Arkitektur, Design, Arkitektens Forlag, 1999.

10 Tochtermann, W., Approval for Architectural Education Unesco-UIA Council Report, trans. by: A. Ülkütekin, unpublished report, Berlin 2002.

11 Habraken, J., The Structure of the Ordinary, (ed.) Jonathan Teicher, The MIT Press, 1998.

12 The development of this consciousness should not be understood as a limitation of thought and creativity; on the contrary, it should be understood as supporting freedom of thought, and stimulating knowledge bases that can develop different points of view and perspectives in the formal or informal education processes.

13 Teymur, N., op cit., p. iii.

14 Bauman, Z., Yasakoyucular ile Yorumcular (Legislators and Interpreters), trans. by: Atakay, K., Metis Yayınları, stanbul, 1995.

15 In this context, the concept of 'conservation' should not be construed as 'keeping the existing', but as 'recreating through transforming the authentic qualities'.

16 Mc Leod, M., "Henri Lefebvre's Critique of Everyday Life: An Introduction", Architecture of the Everyday, Harris, S., Berke, D., (ed), Princeton Architectural Press, Yale Publications on Architecture.

17 Mc Leod, M., ibid., (Lefebvre, H. Critique de la vie quotidienne, 1947.)

18 Here we can refer to Heidegger's philosophy or oriental Taoist theories of 'being on the way'.

19 Pallsamaa, J., op cit.

20 Pallsamaa, J., op cit.

21 G. Spencer-Brown, "Laws of Form", in Habraken, J., The Structure of the Ordinary, (ed.) Jonathan Teicher, MIT Press, 1998.

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5. From the Invitation Bulletin No.1, UIA Istanbul 2005 Congress
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10. Kalkan, Antalya, Turkey by Kamil Fırat : Photograph by Kamil Fırat
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MENTION ANDREW LEVITT CANADA

MENTION

A Designer's Guide to the Resources of the Psyche

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"Nowhere are we closer to the sublime secret of all origination than in the recognition of our own selves, whom we always think we know already. Yet we know the immensities of space better than we know our own depths, where—even though we do not understand it—we can listen directly to the throb of creation itself."
C.G. Jung, "Analytical Psychology and Weltanshauung" (1928)[1]

In this paper I take the position that new knowledge is knowledge about the self. I approach psychology rather than technology as a vital and animating force that needs to find its way into not only architectural education but into the act of design and architectural "know-how."

We hear a great deal about "new knowledge," and the information society. We have heard about the promise of a new global culture and the convenience of making on-line purchases 24/7. The quantity of information available, and the rate and ease at which it can be moved, points to a technologically based revolution whose impact is the subject of endless speculation. I can honestly say I have no idea where these new tools will take us. Whether you believe technological change is positive or negative, most would agree these changes are unstoppable. In fact, everything points to the idea that whatever changes are taking place represent the first stages of potentially much larger transformations that are affecting and redefining not only individuals but also global images of community. The best news may be that "new knowledge" has created an infrastructure capable of sharing information at a rate and scale never before attempted. The ability to access information is not dependent on particular cultures or beliefs; it is tied to the technological sophistication of a machine.

You might assume that with the extraordinary expansion of new sources of information we would see a corresponding increase in our ability to solve problems, but this has not proven to be true. Information, whether it is available at the speed of horses or fiber optic cable, has no rescuing power, holds no wisdom and delivers no guarantee of right action.

It is probably more than a coincidence that while technology is capable of remarkable revolution and change, human beings seem stubbornly resistant to growth. Often even a brush with death cannot change a point of view! The loss of an entire species or eco-system has little effect on our approach to a problem. It has been far easier for us to organize around technological practices and issues of "know-how" than the human challenges and problems that we face.

In the city where I live the collapse of a building is an extremely rare event. On the other hand, thoughtless and banal architecture and planning are exceedingly common. We are far more committed to regulating than creating. An important question for architectural education is, How and why we have become so indifferent to the built world? I think our indifference grew quietly out of underestimating the value of human problems and overestimating the importance of technology when solving problems.

A modern individual can barely sort out a day's worth of modern sense impressions, let alone make space to assimilate what awaits us when we try to respond to all the levels of media that demand our attention. New information always seems full of promise. But after we have had some time to reflect, we realize that, though it may seem and look new, and though it might claim to be new, after some time the shiny surface evaporates.

Some would argue that the great pleasure we feel when we acquire something we desire is not due to the pleasure of acquisition but to the deeper satisfaction that results from the momentary cessation of craving. We are conditioned to believe we are just one piece of new information away from solving our problems, but often our desire for new information is simply generated by an unconscious wish to forget our problems. And the pace and sheer quantity at which we can move, access and store information may have more to do with our need to disconnect from all that is difficult and uncomfortable in our lives rather than any real desire for information, or any intent to learn from problems. In fact, it may be that this darker, more confusing underbelly of the information society has more to tell us about the effect of new information on architectural know-how than what we have come to see and experience on its narcotic surface.

I would argue that the underbelly of new knowledge, though largely unconscious, is the key to any discussion of "new knowledge." This underbelly points to the role self-knowledge plays in decision-making. Self-knowledge is the subtle material that enables us to convert anything into relevance. Self-knowledge is in fact the most valuable and important form of new knowledge because it makes experience meaningful. I want to explore how we can center architectural education on an approach that honors the conscious and unconscious aspects of the self in architectural decision-making.[2]

I want to investigate how we can begin to experiment more directly with appreciating architecture and the act of design as a psychological fact. In the field of architectural education this means we need to get into a new habit that integrates, synchronizes and tests new knowledge with self-knowledge. Self-knowledge brings an awareness of the qualities of the conscious and unconscious mind into the act of creation. It recognizes that different laws govern the realm of the psyche, and is willing to bring this complexity and richness into the built world.[3] Self-knowledge and "new knowledge" present a potentially dynamic and naturally sustainable approach to architectural "know-how."

THE SKILFUL ARCHITECT

Architects offer a unique service. They organize, lead and manage skilled teams, communicate with owners, governments and users and, most significantly, they have been given responsibility for the design of the built world. It is true that this responsibility does not fall on their shoulders alone and usually it involves considerable complexity, consultation and debate, but architects are generally seen by society as the primary form givers for the built world. There are many influential partners in an architectural process that ensure design decisions

do not occur in a vacuum, but it is difficult to imagine another profession that has the practical expertise, creative reach, theoretical understanding and the legal jurisdiction of the modern architect when it comes to shaping and organizing the built world. This helps explain why it takes so long to become an architect. In the course of their training architects are asked to acquire a new imagination, an architectural imagination. This is the fundamental and unique ingredient in any architectural service.[4]

I want to focus on one particular dimension of the architect's know-how: the act of design. Why design? Simply because so much of our world is now designed. We live in a designed world. The chair you are sitting in, the window you look through, the view outside, beautiful or banal – all of these are designed. Anything that has been "built" has first been designed. Even those rare places that are not designed, such as wilderness areas, owe their continued existence to our capacity to design and legislate for their survival.

The world is now a designed place. According to the World Watch Institute, this decade, for the first time, a majority of the earth's citizens will live in cities. How can self-knowledge be expected to thrive or survive in the designed environment unless designers create places that value human nature? Self-knowledge was once an understanding closely tied to nature and saw us understand human behavior by observing the way animals and plants came and went, and led to great mythologies about the world's phenomena. Today we no longer live in natural environments and we have lost the training that once allowed us to learn from quietly observing phenomena. But in the last hundred years we have acquired a new understanding based on the natural world of the psyche, and this offers a universal approach for understanding the value of human problems and their potential relationship with creativity.

ARCHITECTS AT WORK

Architects often explain their work by saying it has been "designed from within." Usually this means we are designing from some rational appreciation of the building's organization, but I want to suggest a less intentional explanation. There is a crucial moment in every design process that rests on a different kind of know-how, a relationship we have to our own inner world of psyche. This place of inner know-how, the world of instinct and intuition, the world of subtlety and the felt sense, is not only a complementary counterweight to "new knowledge," it also represents a part of ourselves and the world that needs to be respected and developed. Our inner know-how, which includes our capacity to imagine, is our greatest undeclared asset. When places and settings are created that uphold this experience, an undeclared but vital part of us has a place to go that supports deep feelings of belonging in this world. The part of us that is at the undeclared center of architectural creativity is outside most architectural curricula. When we say that we design from within I believe we are pointing to how we design. It may seem odd to suggest that self-knowledge needs to become an important part of architectural education, but it is probably also true that over the next twenty years we will have to redefine many currently held positions, such as our notions of prosperity, security, and what is natural.

What interests me is the way this undeclared inner world of the designer has always been covert and ignored in architectural education. Schools rush to become "wired" but are in no rush to look at the deeper strata of inner longings, needs and desires that consciously and unconsciously influence decision-makers and affect decision-making. These layers have been ignored for many reasons. They promise less direct benefit. They make decision-making more difficult before they make things better. They offer a richness that is nearly impossible to quantify. I believe the idea of declaring the role played by the psyche in the creation of the built world is central to making "new knowledge" useful and represents the best way to guide "architectural know-how."

THE ROLE OF PROBLEMS AND NEW KNOWLEDGE

Technology and the desire to surmount problems through invention and the sharing of information is an entirely human approach to solving problems. So ingrained is this approach that it has quietly evolved and taken on the proportions of a spiritual belief.

Yet we find that while technology seeks to end problems, psychological experience shows that an end to problems is neither possible nor desirable. We all move towards happiness and away from difficulties, yet we inevitably become psychologically mature from wrestling with whatever seems to be just beyond our understanding. How can this paradox be brought into the world of know-how when know-how is seen as primarily a technological issue that is dedicated to solving problems? No matter how sophisticated our technology, we cannot escape the gravity of human problems.

The revolution I am imagining is one where we step back and consider that learning how to face problems is potentially more valuable than solving them. We need to believe we can solve problems but we also need to keep in mind that solving them is sometimes less important than understanding what happens to us and inside us when we face difficulties.

DESIGN AND FEELING

I do not want to leave out the complex and troublesome role of feelings in architectural know-how.[5] How can we discuss know-how without feelings? Strictly speaking, feelings tell us whether or not we like a fact. That feelings initially lead to increased complexity and difficulty is no reason for their dismissal. Our enemy is the banality and unfeeling quality of much of the modern built world. And we must admit that there are very few decisions made about the built world that are actually rational.

This is a call to experiment with ways of bringing feelings more consciously into the decision-making process. A common question heard in the psychotherapist's office is, What are feelings? When the person who is seeking help asks this question we know the revolution has begun. Their long-standing investment in the intellect is about to be recalibrated and rebalanced. This seems an extremely important shift in the way we approach the built world and our sense of know-how. A critical type of new knowledge is the value placed on feelings.

Let's not forget that truth itself is a feeling. We are not about to go back to an age before the rise of intellect. Feelings are important centers of new knowledge because they have a long and reliable history, not only as part of our psychological anatomy, but as creative decision-makers. It is not in our interest to neglect the powers of discernment that rest in our feelings. This is probably more significant for our survival than most would admit. The transformation of the built world rests on the capacity of designers to bring this new, subjective know-how into the built world.

What feelings also offer is a way to incorporate suffering into the act of design. The psychological approach suggests that only by making our suffering conscious can it become meaningful. When we ignore our suffering it mysteriously becomes projected into the built world and causes far more harm than if we had taken the path of honestly wrestling with it.

The root of our most stubborn problems is less a matter of intellect, technology or being wired, than an issue of unacknowledged feelings. We have spent centuries developing the intellect, and while it's true we need a healthy intellect, that is not all we need. The intellect has nothing to say about value. To assign value we need to trust our feelings. How are we ever going to enjoy the rich harvest of our technological sophistication without accepting the role feelings play in decision-making?

ARCHITECTURAL LEARNING

Architectural education is typically arranged in a linear sequence. We begin by assigning small problems and gradually progress to more complex ones. For example, we might begin by understanding what a room is and several years later we are ready to try designing a city. This approach makes some sense; after all, architecture is very complex. But I wonder whether we might use psychological knowledge to teach architects not only how to solve problems but how we learn about the self and others through facing them. This might have us begin not only with designing a room but learning where our imagination comes from and what it is for. What is the psyche and what role does it play during creativity and problem-solving? Where do we get our notions of what a room is? The conscious mind and the unconscious mind are equally involved in shaping the built world. What are the roles played by our intuition, sensing, feeling and thinking vehicles as we acquire architectural know-how? This approach sees the transforming power of the built world as coming from our ability to design from within, and understands the act of design as inseparable from enriching the self.

The inner world of the architect is as significant a factor in shaping the built world as the enormous pool of information available to him or her, because it is a source of inner way-finding. The new knowledge I am envisioning is drawn from teaching students to value and develop a strong connection with their architectural instincts.

THE VALUE OF THE SUBJECTIVE

One entirely satisfying experience that emerges from teaching architecture is to witness the unlimited enthusiasm of students when they are offered a chance to re-form the built world. Students bring a great deal of hope and love to their work. They also often bring a formidable willingness to struggle and persevere in their search for self-expression. What follows is a discussion of three keys for the implementation of self-knowledge as new knowledge. I see these steps as an evolution of architectural know-how based on psychology. These steps are centered in the individual and assume a process of constant testing through an iterative process.

Three Keys to Implementing Self-knowledge as New Knowledge

1. The Role of Difficulty
2. The Role of Dreams
3. The Role of the Body

A BRIEF COMMENT ABOUT THE PROCESS OF DESIGN

The smallest unit of design is probably the act of bringing an image from the mind's eye into the world. The journey of this image from spirit into matter is the process of design.

In this way of understanding things we are constantly involved in an almost alchemical operation of refining the subtle and pliant material of the imagination into the coarser existence of material.

The power of this alchemical discipline has an additional benefit beyond acknowledging the reality of the designer's inner world. It leads to understanding that authority for creative work is no longer located externally but resides inwardly and rests on one's knowledge and experience of inner processes. In fact, I would argue that most students can only reconcile the world they live in with their own needs and desires when they stop trying to gain approval for what they create. Rather than see this as leading to subjectively inspired anarchy or a breakdown in hierarchical structures, I would say it is simply what the individual needs to do in order to act in the world we find ourselves in. The strongest product of the information age is the requirement to be anchored humanely in one's own needs and desires. This is the beginning of true "know-how."

This is not a call to self-centeredness but reflects a need to be centered in one's own truth. What was right thirty years ago may be wrong today. What was wrong yesterday may be right tomorrow. These changes come at us at the speed of new information. How will we ever know what is right or beautiful? There is no convincing global leadership on the significant issues that face our planet. There seem to be fewer and fewer people concerned with beauty. With so little being done in response to melting ice caps, shrinking aquifers and species extinction, we must take matters into our own hearts and minds. Acting on the information that comes from within is becoming more and more important in the information age. It is not an esoteric option, it is a practical way to find a path that is not corrupted by media and the powerful self-interests of others. We need to teach architects that the world is an

experiment whose outcome depends on the hearts and minds of each individual who designs the built world. Alienation, loneliness and despair are not the afflictions of "others." They are found throughout society because they exist unacknowledged in the hearts and minds of designers and decision-makers.

THE ROLE OF DIFFICULTY

"The purpose of life is to be defeated by greater and greater things."
Letters to a Young Poet, Rainer Maria Rilke[6]

When it comes to architectural education, the most essential element of know-how has to do with understanding the role of difficulty. Every project, large or small, is eventually complex and difficult. This is not a matter of scale or budget, it is an essential quality of life that arises as naturally as night follows day. Of course things never go exactly as we wish and inevitably much of our work is dealing with internal and external frictions and disturbances that influence our capacity to think and create. The world of emotion and emotional complexity are critical building blocks in any modern project.

My concern about the information society and "new knowledge" is that it leaves less room for the discernment of the emotional world. The world is not black and white. Difficulty is the beginning of color, richness, depth and resonance. And difficulty is the birthplace of the modern soul. Recognizing this architecturally means these parts of our selves need to find a way of becoming embodied in the built world. We need to learn how to amplify and draw out these inner voices until they become part of our creative process. When architects begin to bring this into their work the chances grow that vulnerable places will survive. What does difficulty feel like? It is the irreconcilable, the unspeakable, the uncomfortable and the hidden. Difficulty is mysteriously magnetized and always points us to new frontiers of growth. Difficulty is always a door to the messy foundation for new insights and understandings. We are talking about a great, untapped global resource – the capacity and willingness to wrestle with difficulty.

A student may describe their difficult experience to me by saying:
"I'm stuck."
"I'm spinning my wheels."
"I don't know what to do."
I always suggest they bring their "stuckness," spinning of wheels and their not knowing directly into their project. I always suggest we use the emotion or blocked expression to unlock, deepen and articulate the design. We are really applying an idea of psychological transformation to the inner world of design. We need to go down into the problem because that's where its transformative creative energies are located. The sensation of "going down" is the humbling price we must pay to gain the release. The value of difficulty is that it brings the possibility of new understanding and new insight to the inner world of the designer. It is what allows us to deepen our relationship to matter.

THE ROLE OF DREAMS

Dreams are a source of new knowledge. They present a view from the perspective of the unconscious. They are not filtered through the conscious ego. We are asleep when they happen. All of us dream and many of us remember our dreams, but the dream is largely out of favor as a source of new information.[7] Some would say we have nothing to do with the content of dreams, and their content has nothing to do with us. To most people dreams are far less relevant than information sourced from the internet. This represents a great loss for those who create places and settings in the built world.

Once a student reported a dream to me. She had been unable to move forward on a project. I suggested she draw as best she could the images from the dream. This led to four vibrant drawings. The student felt compelled to share the images with her mother and then uncle, all of whom were Holocaust survivors. She told me that her dream images sparked long-forgotten memories and a great wave meaningful dialogue enveloped her and her family. As stories and memories were released, she began to feel a clarity and freedom to work on her project. She had started out thinking of designing a Holocaust-related program, but shifted to a centre for adoption. I believe she had uncovered, through the architectural images of the dream, a path for herself that both inspired her and healed her creative blocks. As you might imagine she worked passionately on the project and was able to create something she was very satisfied with.

There is no technology involved in remembering our dreams. There is no technology for interpreting our dreams. Understanding a dream is a complex task that involves art, science and compassion in a way that cannot be reduced to a simple formula. One of the great lessons of the dream is that it forces us to admit that an unseen dimension exists and has a voice. It forces us to admit for a moment that there are other kinds of energies at work. The dream is always an attempt to overthrow the ego and bring in a new point of view; this new ego benefits from being incrementally wiser and more tested. Every creative act involves a journey between the conscious and unconscious world.

When I speak about dreaming I am also talking about the capacity to understand the dream. To make the dream relevant and necessary in our life we need to be not only interested but also able and skillful enough to gather its meaning. In order to do this we need to have a feel for, and an understanding of, the symbolic world of the dream.[8]

What is remarkable about the symbolic language of the dream is the role played by architecture. Architecture in a dream appears as a setting or environment for an event. In listening to other people's dreams we are frequently introduced to a setting at the beginning of the narrative structure. I am in the kitchen. I am at the train station. I am standing on a busy street. Many clients will protest their own dreams. They might say, I only dreamed about that train station because I was there two weeks ago. But they have been to many places over the last few weeks, so why does the psyche select this particular setting for a narrative? What

are the unique and important truths to be gleaned from this place? This causes us to ask, What is a train station? What are the associations we have with a train station? Soon we begin to see that this place exists as strongly in our psyche as it does in our everyday world. It certainly lives symbolically. In fact the entire built world exists as a symbolic place.[9]

When we say we are designing a school, we are asking, What is a school? But what is the underlying question we are asking? For many centuries a school was a simple idea. But today when we dream about a school, what are we dreaming about? Is it a place of learning or of trauma? Is it a place where people create or is it a place where you're told what to do, or is it both? All of these associations lead to a particular architectural voice. And one of the great merits of bringing dreams into an architectural curriculum is that it represents not only new knowledge but also an old truth. We are the products of our ancestors and this will not change. We are more than flesh and blood and the settings we create exist symbolically and speak to parts of us that are rarely acknowledged. This is a new knowledge that lies as buried in us as in the built world and we need to give expression to these human instincts and archetypes.

Even in societies where architecture is not considered important, the psyche will be very attuned to architecture and will bring the built world to life in dreams. And so through the dream architects have the means to create settings for all kinds of events that the psyche will use. Likewise the architect can generate settings that will appear as crucial support for future dreaming.

The dream is not something we can summon; it summons us and this was always respected. Why not continue this action? And why not see the possibility of this becoming part of the built world? The built world is already full of nightmares and pleasant places, dream-like and terrifying, bland and banal.

THE ROLE OF THE BODY

The fundamental psychological truth about the body is that it represents the unconscious. This is because we are usually not conscious of our body until it malfunctions. We are never concerned about consciously monitoring the secretions of our organs, or activating our ability to hear or see; we do these things without conscious intervention. Yet tuning into our body can offer unexpected resources of new knowledge. The body directly and unequivocally experiences all manner of pleasure and comfort. We have lost the ability to interpret these signals, which in turn has made it very difficult for us to create settings and places that exist as catalysts for body-centered knowledge. There are environments that put us to sleep and there are environments that awaken us. Our body is a lively monitor of the built world if we are sensitive to its signals.[10]

Our body is also a convenient symbol of the natural world and natural process. How can we have a decent relationship with the world of nature when we are so dismissive of our own

nature? This is not an issue solved by more information. No wonder we are losing species at an incredible rate. Our definition of know-how favors exporting shoes and making clutchless transmissions, not saving animals, habitats or human beings. Our belief in the superiority of thinking is so threatened by the wisdom of the body that it tricks us into believing that it has to be one or the other. This is not true. We need both. As Jung liked to say, "In the hour of reconciliation great marvels appear."

Our body offers us a gateway to reconciling ourselves with all matter, yet looking dispassionately at the world we must conclude that our sincere concern for material is in doubt. Though we are wild consumers of every kind of material, we have less and less feeling of reverence or connection with material. As a society we are in danger of becoming like those who take an interest in their health only after becoming ill. Will we continue this pattern? If enough people follow the current example it is likely. The way to activate a fresh approach would be to bring to architectural education lessons in listening to and learning from our body. This is as simple as not ignoring exhaustion and learning how to relax. But it also includes learning to heed the subtle somatic messages that arise from the body as it directly declares its likes and dislikes as we move through the built world.

The body is a living instrument that is always honestly monitoring itself. It operates incrementally on our awareness. It is unrelenting in its insistence that we acknowledge its material base. It always locates us in the physical world of matter. Like a stone in our shoe, it may not be noticed in the short term but over the course of a long walk that little stone will speak to us. The issue is whether we will learn to pay attention or choose to become distracted.

THE ROUND TABLE

The capacity to move images in the mind's eye might be the most unique skill the architect possesses. What follows is an active imagination exercise that develops and encourages the power of visualization and imagination in architectural design.[11]

If we are open to the world we are moved. Sometimes we are unconsciously moved. Other times we acknowledge our sources of inspiration. For instance, as a student, I was fascinated by the Etruscans, by the work of Louis Kahn, the poetry of T.S. Eliot and the sculpture of Michelangelo. When I worked I had these references around me. But working on a project was a constant back and forth between these inspirations. Then I decided to try to invoke a more conscious use of my imagination that accesses the use of reverie, daydream, fantasy and visualization. I closed my eyes, relaxed and imagined that an Etruscan, Michelangelo, T.S. Eliot and Louis Kahn were sitting at a round table discussing the architectural problem I was considering. In my mind I asked the four of them to have a dialogue about the problem I faced. I listened to their imagined conversation and closely watched what their drawing looked like and recorded everything I inwardly saw and heard. I let them do the work for me. I was "online" with my own imagination using the creative abundance of the unconscious consciously. I found myself with a surplus of ideas and images to work with. Today, based on

principles of guided imagination, I teach these exercises as a way to develop skill sets that bring the inner world to the built world. We are all able to imagine and we are inspired by what moves us. This approach allows us to bring what moves us into the world. It is an accessible and simple approach that supports individual expression and rests on a naturally shared platform of imagination and experience. As architects this process is very close to what we are doing when we design.

KNOW-HOW AND SHADOW

Know-how is sabotaged by what inspires it: a desire for perfection. Its goal is to transform an idea into something real, but what know-how really needs is an experience of the underbelly of perfection, which is the shadow. Architecturally we know that a shadow gives a surface depth. Similarly, human beings acquire psychological depth by acknowledging their shadow. The personality that admits to shadow admits to darkness and difficulty and gains depth and substance. Admitting to difficulty and chewing on these unwanted problems fundamentally alters our approach to difficulty. We acquire new ways of seeing the whole picture if we admit to these otherwise unwanted characteristics that exist in the shadow. Our very acceptance of shadow gives us insight and allows us to choose understanding.[12]

The danger of one-sided thinking is that it ignores these shadow traits, and that thereby they become projected. The exact mechanism of shadow projection is not easily measured or found but we can easily identify the product of this phenomenon. There is no other way to explain how or why modern know-how does not protect us from declaring war on the most harmless things. Know-how needs to get familiar with its own unconscious or we will continue to project our unwanted and unacknowledged problems into the built world. The greatest threat to the world comes from this undigested dimension of know-how. The underbelly of know-how, our unconscious, felt experience, is the most menacing danger that every decision-maker needs to wrestle with and eventually draw out so that it can be safely transcribed into the built world.[13]

Are we ready to understand the built world as a direct and honest portrait of our ability to reconcile spirit and matter, psychology and technology? The center of gravity for architectural know-how will increasingly be the ability to wrestle with problems that come from designing from within.

AN ALTERNATIVE KNOW-HOW

The purpose of education is two-fold: the evolution of self-knowledge and the acquisition of know-how. What percentage of a curriculum deserves to be devoted to "new knowledge" and how will this be balanced by the need for relevant "know-how"? The question I want to ask is, How can these two streams be brought together? How can we bring self-knowledge to problem-solving?

KEYS

1. Learning to tolerate more emotional experience and allow it directly into the act of design.
2. Allowing the felt world to infiltrate, respond and if necessary disturb and influence technology and architectural know-how.
3. Bringing an awareness of the unconscious into the way we design the built world.

We need an architectural curriculum that encourages us to design from within and does not separate transformation and creativity. It is not surprising that when self-knowledge and technological know-how are split apart we gain a world that is unsustainable.

The problems facing the built world are enormous and all of them directly reflect our beliefs about the transformation of spirit into matter. We do not suffer from a lack of technological know-how. We suffer from an inability to honestly accept psychological problems as being equal in importance to material or technological ones. Know-how needs to be deeply rooted in human experience, which includes the turmoil and the bliss of the psyche. We no longer design only for the built world. We now must design for the inner world, the other world and the underworld.

I suspect we secretly know that to bring deeper levels of feeling to decision-making will cause enormous disruption and discomfort, but I suspect we also know that we are now at the point where we face equally grave consequences if we avoid this.

CONCLUSION

The problem of evil is not that it exists but that we fear it is greater than us. The same may be said of technology. We need not fear technology. After all, the desire to invent and create has served us well and we must hope this continues. The danger of technology lies in the ease with which it helps us forget we are human beings. This is hardly the fault of machines.

When architectural students are shown how to bring the reality of their body, dreams and shadow into their creative work they instinctively know what technology is for. They instinctively understand that transformation and the fate of society rests on human voices, human relatedness and a longing to be included and touched by something real in the built world. This shift steadfastly reminds us that a meaningful built world is underpinned by the depth, luminosity and resonance of our inner world. Acquiring psychological know-how allows us to wrestle with technology where it is born and where imagination has its most evocative call: inside our own hearts and minds.

NOTES AND REFERENCES

The psychological terms I use in this paper are drawn from the work of C.G. Jung. It is outside the scope of this paper to discuss these terms fully, but the following references and comments are intended to serve those wishing to make a more thorough study of this material. All references, except where noted, are to C.G. Jung, Collected Works, Vols. 1-20, R.F.C. Hull, trans. (Princeton, NJ: Princeton University Press, 1967).

1 "The Structure and Dynamics of the Psyche," CW 8, par. 737.

2 Consciousness is considered the function or activity that maintains the relationship of psychic contents to the ego. "The reason why consciousness exists, and why there is an urge to widen and deepen it, is very simple: without consciousness things go less well." "The Structure and Dynamics of the Psyche," CW 8, par. 695.

According to Jung, the unconscious is the sum total of all psychic phenomena that lack the quality of consciousness. "The unconscious processes that compensate the conscious ego contain all those elements that are necessary for the self-regulation of the psyche as a whole." "General Description of Types," CW 6, par. 573. For a thorough and scholarly review of the evolution of our understanding of the unconscious, particularly through the Modern period, see Henri. F. Ellenberger, The Discovery of the Unconscious (New York: Basic Books, 1970).

3 Jung's definition of the psyche is the totality of all psychic processes, both conscious and unconscious. "It is highly sensible ... to make clear the primacy of the psyche, for that is the one thing which life does not make clear to us. We are so hemmed in by things which jostle and oppress that we never get a chance, in the midst of all these 'given' things, to wonder by whom they are 'given' ... we [need to] learn that the giver of all things dwells within us. This is a truth which in the face of all evidence, in the greatest things as in the smallest, is never known, although it is often so very necessary, indeed vital, for us to know it." "Psychological Factors in Human Behavior," CW 11, par. 762.

4 The following thoughts on imagination are from the James Hillman Lectures (Eranos 2), The Thoughts of the Heart (Dallas, TX: Spring Publications, 1981). "The heart is the seat of imagination, that imagination is the authentic voice of the heart" (p. 2). "When we fall in love, we begin to imagine; and when we begin to imagine, we fall in love" (p. 5).

5 According to Jung, feeling is the psychological function that evaluates what something or someone is worth. It is termed rational because it works through judgments and evaluations. "Feeling is distinguished from affect by the fact that it produces no perceptible physical innervations, i.e., neither more nor less than an ordinary thinking process." "Definitions," CW 6, par. 725. "A feeling is as indisputable reality as the existence of an idea." "The Psychology of the Transference," CW 16, par. 151.

6 Jung's major contribution to the psychology of difficulty and conflict was his belief that it had a purpose in the self-regulation of the psyche. He believed that if the tension between opposites can be held in consciousness, then something would happen internally to resolve the conflict or difficulty. This "solution," essentially something irrational and otherwise unforeseeable, generally appears as a new creative attitude with one's self and the outer world. Jung called this the tertium non datur or transcendent function. "The Transcendent Function," CW 8, par. 145.

Marie Louise von Franz nicely sums up the psychological process: "Jung has said to be in a situation where there is no way out, or to be in a conflict where there is no solution, is the classical beginning

of the process of individuation. It is meant to be a situation without solution: the unconscious wants the hopeless conflict in order to put ego consciousness up against the wall, so that the man has to realize that whatever he does is wrong, which ever way he decides will be wrong. This is meant to knock out the superiority of the ego, which always acts from the illusion that it has responsibility of decision. Naturally, if a man says, 'Oh well, then I shall just let everything go and make no decision, but just protract and wriggle out of it,' the whole thing is equally wrong, for then naturally nothing happens. But if he is ethical enough to suffer to the core of his personality, then generally...the Self manifests. In religious language you could say that the situation without issue is meant to force the man to rely on an act of God. In psychological language the situation without issue, which the anima arranges with great skill in a man's life, is meant to drive him into a condition in which he is capable of experiencing the Self. When thinking of the anima as the soul guide, we are apt to think of Beatrice leading Dante up to Paradise, but we should not forget that he experienced that only after he had gone through Hell. Normally the anima does not take a man by the hand and lead him right up to Paradise; she puts him first into a hot cauldron where he is nicely roasted for a while." Marie Louise von Franz, Interpretation of Fairy Tales (New York: Spring Publications, 1970), sec. VI, p. 4.
For a Jungian perspective on the role of difficulty and conflict in the Old and New Testament, see J. Sanford, The Man Who Wrestled with God (New York: Paulist Press, 1974).

7 Jung agreed with Freud that dreams have a wish-fulfilling and sleep-preserving function, but focused on their symbolic content and their compensatory role in the self-regulation of the psyche. "Dreams," CW 8, par. 545.

8 For a Jungian approach to working with dreams and, in particular, issues of amplifying symbols, see Robert Johnson, Inner Work (San Francisco: Harper and Row, 1968). For examples of Jungian dream interpretation, including the role of symbols in the development of the psyche, see Marie Louise von Franz, The Way of the Dream (Boston: Shambhala, 1994).

9 Jung considered symbols the best possible expression for something unknown. "A sign is always less than the thing it points to, and a symbol is always more than we can understand at first sight. Therefore we never stop at the sign but go on to the goal it indicates; but we remain with the symbol because it promises more than it reveals." "Symbols and the Interpretation of Dreams," CW 18 (par. 482). For a comprehensive classification of mythic symbols, see Joseph Campbell, The Mythic Image (Princeton, NJ: Princeton University Press, 1974). For a discussion of the relationship between the psyche and the "symbolic life," see E. Edinger, Ego and Archetype (Boston: Shambhala, 1992), p.117.

10 The difficulty and paradox of discussing the intelligence of the body lies in the fact that this intelligence is not text-based and is therefore considered inferior by our thinking function, which our ego habitually aligns with when making decisions. Those who consciously experience their body through athletics, dance or illness may directly make contact with the decision-making capacity of the body. A psychological approach to the body has the integration of this wisdom as one of its goals. "The gods have become diseases; Zeus no longer rules Olympus but the solar plexus, and creates specimens for the physician's consulting room, or disturbs the brains of the politicians and journalists who then unwittingly unleash mental epidemics." Jung, The Secret of the Golden Flower, p. 113.
For the role of the body in the process of psychological transformation, see Marion Woodman, The Pregnant Virgin (Toronto: Inner City Books, 1985). For a study of the connection between the psyche and the body, see Judith Harris, Jung and Yoga (Toronto: Inner City Books, 2001).

11 Active Imagination was invented by Jung as a way of assimilating unconscious contents through some form of self-expression. The objective of active imagination is to give voice to a side of the personality not usually heard, thereby creating a line of communication between the conscious and unconscious. "We must be able to let things happen in the psyche. For us, this actually is an art of which few people know anything. Consciousness is forever interfering, helping, correcting, and negating, and never leaving the simple growth of the psychic processes in peace. It would be simple enough, if only simplicity were not the most difficult of all things." C.G. Jung, The Secret of the Golden Flower, Wilhelm Richard, trans., (New York: Harcourt Brace & World, 1962), p. 93. For a Jungian approach to working with Active Imagination see Johnson, Inner Work, chapter 3.

12 Shadow is a Jungian term that describes a hidden or unconscious aspect of one's self, either good or bad, which the ego has repressed or not recognized. "The Shadow," CW 9, par. 14. For an excellent survey of contemporary psychological issues concerning shadow, see C. Zweig & J. Abrams, eds., Meeting the Shadow (New York: Penguin Books, 1990). For a guide to the psychological process of working with one's own shadows, see Robert Johnson, Owning Your Own Shadow (New York: HarperCollins, 1991).

13 Projection is a Jungian term that describes an autonomic process whereby the content of one's own unconscious is perceived to be in others. "The psychological rule says that when an inner situation is not made conscious, it happens outside as fate. That is to say, when the individual remains undivided and does not become conscious of his inner contradiction, the world must perforce act out the conflict and be torn into opposite halves." CW vol. 9 (II), par. 126. For a detailed discussion of the projection of the shadow, see Jolande Jacobi, The Psychology of CG Jung (New Haven, CT: Yale University Press, 1973), p. 109. For a discussion of the results of mass projection, see C.G. Jung, "The Psychology of Nazism," R.F.C. Hull, trans., in Essays on Contemporary Events (Princeton, NJ: Princeton University Press, 1989).

MENTION UPALI NANDA + IRINA SOLOVY0VA USA

MENTION

The Embodiment of the Eye in Architectural Education

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This paper discusses the disembodiment of architectural education. It examines the visual bias in education, its cause and its consequences, as well as the issue of perception and the problems involved in its comprehension and representation. Finally, it proposes a multi-modal 'synesthetic' approach that explores different media and sense-modalities to achieve an embodied objective in education.

ARCHITECTURAL EDUCATION: AN OVERVIEW

Architecture is one of the oldest professions: it dates back to the third millennium BC. The education of architects has for many centuries taken the form of apprenticeship, but in the last century it evolved into a 'studio-based tutorial environment' (Glasser, 2000). This change in professional training is mostly explained by the centralization of education and the development of modern methods and media. For example, the emergence of photography, video and the internet has made travel less essential in the education of a young architect (Lawson, 2001). Education has turned passive: learning is mostly theoretical and in-studio.

"The basic assumption of passive professional education is that language can express reality adequately enough to motivate and guide practice" (Hoberman and Mailick, 1994, p. 22). This statement is valid for current professional education in general: education that is disconnected from the profession. This type of education may work better in some disciplines than in others. In the case of architecture, language and even visual media are not enough to convey to students the concepts of space that are indispensable to developing the ability to design environments. As noticed by Langer (1980), the complex understanding of space that we owe to our sensual experiences can never be taught or developed through cognitive processes alone. Our experience and understanding of space is personally embodied – we make sense of the environment through all our senses and changes in perception. Our experience of environment is not static. It is a four-dimensional, multi-sensory experience that occurs in time as well as in space, is sequential and embodied, and inseparable from experience in general.

It is fair to say, therefore, that "architecture as a purely musical composition of shapes and colors in light is an elusive ideal" (Baljon, 2002, p. 334). Architecture has always relied on knowledge of precedents in building types and arrangement of spaces within the environment. In the information age, however, this knowledge has become omnipresent, yet anonymous. Today, students rarely have first-hand experience of these precedents; rather, their experience is disseminated through images in magazines, journals, books, the internet and television (Lawson, 2001). One of the key objectives of an architectural education is to expose students to a "veritable barrage" of experience that they can draw upon when they design (Lawson, 2001, Downing 2000). In current education, such a "barrage" is visually biased. In the era of information technology and virtual reality – with the dominance of visual representation as the end product of architecture – what we actually do (often unintentionally) is limit ourselves to image-to-image transformation. I am sure that the following characterization is familiar to most staff of architecture faculties: "A student from an undergraduate studio presents a project that has a façade with randomly placed windows of varying

size and proportion. The façade, the student says, is "like Ronchamp's." The critics stretch their imaginations to Le Corbusier's powerful and poetic treatment of the thick south wall of Notre Dame du Haut. The student's version is weak and pathetic..." (Findley, 1990, p. 36).

As noted by David Appleyard (in Thiel, 1997), already in the seventies, the professional culture of architecture was becoming more and more remote from the 'real' world: reading current architectural periodicals and other printed materials replaced actual communication with clients; judges of the visual 'formal-aesthetic aspects of a hypothetical mean' of projects were now peer architects and not the general public. All this contributed to architectural language becoming more and more abstract and specific, more and more visual, and more secluded from the 'lay people,' those whom architecture is made for. The same happens in architectural education: students are taught a 'special language' and led toward a disembodiment of their experiences through visual manipulation and amalgamation. "The main concerns have shifted from architecture towards its representation... The emphasis is put on the visual and its representation" (Senturer and Istek, 2000, p. 83). As a result, education prepares great technicians, who can collect beautiful images from other beautiful images, but unlearn or never learn how to apply their bodily understanding of spaces to the creation of new experiences of place. Design students under the pressure of learning their craft confuse the means with the ends and believe reality to be their drawings, rather than the actual reality that their drawings represent (Thiel, 1997). "The victory belongs to 'the photographers,' 'the graphic designers' and 'the computers'. They have taken the forefront in architecture... Education becomes dominated by the media modes of representation and expression..." (Senturer and Istek, 2000, pp. 81-82).

We have created a growing gap between the real world, with its rich, real experiences, deep understanding of matter, and complex translation of those experiences into new experiences, and the world of architectural education, with its mediated, mostly visual experiences and rearrangement of those experiences into new representations. "We perhaps are fooled into believing that we understand things that have been presented to us in mediated form. What we really understand or know [if at all] is the particular slice of the thing framed in a particular way" (Findley, 1990, p. 37). And then we fool ourselves once again when we believe that an animation of a designed space is the end product of the design. There is no question that media are very important, and that they create possibilities that were unfeasible before: advanced visualizations such as 3D modeling and walk-throughs, layering of complex infrastructural and functional information, and a flexibility that allows for changes and revisions. Yet the limitations of sophisticated technology must also be acknowledged, and compared with the strengths of more conventional methods.

"Plans, sections and other 'standard' architectural drawings allow a never-ending alternation between representable and non-representable" (Frascari, 2003). A certain amount of reflective thinking is essential to allow this alternation to take place. Photographic representations like walk-throughs that are overly literal can limit architectural perceptions. For example, in

a typical 3D walkthrough, the user projects himself as a suspended point in space floating through the designed place, making the walk on a marble floor seem as smooth and silent as walking on a carpet, as defiant of gravity as walking on a cloud, and intrinsically disembodied, because his or her eyes move through a space where the considerations of the body are left behind. The speed, ease, and flexibility that computers give us must be placed within the context of the need for reflective thinking and incorporation of perceptual and experiential concerns.

EDUCATION VS. SIMULATION

In as early as 1979, Paul Ritter cautioned us of the dange to assume that is the computer we need and about changing architectural design methods from the development of human skills to suitability for computer language. Yet design education today is almost a complete simulation: "it implies imagining a virtual transformation of an area in the city, country or wherever, and is relatively free from any need to actually realize the project" (Brusascoa et al., 2000, p. 394). Architecture students at present (with very few exceptions) are completely deprived of the actual experience of the physical object that they design. It is obvious that we cannot require all students to build a building, but we can at least help them to bring their embodied experiences into the design studio. According to Lawson (2001, p. 145), "educators have probably failed to recognize the knowledge system issue and provide cognitive tools for crossing the knowledge boundaries". Novice designers have not yet themselves developed the skills to apply knowledge and experience from different realms to designing. There is in fact a dissociation of education and experiencing.

Design education works by defining the boundary between the autobiographical and professional experience of a designer (Downing, 2000). Professional designers display greater fluidity across domains and experiences than students do. Mature designers no longer recognize any significant differences between informal imagery and formal imagery. The current state of communication involves inherently shared sensations. In the case of mature designers it also involves awareness of that sharing, a better understanding of concepts enhanced by media, and reflection through projection of personal experiences onto mediated experiences. Students, on the other hand, often treat mediated experience as formal imagery and lack an understanding of embedded concepts.

When professional education discarded the older apprenticeship model, knowledge through analytical thinking superseded learning through practice. The emphasis moved from learning by doing and contemplation of activity and consequence, to 'pure' thought, that is, to learning theory and techniques, and abstract analysis of lectures by knowledgeable researchers (Hoberman and Mailick, 1994). And, intentionally or not, the whole aim of education shifted from gaining an understanding of 'how it works,' learning to learn, and acquiring the minimum required skills, to gleaning as much information (with the assumption that understanding will be deduced from it) and as many skills in computer tools and current media as possible. Computers became more than mere drafting tools, and were introduced into the

design process at the conceptual stage. This fundamental change may well be an indication of where the twenty first century is headed. However, it is not quite there yet. According to Waterworth (1997), computers are perceptual artifacts that cannot and should not be expected to substitute humans in problem-solving. And this is where the crux of the problem lies: reliance on technology as a 'complete' tool. Overemphasis of information, technology and representation in architectural education continues the advancement of disembodiment through a system that is biased towards the visual.

THE PROBLEM OF 'LANGUAGE': VISUAL BIAS AND ITS CONSEQUENCES

The richer the designed environment, the more apparent it becomes that the usual set of professional design tools, though well-adapted to the portrayal of static objects from static viewpoints, or even static objects from moving viewpoints, are inadequate for representing the environment from moment to moment as one moves through it experientially. The question then becomes how we can design, not the static object in itself, but the experience, be empathetic to the range of experiences that the designed environment allows, and communicate this range to the future users.

Since the importation and absorption of perspective by architectural space in the fifteenth century, architecture has been dominated by the mechanics of vision. Technology has fused the boundaries of space and time as we once knew it, and in doing so has created a sensory imbalance subjected to what Levin (2001) calls the "hegemony of vision." Our eyes are able to take us to places far beyond where our bodies are. According to Kripper & Aiken (2000), this change in sensory sensibilities can be attributed to the increased pace of social change, which has affected our identification with our senses, and even our sensory organs, and changed our understanding of time. It is a change that we need to recognize and revaluate. Pallasmaa (2001, p.12) sums it up eloquently when he says that "we live in a perpetual present, flattened by speed and simultaneity, and grasped by the instantaneous perceptions of the eye. The only sense that is fast enough to keep pace with the astounding increase of speed is sight." Thus architecture assumes sight to be important and in some way natural to its processes. The development of the electronic paradigm took vision and representation little further – from flat drawings to simulations of walking through space. But this new paradigm did not change our ways of making architecture, at least in terms of how it is taught in academia.

Perhaps the problem is that there is really no systematic language to represent the experiential issues associated with architectural drawings. It would be helpful to have a system of notations similar to the one proposed by Thiel (1997). Such notations are "the multipartite polyphonic description of actual (or proposed) real-time sequences of concurrent actions, feelings, and thoughts associated with given behavior patterns and given users, and the real-time sequential description of multisensory physical environments as experienced (or experienceable) in movement along given routes" (Thiel, 1997, p. 4). By means of such notations, prototypical experience may be denoted for a given timeframe, place, and situation.

These kinds of prototypical environments, if described as embodied sequential experiences, can be associated with actual remembered experiences and can be easily communicated. This kind of information, unfortunately, is not prioritized in our education system in the 'information age.'

Not only design education, but the design profession as a whole, still does not have a nomenclature of environmental and experiential factors (notations). The language that is used by designers and taught in architectural schools is a separate language not understood by the general public. This language, besides being completely incomprehensible to the lay person, is also confusing for students. Media and notation may have to be tackled simultaneously, but before doing so, the issues of perception that they seek to communicate must be understood more fully.

EMBODIMENT OF THE EYE

Research shows that "touch contributes strongly to our experience of architecture" (Ryhl, p. 40). It is true that typically we remember spaces visually, kinesthetically (as we move through space), and tactually, rather than acoustically or olfactorily; even though, for example, smell is considered to be one of the main triggers of memory. Vision by itself, however, is impaired – it is limited to our field of vision and is dependent on our motion through space. Nonetheless, when it comes to education, the visual modality is dominant. In typical representations, the continuity of the real world as we move through it and interact with it as sensual beings is simplified to the passive viewing of the walk-throughs with, at best, some sound effects. The eye has come to dominate the body. And the body, which experiences architecture holistically (through the visual, auditory, tactile, haptic, olfactory, kinesthetic and other sensibilities), has been relegated to notating scale in representational drawings.

In architecture, sensitivity to the body has been as abstracted into measure (proportions) and metaphor (symbols, forms, etc.). 'Sensory' interaction with environment has been addressed only since the1960s (e.g. Lynch, 1960, Jacobs, 1964, Sommer, 1969, Bloomer, 1977). The sensory aspect has since become part of the environmental concern, with 'sensory overload' and 'sensory deprivation' being common critical terms. Today, there is no denying that all experience, including the experience of architecture, takes place via the medium of our bodies. Lakoff and Johnson (1999) make a convincing argument for embodied realism that discounts the idea of a reality that is divided into categories independent of the properties of human minds, brains, or bodies. The core ontological assumption is that we are coupled to the world through our embodied interactions. Mind and body are not separate entities; rather, the mind is considered embodied. In this sense, our conceptual structures can be understood as arising from our sensorimotor (from 'sensation' and 'movement') experience and the neural structures that give rise to it. Our mental structures become intrinsically meaningful by virtue of their connection to our bodies and our embodied experience, and reason arises from sensorimotor and other fundamental body-based forms of inference (Lakoff and Johnson, 1999).

While we acknowledge the importance of 'sensorimotor' experience, it is interesting that in our day-to-day use of embodied metaphors, we use the term 'visualize', but never 'auralize,' or 'tactualize.' Primitive man's x-ray art, based more on intimate knowledge than just on what can be seen, has given way to the 'perspective art' of the detached observer established in the Renaissance. According to Pallasmaa (2001) the evident ocular-centrism of our world can be held partly responsible for the inhumanity of contemporary architecture and cities: "The dominance of the eye and the suppression of the other senses tend to push us into isolation, detachment and exteriority" (ibid, p.10).

The experience of architecture is as performed. All our faculties, our position, and our movement contribute to the experience. Within the complexity of this experience, the power of the visual must be acknowledged: it has the largest sphere of influence, it is the most communicable, and a powerful abstraction. Yet the 'sign'ificance of the visual is in all the information it 'implies'; the sight of fire implicitly conveys heat and warmth. To acknowledge the Eye as an Implicit of all the other senses is a valuable 'view'. Unfortunately, in our times we accept the rule of the 'Narcissistic Eye,' which views architecture solely as a means of self-expression, or the 'Nihilistic Eye,' which deliberately advances sensory and mental detachment and alienation (Pallasmaaa, 2001, p. 13). In a sense then, the Implied rules while dissociating itself from its very implication. Perhaps there is a need to develop 'perceptives': multiple-participatory-perspectives for all the senses, which are more immersive than the detached one-point perspective of the past. There is a need, so to speak, to embody the Eye.

A SYNESTHETIC APPROACH TO EMBODIED EDUCATION

When considering the embodied paradigm discussed above, one might think that while the senses work together, they work independently from each other, and therefore, to approach embodiment we simply need to be attuned to each of the senses. However, this is a gross simplification: our senses are not independent of each other, they are interdependent.

One of the most fascinating evidences of the interconnections between the different senses is the disorder synesthesia, which is a neurological condition in which a stimulus to one sense triggers another. For instance, when a person tastes chocolate, she sees the color red (http:// hyperdictionary. com). In our daily lives we notice these interconnections in the way that sounds seem louder when the lights are turned off, or in the way the blind have a more acute sense of touch than the normally sighted. One sense seems to compensate for the other, and this makes us ware of the need to examine these connections further. According to J.J. Gibson (1966), the human body and sensory systems cannot be considered in exclusion of motor processes and proprioceptive factors (such as the position and movement of the body). In the last few decades, studies in psychology and cognitive neuroscience have used behavioral and neural responses to different sense modalities (vision, audition, touch, olfaction and taste) to demonstrate a certain interdependence within the sensory systems: touch can affect the perceived sound, sound can affect the perceived view, and so on. This change in the approach to perception can be tabulated as follows:

Traditional approach to Perception	Present Day Approach to Perception
Incidence of Stimuli	"Interaction" with stimuli
Perception as a linear process	Perception as a non-linear process
Separate and independent modalities. More emphasis on single-modal studies.	Interdependent and Plastic Modalities. More emphasis on multi-modal studies.

A synthesis of some of the information on crossmodal and multimodal processes in the background research shows that the simplicity of living in a world that seems continuous and seamless comes from a fluid interaction between different plastic modalities, filtered through different intentions (Shimojo and Shams, 2001, Goldstein, 2002). A certain organization of the attentions across modalities occurs, wherein a relevant modality becomes distinct from an irrelevant modality by being more significant. At the same time, the modalities strive toward localization in external space, and thus the change in the primary modality effects a change in the secondary modalities (Driver and Spence, 1998). This organization is dynamic and is constantly modified by the task at hand and the position of the body in space, in addition to the sensory stimuli. Gibson's theory (1967) of considering the senses not simply as producers of various sensations, but as active sensation-seeking mechanisms for looking, listening, touching, and so on, is an approach that establishes that the incidence of stimuli is not as critical as the interaction with stimuli, a notion significant to place-design.

In the fast-paced and simultaneous world we live in, within the context of consumerism and instant gratification, design thinking needs to undergo a complete overhaul, and focus beyond the high architecture that seeks immortality, to the very mortal needs of the here and now. This is not to curtail any aspirations toward the timeless, but to infuse our efforts with the sensate nature of our moment-to-moment interactions with the environment.
To focus on the simultaneous is tricky, because in studying it or creating it we automatically give it a sequential dimension. The smaller but trickier question in education is how this simultaneity, these concurrent interconnections, these multi-perceptives, which both philosophers and psychologists adhere to, can be taught in the design studio, so that we can we can incorporate them intuitively into design practice.

The sequential and simultaneous aspects of architecture render both the dissectional approach of sections and the detached approach of visual perspective inadequate. It is important to remember that a designer's skill lies in his or her ability to conceptualize physical and cognitive realities and not to 'represent' an entity that is as yet un-built. Perhaps the solution is to reintroduce embodied issues, and focus on the ability to abstract, while avoiding the trap of the overly literal or figurative, at least at the conceptual stages of design. This requires

a sensitization to sensory, kinesthetic and cognitive issues at one end of the continuum, and experimentation with new media, use of new notations, and new information 'translators' at the other end. According to Waterworth (2004), "The key lesson of synesthesia in people is that reality has no particular form. It does have content, which may be experienced in a variety of ways. To apprehend reality as fully as we can, we need to experience it in as many forms as possible" (Waterworth, 1997). It is this approach that may be necessary for education in the information age.

One can argue that the threat of the information age and media sophistication is that they increase the distance between experience and knowledge, while collapsing all time into the here and now. This simultaneous disconnection and connection is the quandary of our times. It makes it easy to blur the boundaries between the real and the virtual, and while this is a technological triumph, it can be a conceptual pitfall. If the real is confused with the simulated in the process of creating what remains, even today, a material reality, then it becomes imperative to question the modes and media that foster this confusion. It is unfair to ask students to think 'experientially' or 'sensually' while limiting them to a visual artifact. At the same time, it is necessary that students learn the art of translating an environmental quality they perceive into a communicable form. Education then has two challenges: 1) To inculcate the appreciation of an environmental quality that goes beyond the mediated precedents that students rely on so heavily, and 2) To ensure that this quality, once perceived, is not compromised merely due to the limitations of the mode of representation. To meet these challenges, educators cannot discard technology; they must embrace it, but intelligently, sensitively, and with an embodied objective.

The synesthetic approach that we advocate is one that tunes into the strength of a given media to achieve conceptual depth in a mode that is not traditionally associated with this media. The involuntary and neural cross-wiring that causes synesthesia has been a source of inspiration to many artists. In an age where we are overcome by the speed of the visual, it may be incumbent on us to intentionally cross-wire our own 'image domains'. To ask students to address a visual challenge, such as a 'bright and spacious' room, and then take from them the option of using their mental library of visual images by requiring a sound-piece, is an example of how we can switch modes and media and revisit abstraction, without tripping over representation. Media and hypermedia are incredible tools for communicating and sharing experiences, but they cannot replace human cognition and creativity. We need to make sure we ourselves and our students clearly understand that. Otherwise we may get trapped in modes of representation that leave no time for reflection.

In conclusion, there is a need to reconsider traditional methods and media if we are to seriously adopt a more rigorous approach (and here rigor is not equated to science) to the issue of perception in design. Despite the cold and distant architecture extolled by many, there has been a growing appreciation of sensual, and embodied, projects by intuitive practitioners and theorists. There are many examples today, in scales ranging from product design and

installations to landscape design and city zoning, which are concerned with the different senses and the human body's movements. In this connection, we can refer to various individual artists and architects who either have been synesthetes or have used synesthetic approaches: for example, Kandinsky and Skriabin as regards colored hearing (van Campen, 1997, Frascari, 2003), Scarpa as regards synesthetic drafting (Fascari, 2003), and other contemporary scientists, artists, and musicians (Dr. Hugo, 1995). In fact, there have also been attempts to create computer programs that promote synesthetic experience (Dr. Hugo, 1995, Waterworth, 1997), such as 2.2 Automated Synesthesia (Gaffney and Kuzmanovic, 2001) or MetaSynth (U&I Software, 1998).

"Joining of the information received by one sense to a perception in another sense is the essence of the architectural thinking" (Frascari, 2003). Yet in architectural education, the bias toward the visual and its representation at all design stages still exits. The power of the visual lies in its transferability and communicability, and hence it seems unlikely that the dominance of the visual will cease. But it must definitely be questioned, and challenged, in order to see beyond the surface, into the structure, via the skin.

The synesthetic approach advocated in this paper has been based partly on philosophical views and partly on psychological facts. However, it targets the intuition of the designer, who must synthesize all the complexities of how we perform in time and place. The success of user-oriented design, and the communication of such design, requires architectural education to introduce design tools and strategies that would allow for time-based description of environmentally contingent, sequential, and simultaneous experiences. Such description would include an understanding of environmental perception and a transmission of this understanding into design presentation.

In this paper we have not attempted to make a concrete proposal. Rather, we have suggested a new 'synesthetic' approach that explores different media and different sense modalities in order to achieve an embodied objective in education. Sometimes it is important to open our ears to see, and to feel our pulse to hear. It may be the one way that we can differentiate the sound from the noise, the conversation from the chatter, and the message from the graffiti.

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MENTION JEREMY TILL UK

MENTION

Lost judgement

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FROM SKIRTING BOARDS TO SUICIDE

"Answer the question; just answer the question." That's the first homily issued to students. "First say what you are going to say, then say it, then say you have said it." That's the second one. And yet confronted with this EAAE question,[1] I am impelled to break these rules.

This apparent belligerence is not just a reaction to the limits of the question (of which more later) but is perhaps a reflection of the fact that I have never felt fully at home within the house of architecture. This discomfort may be traced back to my very first day at architecture school. "Architecture", announced the head of year in his introduction to the assembled new students, "architecture sucks you in. You will soon find yourselves looking at people's skirting boards when you go round to dinner". There were a few raised eyebrows at this strange pronouncement, but young and impressionable as we were, and desperate to please, we soon found ourselves taking surreptitious glances at the ogees ("gloriously retro"), shadow gaps (much approved) and chamfered tops ("building not architecture" or, from the clever ones, "bicycle shed, not Lincoln Cathedral"[2]) in people's homes.

As a means of inspiration, skirting boards are a strange choice – we wanted pictures of Bucky, Foster's latest, any stuff to sate the naïve optimism of youth – but in hindsight its very weirdness as an example of what it means to be an architect was indicative of a process of removal that was to be enacted over the forthcoming years of our education: the removal from a world with others into a rarefied space of strange values, specialised codes and distinct language.

Maybe we were lucky that it was the benign bourgeois values of skirting boards that instigated this removal. I could have ended up at, say, ETH Zurich in Miroslav Sik's atelier whose members' "black uniforms and deliberate isolation bore overtones of a clan; in addition, their interest in discredited architecture, such as that of the Fascist era, was disturbing".[3] Disturbing – I should say so, but then even this seems mild compared to Günther Domenig's description of life at the School in Graz. "The Architect", he says in a documentary film,[4] "must have the tools of obstinacy and resistance. I have taught at the University for twenty years and there are to my knowledge at least six students who have committed suicide because of the lack of these traits. That is quite sad but consequent".

No, Professor Domenig, not quite sad, downright tragic. And only "consequent" (that totalising word that edits out humanity) if you accept and promote the appalling values that lead to such tragic consequences. His very acceptance of the values is given away in the next sentence – delivered deadpan: "In comparison, only one single tutor committed suicide, and that is too little". (You can see his eyes, no irony, no emotion, just a weary resignation.) Now one may dismiss these as the rantings of a disappointed old man, but the terrifying thing is that most architectural educators and students will probably have experienced or sensed such madness to a greater or lesser extent. This essay argues that one must first unravel this state before one can even begin to answer the question set, so forgive me if the direct, studently, response is somewhat delayed.

GYMNASTS IN THE PRISON YARD

Tracing a line from skirting boards to suicides via blackshirts may stretch the argument almost to breaking point, but the argument is this: architecture, as a profession, promotes a series of self-referential and autonomous values. Architectural education explicitly inculcates these values through its processes and rituals. This argument is not new. It was most cogently – even angrily – put by Reyner Banham in his last essay, A Black Box: The Secret Profession of Architecture.[5] He argues:

Anthropologists have been known to compare the teaching studio to a tribal longhouse; the place and the rituals pursued there are almost unique in the annals of western education. One of things that sustains this uniqueness is the frequency with which students are discouraged from pursuing modes of design that come from outside the studio.

What Banham identifies so clearly is the way that the studio as setting, and design criticism (jury) as ritual, establish attitudes and values that are then played out in the black box of the profession. The sting in Banham's tail is the association with the figure of the anthropologist. Anthropology, at least traditionally, is concerned with the study of the marginal or of the near-extinct. Banham is thus implying that architecture, caught in its black box, is heading towards the margins or extinction.

So if the argument is not new, why then have we not dealt with it? One reason is that we cannot see the wood for the trees. The world of architectural education is obsessed with what it produces, and in this forgets to examine how it produces. This obsession with product is not surprising: as education gets increasingly commodified in the global exchange of images (and students), each school depends on an immediate display of its output in order to survive. They need to pump up and pump out their symbolic capital into the marketplace. We celebrate the diversity of this output, from slick to hairy, from straight to curvy. We promote the differences in theoretical approach, from fundamental ontology to technical determinism. The apparent diversity leads us to believe that there is a multiplicity of values being supported, but in fact the diversity only exists on the surface; deep down, the pedagogic processes and the associated values are all too similar. The seduction of the image conflated with the strenuous arm-waving of the supporting theories are distractions from a critical examination of the underlying value system, which is thus allowed to sit unperturbed. The fixed body of architecture is concealed beneath a never-ending parade of masks and clothes.

The schools play out the autonomous discourses and value systems of the profession, but in a manner that is one step further removed from the realities and contingencies of the world in which the architectural products will eventually be located. The studio, though feted by others than Banham as the locus of creative and reflective action, is in fact a detached and artificial environment, a hothouse in which strange values and forms are allowed to breed and mutate. A linear process from 'problem' to 'solution' is instigated, unaffected by

external forces. Particular events (the critics/jury, the charette, the interim exercise) are introduced to the process in order to create a semblance of disturbance and unpredictability, but these are in fact always determined and overseen by the authority of the tutor. This is why Donald Schön's identification of the architecture studio as an example of an education that encourages the formation of the 'reflective practitioner' is so misplaced.[6]

Schön's approach is so often quoted because it supports the status quo, and since that support comes from an distinguished outsider it gives it a special credence – but in fact a close reading of his description, and in particular the language he deploys, shows just how flawed his analysis is. In his description of a 'typical' studio project, he outlines how a studio master (Quist) first sets a problem and then guides the student (Petra) through a series of actions and ways of thinking in order to arrive at a solution. Schön interprets the process as one developing "artistry" and "reflective ways of doing", but what is really apparent is the power structure of the relationship. Quist's performance is described as "virtuoso", but at every stage he exerts his authority over the mystified student, cutting into her explanations, tracing over her drawings and eventually getting her to draw his preferred solution. Whilst Schön interprets this as drawing out the reflective capacity of the student, it is the tutor's knowledge and his solution that is deemed appropriate; her struggle is patronisingly dismissed ("stutteringly" trying to solve a problem beyond her understanding). It is a classic display of domination, right down to its gendered structure and eventual denouement in the jury.

Far from being Schön's exemplar of a setting for reflection-in-action, the studio is a place removed, and in this removal from the norms of social life it becomes a place where power can be enacted in an unchallenged way.[7] In effect this mixture of autonomy and power in schools of architecture creates a double prison yard for our apprentice gymnasts to perform in: an outer fence policed by the values of the profession and an inner fence policed by the authority of the school. It is maybe not surprising that a sense of fear pervades architectural education, most notably a sense of fear of being found guilty at the final jury. Which brings us back to the madness of Günther Domenig.

Domenig is best known for his 'radical' architecture. It is the radical who is celebrated, and in this celebration architectural culture falls into the well-known trap of believing that avant-garde forms represent avant-garde thinking, confusing fashion with thought, form with content. In fact the most 'radical' forms of making are often conducted under the most conservative of regimes. Such an argument is deployed to devastating effect by Manfredo Tafuri in Architecture and Utopia. He points to the futility of the architectural gesture in the face of capitalism and the way that, in the obsession with internalised, 'ideological', discourses, "any possibility of external elaboration of intellectual work is precluded".[8] Architects become no more than "gymnasts in the prison yard". The same critique can be made of architectural education. The most feted schools of the twentieth century are identified through individuals who have orchestrated their troupe of master gymnasts (the tutors), who in turn cajole their troupe of apprentice gymnasts (the students) into mimetic action. Gropius at

the 1920s Bauhaus,[9] Kahn at 1950s Penn, Boyarksy at the 1970s Architectural Association and Cook at the 1990s Bartlett[10] – the product clearly looks different but the underlying processes are remarkably similar. In all cases, the model of the student dutifully, and often painfully, copying the actions and forms of the master is the model that Paolo Freire so brilliantly argues as being corrupting. "It turns students into receptacles to be filled by the teacher. The more completely she fills the receptacles, the better teacher she is. The more meekly the receptacles permit themselves to be filled the better students they are."[11] The fact that these fillings are nicely, even radically shaped distracts us from the orthodoxy of the method, trapping us still more within the walls of architecture's black box.

MONAD – GONAD

How then can we possibly address external issues from within the walls of the doubled prison yard? How can we carry out the external elaboration of intellectual work that Tafuri says is precluded but which is still necessary? How, for the sake of this essay, can we answer the question at hand, namely, How do we respond to the development of new societal conditions, such as the so-called information society?

Typically the architect's response to external forces is one of assimilation and abstraction. Take an external idea or condition and convert it into form. The late twentieth century spawned a frenzy of such activity. The translation of the complexities of philosophical deconstruction to 'deconstructivist' architecture was a particular nadir, only exceeded by the subsequent rash of 'folding'. Architectural theorists had greatly struggled with the intricacies of Deleuze and Guattari's early work, in particular A Thousand Plateaus, but somehow felt it was important. There was thus a collective sigh of relief when Deleuze produced The Fold.[12] Now that word is something to do with form, with making. Skip the difficult Leibniz stuff ("monad – gonad", my students would chant), and cut to the quick. Fold and fold again, and feel good that a major philosopher is somehow legitimating it, as if the resultant spatial 'complexity' will somehow summon up the intellectual complexity.[13]

Whether in folding or other philosophical appropriations, the procedure is one of reification, both in the original sense of the word – turning the abstract into matter – but also in the Marxist interpretation that this procedure is also one of commodification. Ideas are the currency of the academy; in their architectural reification, greater value is produced for those who take the freshest ideas and reify them into the freshest forms. And of course, that greater value, as symbolic capital, is absolutely necessary to survive in the marketplace of global education. The websites of the leading (or rather the most expensive) architectural schools are all about freshness, about novelty, and about the equipment they have to reify that novelty.[14]

The appropriation of external ideas found fullest force within the inner walls of the academy and the architects associated with it (for example Eisenmann, Libeskind and UN Studio). In contrast, the profession's appropriation of external influences is based less on the incorpora-

tion of ideas and more on the assimilation of technology or aesthetics. Throughout the twentieth century, spurred into action by the hysterical cries of the Futurists, architects have translated the latest technological advances into their work. There is a will to reflect the spirit of the age, to be seen to be breaking new ground, and so the appropriation is normally of the so-called progressive technologies – those of advanced industry (in the work of the hi-tech architects), of the space race (in the use of new materials), of the armaments industry (Gehry's well-known use of Catia software developed first for warplane design). It is a classic case of technological determinism, and brings with it all the problems identified with such attitudes.[15] For my purpose, the key aspect of the assimilation is its uncritical nature, and with this the way it is used to perpetuate the autonomous architectural values contained within the walls of the profession and education; it is used to gild the surface of objects removed from the everyday concerns of society. There is clearly little questioning of the often suspect values that underlie the production of advanced technologies in the first place, or of the global environmental disaster that they have created. Instead, progressive technology is appropriated not even to exploit the technical efficacy of the original, but merely to exploit its aesthetic potential.

In the case of the 'information society', this process is already well under way. How many 'media centres' have I examined in architecture schools across continents in the past decade? A lot: far too many. The argument is appears simple: there are lots of media out there, so let's design a building to house them. Well, there's lots of poverty out there, but I haven't seen many poverty centres. Poverty don't look good: media does. But just looking good ain't enough, so these media centres are justified with spurious intellectual arguments: with every media centre there is some cliché about the physical and virtual. What happens is that the 'information society' becomes a figure for representation, and, in the very uncritical nature of the representation, becomes celebrated and dramatically misunderstood. Of course there is a deep irony in the making into solid form of something that is by its very nature a system of invisible flows, but this irony is overlooked because these buildings look so damn good. The information society has provided a whole new arsenal of technologies and materials to be exploited for aesthetic effect – flashing screens, mutating facades, liquidity – and when it is done well (for example in Toyo Ito's Sendai Mediateque) the results are so spectacular, so beautiful even, that one is seduced into forgetting that maybe all is not well in the information society.

It is not unfair to say that students are particularly susceptible to such seduction (remember me and my fellow students' desire for images of freshness and dynamism instead of stories of skirting boards), and thus fall prey to the particular form of forgetting that so-called progressive architecture induces. This is nothing new. Robin Evans in his brilliant unraveling of the complexities of Mies's Barcelona Pavilion, notes that the beauty of the place "distracts ... it is the architecture of forgetting".[16] He goes on to note that this is a conscious forgetting, a displacement from "a confrontation with violence and politics",[17] a forgetting of course of the fact that the Barcelona Pavilion was to celebrate a nation on the verge of the Third Reich.

In this way the very EAAE question is another form of forgetting. In its raising of the issue of the information society, it either panders to the progressive amnesiacs or else provokes the Luddite tendencies of the technophobes. Either way, it is hard to fully engage with the issues at stake in order to place architectural education in a wider social and political context. It is not that the question is irrelevant, just that it is potentially distracting.

The distraction is reinforced by the second half of the question: "how will..... 'new knowledge' affect the demand for relevant and necessary 'know-how' in architectural education?" It is interesting that the information society is here distilled into new forms of knowledge rather than into new social constructs or new ways of thinking. 'New knowledge' out there normally anticipates added knowledge inside the architecture schools. Every week a new edict lands on my desk: new forms of building legislation, new forms of disabled access requirements, new issues of sustainability, new skills needed to cope with the information society – the list is endless. And so every week I feel exhausted on behalf of my students. In each case there is a concomitant demand or inference that these edicts should in some way be reflected in a revised curriculum. Sometimes this is later policed by professional demands in the form of new criteria issued by the professional bodies as part of the validation process, a method through which the profession controls the knowledge that is deemed necessary for schools of architecture to transmit to their students. And thus schools of architecture are forced to dance to a prescriptive tune. Recent (and therefore already outdated) practices are being dangerously inscribed into the curriculum. Whilst it is a cliché to say that education should be about the future, we are being asked not to just accept the status quo but to actually consolidate it.

The request for 'relevant' forms of new knowledge is therefore distracting, because what is new now is going to be out of date, irrelevant even, by the time our students face the world. Societal, and thus spatial, constructs are emerging with such rapidity that we are can no longer educate for a fixity; instead we must educate for moving targets. Knowledge – at least in its manifestation as Wissenschaft, a rational sense of certainty – will be of little use if the object it is being applied to has shifted. The radical contingency of architectural practice demands new forms of education, not new forms of knowledge. Positing a scenario of what the construction industry may be like in twenty years time, Will Hughes describes a world full of people and knowledge, but with no critical faculties with which to sensibly deploy its knowledge. He paints a picture of an industry controlled by the market forces of the contractors, with the professionals, including architects, completely marginalised. His scenario is at once deeply depressing and deeply convincing.[18] Hughes argues that to avoid this, what we need to do in education is to develop judgment rather than to package up knowledge in neatly assessable chunks. More specifically for architectural education, what is crucial is to encourage multiple modes of thinking rather than specific methods of doing.

The final section of the EAAE question is closer to the mark, because the use of the phrase "know-how" suggests the development and then deployment of knowledge as Erkenntnis

(a human, conditioned, evolving force of understanding) rather than knowledge as Wissenschaft (a professional, authoritative fixity). But even this does not go far enough in preparing students for the multiple conditions they will face, whether it be the question at hand (the emergence of the information society) or another equally relevant question that might have been asked (say the issues of societies divided by wealth and poverty). What is needed is the development of ways of making judgments, an ability that has been lost in the seduction of form and the distractions of progress.

This proposal to recover lost judgment opens up new issues. Firstly, it is difficult to assess, let alone legislate, judgment, whereas one can 'benchmark' knowledge, something that the professional validating bodies are all too keen to do. An education that is based on notions of judgment rather than knowledge is thus an education that inevitably reconsiders its relation to the profession. It also begs the question: on what basis are these judgments made? The rest of this essay will address this question. I will argue that an education based on judgment inevitably disrupts the internalised and (in this argument) corrupted value system that the profession has held so dear.

FORGETTING WHO WE ARE

Some years ago, I was knocked off my bicycle and suffered a rare (for which read extremely painful) form of fracture and dislocation. This landed me in a teaching hospital, there to be subjected to the prods of doctors and students. On one occasion the prod of the chief tutor, the consultant, was particularly blunt. "This could be you, one day", I winced. "No, I would never be so stupid to ride a bicycle", he responded with that superciliousness only hospital doctors can manage. "No", I responded, "what I meant was one day you could be a patient". He turned puce: "If you don't want us to help you, we won't", and stormed off with a gaggle of students in his wake.

Maybe I provoked his anger because I had shown him up in front of his students. But more likely it was because I had reminded him that his professional status was not completely secure. Professions define themselves by setting themselves apart, both epistemologically and socially. In medicine the knowledge base is well-defined and thus secure; together with law it is usually defined as the strongest of the professions, with concomitant rewards in terms of remuneration and status. However, when doctors are reminded socially that they are also patients-in-waiting, the distance between the profession and society collapses; they are asked to be human, and to use their knowledge not just in an instrumental way, but also in a way that demands judgment.

The same is true of architects. Just as doctors in their brusque bedside manner often seem to forget that they too are potential patients, architects are prone to deny their experience as users, to forget that they too are embodied citizens. The denial is not surprising from a professional standpoint. Architects are wary of identifying with the user[19] because they believe this would threaten what sets them apart. There is the nagging worry that in dealing

with the normal, using normal language, one might be seen as normal. This worry is reinforced by the fact that our knowledge base is not as robust as it is in law and medicine; the value system that the profession constructs can be seen as a defense mechanism to deal with this potential weakness.

Research has shown how students over the five years of their course become assimilated into the social mores of the profession.[20] They gradually take on the language codes, stylistic preferences and rituals of architects (right down to the clothes), becoming increasing remote from way that lay people describe and prioritise architecture. Architectural education effectively removes students from the world from which they came, instigating a denial of the ordinary in the pursuit of the extraordinary. By the end of their education, students have forgotten that they too are users.[21]

However, it is not just this personal forgetting that is at stake in architecture. It is also striking how in most cases the design process itself delays the involvement of the user for as long as possible. Except in participatory design, the user is held at arms length; they are only allowed in as abstractions (through functional concerns) or as ideals (through notions of authentic living). If they are admitted in all their contingent and multiple glories, users disturb the idealised patterns of the design process. So they are kept out, promoting the suspension of disbelief that is a condition of design practice. One knows in one's heart of hearts that the suspension cannot last, but the state is hypnotic whilst it lasts – those clean diagrams, those neatly scheduled packages of work that defy all construction practice, those empty photographs taken before the great unwashed (users, dirt, weather, change) move in. And when it all goes wrong afterwards, when reality truly does upset the ideals, one can always resort to the publication of a monograph to resuscitate and perpetuate the mythology of a perfected state of architectural production.

So, the first answer to the question at hand, and a pointer to how judgments may be made, is simple. Remember who you were. Remember that you too inhabit this world. Remember that you too use buildings, occupy space. And remember that users are more than abstractions or ideals; they are imperfect, multiple, political, and all the better for it. An architecture (and an architectural education) that remembers all these things will also be an architecture and education that begins to break free from the prison yard where the mythology of a perfected state is cruelly allowed to develop.

THE INAUTHENTIC PHENOMENOLOGIST

So, be human. That is the message.

This comes somewhat as an anticlimax. After all my bile, the tabloid sensationalism, the anecdotes, is that all I can offer – a limp liberal humanism?

Well – yes and no.

Yes, because, at a basic level, architecture is about the occupation of space by embodied,

sensate, cognisant, social beings. Indeed, to describe architecture without such beings is maybe to describe something that is not architecture. This seems so obvious that one does not need a long word like phenomenology to capture it.
But then no, because one of the problems of the phenomenological approach is that it does not fully consider the political dimension of the world, and thus the humans described are removed into purified contexts. Phenomenology has rightly been adopted into architectural thinking as a counter to the limits of instrumental Enlightenment thought that has dominated architectural production for so long. However, the reaction to one dogma has often resulted in the retreat into another. This can be identified in the architectural interpretations of three key phenomenological thinkers; Bachelard, Heidegger and Merleau-Ponty.

It is a mistake to take Bachelard literally. The Poetics of Space is essentially a literary text; the situations it describes are metaphorical. And yet, attics and cellars appear as concrete realities in countless student schemes guided by phenomenologically inclined tutors; another form of reification. With Heidegger there is a concentration on the later texts, and in particular Building, Dwelling, Thinking. This is to overlook the problematic of Being and Time. The early sections are essential – the critique of the limits of Cartesian thought, the replacement of the extensio with the twin spatial aspects of deseverance and directionality, the insistence on Dasein as essentially spatial – all of these are compelling, even if the final description of space is full of aporias.[22] The final sections on temporality and historicality are equally compelling. It is the central sections, where Heidegger dismisses the inauthenticity of the 'they' (effectively the great mass of humanity), that are so problematic politically and, by implication, architecturally. Many commentators have noted how Heidegger's dismissal of the inauthenticity of the 'they' and the drive towards the authentic character of Dasein is symptomatic of his association with the Nazis and their programme of a 'master race'.[23] This may be a crude analogy, but its very suggestion is enough to create severe doubts about the propriety of accepting Heidegger's interpretation of the 'they' as some kind of 'average everyday' that distracts us from our authentic being.[24] As Henri Lefebvre notes:

Phenomenology and existentialism can be defined as philosophies which have fallen to the level of the everyday but which have retained the negative characteristics of traditional philosophy: devaluation of the everyday in the favour of pure or tragic moments – criticism of life through anguish or death – artificial criteria of authenticity, etc.[25]

Heidegger's drive towards a fundamental ontology based on notions of authenticity is reflected in the architectural obsessions with purity, the authentic situation,[26] and the retreat from the everyday into elevated or idealised notions of living. In all of these, we see a privileging of fundamental belief systems, which can only be developed in retreat from the contingencies of the real world. The authentic phenomenologist remains inside the house of architecture, caught in endless reveries of movement from cellar to attic, seeking that moment of ontological purity, curtains (heavy velvet curtains) drawn to the fallen world outside. Personally I enjoy those moments of the 'they' that Heidegger dismisses as inauthentic. Idle

talk (hence my anecdotes); curiosity (hence my continual optimism as teacher, curious about the world, curious about how students see the world)[27]; ambiguity (hence my insistence on contingency as the defining feature of architecture). Personally, I am an inauthentic phenomenologist.

So, to elaborate my answer to the question. It is about being human; develop an ontology, but not a fundamental ontology; develop a phenomenology, but not an 'authentic' phenomenology.

STRONG DOUBT

Which brings us to Merleau-Ponty. Not the Merleau-Ponty of The Phenomenology of Perception (rightly used by some architectural theorists to develop an understanding of embodiment) or The Visible and the Invisible, but the Merleau-Ponty who opens his inaugural lecture with the words: "The man who witnesses his own research, that is to say his own inner disorder...".[28] It is wonderful that a philosopher – philosophy being the presumed harbour of truth – should open his inaugural lecture with a profession of doubt. The point is that Merleau-Ponty sees doubt as an essential condition of his life as a philosopher and researcher. To understand this, he argues, we must remember Socrates. Socrates who refused to flee the city, but insisted on facing his tribunal, because he does not see his philosophy as some kind of idol that must be protected, but as a mode of thinking which exists in its very living relevance to the Athenians. He is killed in the end because he inflicts on others the unpardonable offence of making them doubt themselves. Seventy-five years later Aristotle will leave the city, arguing that he cannot allow the city to commit a new crime against philosophy. Now is it too much to liken some strands of architecture to Aristotelian retreat, a mode of intellectual protection of the purity of buildings against the stains that society will wish to inflict? I think not. And is not Socratic engagement the better model? I think so. This model is one that proceeds through doubt, in a constant unraveling of what may be wrong, in order to make it better. But this engagement is not one of hopeless capitulation. Merleau-Ponty argues for a continual movement between retreat and radical reflection, and engagement and intentional action. "We must withdraw and gain distance in order to become truly engaged."

This doubt is also an essential part of education. Without it, teaching becomes the inculcation of orthodoxy, or, in Paolo Freire's term, the "banking" model of education, "in which the scope of action allowed to the students extends only as far as receiving, filing and storing the deposits".[29] The orthodox model of education tends towards prescriptive methods, rule-based learning and the continuation of the status quo. A power structure is established, with tutors as possessors/makers of the rules, asserting authority over the students, who feel the need to learn the rules. Doubt, on the other hand, encourages the development of what Dewey calls "reflective intelligence", whereby each student begins to develop his or her own structure of thinking with which to face a variety of competing positions – be it the demands of the information society or issues of divided societies. In architecture, the development of this reflective intelligence is an essential preparation for the contingency of the architec-

tural world. If one accepts that there is no 'correct' method, no ideals to be reached, no fixed targets, then what emerges are multiple modes of thinking. One can accomplish this through a teasing and probing which reveals the underlying prejudices and assumptions that the designer may have, and encourages a critical interpretation of those assumptions. It is only when potential architects are aware of the power structures that control both them and society at large that they are in a position to negotiate within those structures. Ideally, the roles of questioner (teacher) and questioned (student) should merge, as the student begins to build a self-critical response to the conditions with which they are faced and so begin to form their own judgments and intentions.[30]

However, this movement from doubt to action does not fully address the question regarding on what basis judgments should be made. I have argued that they should be formed within an everyday, human context. More specifically, they need to be formed in a context that is socialised and thus politicised. This is not political in the party-political sense of the word, but political in the feminist sense (the personal is the political) and etymological sense (as a setting for civic life). The architectural profession often exists in a state of denial about the political implications of the processes and products of practice, preferring to deal with areas which are wrongly interpreted as beyond the political (abstracted form-making or the 'neutrality' of technology).[31] However, attempting banish politics from architecture only delays the inevitable. Just as King Canute was swept away by the waves, social life will find its way through the cracks in the wall of architectural denial, eventually overwhelming the hopeless purity of the forms within – because those forms, conceived in a political vacuum, can put up no resistance.[32] Better to take on board these contested territories earlier, in education, than to be disappointed later.

Back to the EAAE question. "How will the demands of the information society and 'new knowledge' affect the demand for relevant and necessary 'know-how' in architectural education?" The answer is getting clearer. Do not respond to new knowledge with more knowledge. Encourage the development of judgment, but from a human, not a professional, perspective. This perspective is one that acknowledges doubt as a strength. Finally, the judgments are made from within a context that acknowledges the political and social responsibilities of the architect.

AVOIDING POLISHED DEATH

... acknowledges the political and social responsibilities of the architect. This is too easy to say.[33] What defines the social? What type of politics?
Libertarian? ("This is the Howard Roark media centre. I don't care if you don't like it.")
Neo-liberal? ("This is the Murdoch global media interchange. It's really cool.")
Soft liberal? ("My media centre has a crèche in it.")
Early Marx? ("My media centre subverts the idea of media as commodity as fetish. It is ugly.")
Late Marx? ("Media centres are symbols of global capitalism. I designed it, then tore it up.")
Anarchist? ("...and this is my city farm.")

Of course these are parodies, but cut off from the real world, much of the politics emerging from architectural studios is indeed parody, and so best left aside. Stating a political belief is also something that is becoming increasingly unacceptable in higher education, and so politics are suppressed as a matter for open debate. The resulting denial of the political in architectural schools in fact allows a certain type of politics (I would argue flip-flopping between explicitly libertarian and implicitly neo-liberal) to develop unhindered but unmentioned.

If, then, the political is suppressed as a mode of making judgments, what about the social? This is generally accounted for in the catch-all notion of ethics. Ethics is a soothing term, somehow suggesting moral responsibility without ever quite defining how that responsibility should be played out. It is therefore an abused term, confusing professional ethics with social ethics. Professional ethics, inscribed in institutional codes and societal expectations, are no more than a moral smokescreen behind which the architect or architectural student can abrogate any (socially) ethical responsibility. As Zygmunt Bauman argues, "when 'ethics' appears in the vocabulary of bureaucracy, it is in connection with 'professional ethics'...the modern organisation is the way of doing things that is free from moral constraints".[34]

Professional ethics is thus not a basis for making social or political judgments. Neither is the type of originary ethics often implied as the basis for architectural action. In Karsten Harries's book The Ethical Function of Architecture one searches hard to find a specific definition of the term; the argument as to why architecture needs an ethical function, and has so long avoided that need, is lucidly made, but quite on what basis to carry out that function is less clear. It is maybe indicative that Harries employs so much of Heidegger to develop his argument. As John Caputo says of Heidegger, "the problem... is not that he has no ethics, but his ethics are eschatological.... it tells the story of the primordial ethos and the great beginning".[35] When eventually Harries does define his term, the suspicion of some kind of originary ethics is confirmed: "Architecture has an ethical function in that it calls us out of the everyday, recalls us to the values presiding over our lives as members of a society, it beckons us toward a better life, a bit closer to the ideal. One task of architecture is to preserve at least a piece of utopia, and inevitably such a piece leaves and should leave a sting, awaken utopian longings, fill us with dreams of another and a better world".[36] Most worryingly, this sentiment is illustrated with a photograph of the US Capitol.[37]

A number of features can be identified here:

- Ethics as a form of removal to a privileged place.
- Ethics as utopist.
- Ethics as deeply apolitical (in as much as the politics are clearly taken care of through the principles of liberal democracy enshrined in the Capitol).

These features remind me of Ernst Bloch's description of modernist architectural utopias, Polished Death.[38] This is no position from which to make judgments.

I started with suicide and now am ending with polished death. But I am only going to these desperate places as a warning of what may happen if one, in Roberto Unger's terms, ends up "taking for granted received ideals or recognised interests [or] searching for a more transcendent perspective".[39] Unger's alternative way is clear: work out from the given context, be both practical and imaginative, critical and visionary. In every case there is a formative context that can be transformed, and in every case there is a productive tension between realism and imagination: "we must be realists in order to become visionaries and we need an understanding of social life to criticize and enlarge our view of social reality and social possibility".[40]

In terms of the question at hand, the context is the information society. Be realistic: it is here with us, and no amount of beauty, poetics or craft will efface it. It must be engaged with. In terms of architectural education, that engagement is two-headed. The first head is sheer expediency: equipping our students with all the skills and techniques that the information society has thrown up. Only then will they be able to survive in the marketplace and only then will they be able to transform that little bit of context that comes their way. The second head is one of judgment: developing a critical awareness of how one might transform that context for the better. This is in the end an ethical issue, but not based on an ethics as we have thus far encountered. It is in an ethics, following the lead of Zygmunt Bauman, that "means to assume responsibility for the Other",[41] an ethics that "recasts the Other as the crucial character in process through which the moral self comes into its own".[42] For Bauman this demands a shift from the modernist model of the expert as legislator dreaming of ordered rational worlds, to that of the expert as interpreter, participating with and acting for the Other. The Other for architects is the one or ones who will be part of the social space our buildings help construct. In this way we can be the architects Unger would wish us to be, "enabling people as individuals and as groups to express themselves by changing their situations... [the architect] lives out his transformative vocation by assisting someone else's".

But let us be clear. This two-headed figure of the transformed and transforming student/architect is not some beast from Greek mythology, switching manically between expediency and ethics. It is the twin heads of the Tsimshian masks,[43] one slipping inside the other, expediency inside ethics. However developed the skills and techniques, the final filter to the world must be that of a responsibility towards others. Only then can we effect "the replacement of the dream of the legislator with the practice of the interpreter".[44]



NOTES

1 This paper was written in response to the question raised by the European Association for Architectural Education for their biennial prize in architectural writing: The question was: "How will the demands of the information society and 'new knowledge' affect the demand for relevant or necessary 'know-how' in architectural education?" I am particularly grateful to the jurors for the comments they made on the first version of the paper. Ebbe Harder and The Royal Danish Academy of Fine Arts, School of Architecture, together with the sponsors Velux, must also be thanked for organising the incredibly generous and useful symposium at which all the papers were presented and discussed.

2 Our very first history lecture opened with Niklaus Pevsner's thundering quote: "A bicycle shed is a building. Lincoln Cathedral is a piece of architecture". For a critique of the elitist and myopic implications of Pevsner's approach, see Reyner Banham, "A Black Box: The Secret Profession of Architecture", in A Critic Writes, ed. Banham (Berkeley: University of California Press, 1996).

3 Jacques Lucan, ed., A Matter of Art: Contemporary Architecture in Switzerland (Basel: Birkhauser, 2001), p 44.

4 Jessica Hausner and Antonin Svoboda, "Kunsthaus Graz: A Friendly Alien", (Austria: 2003).

5 Banham.

6 Donald A. Schön, Educating the Reflective Practitioner, 1st ed., Jossey-Bass Higher Education Series (San Francisco: Jossey-Bass, 1987), pp 80-118.. This is an extended interpretation of the issues raised in Donald A. Schön, The Reflective Practitioner: How Professionals Think in Action (New York: Basic Books, 1983).

7 When I first presented this paper, Juhani Pallasmaa rightly criticized me for creating a parody of architectural education, noting that there were many schools based on humanist and self-aware educational practices where, for example, such untrammeled power would not be tolerated. My defence for the use of the parody is that I am using it as Foucault does: through the exaggeration of parody one enacts a critique of normative power structures. Parody is used by Foucault to describe a view of history that is "directed against reality". See Margaret Rose, Parody: Ancient, Modern, and Postmodern (Cambridge: Cambridge University Press, 1993), p 183.

8 Manfredo Tafuri, Architecture and Utopia: Design and Capitalist Development (Cambridge, Mass: MIT Press, 1975), p 163.

9 Katerina Ruëdi has sustained a brilliant investigation of the workings of both the Bauhaus and the Architectural Association in her writings. The body is contained in her Masters and PhD at the Bartlett, UCL (Guardians of Sleep which is about the AA, and Bauhaus Dreamhouse: Architectural Education in the Age of Image Reproduction, which is about the Bauhaus). For a summary, see Katerina Ruëdi, "Bauhaus Dream-House", in Architecture: The Subject Is Matter, ed. Hill (London; New York: Routledge, 2001).

10 For a critical review of the traits at the Bartlett in the 1990s, see Nick Temple, "Architectural Education: Fashion/Fetish and the Historical Dimension', Stoa 1 (1996). The pitfalls of his alternative, hermeneutical approach based is addressed later in this essay.

11 Paulo Freire, Pedagogy of the Oppressed, trans. Ramos (London: Penguin, 1996), p 53.

12 Gilles Deleuze and Félix Guattari, A Thousand Plateaus: Capitalism and Schizophrenia (Minneapolis: University of Minnesota Press, 1987). I am referring here to projects such as those illustrated in Greg Lynn, ed., Folding in Architecture, vol. 103, Architectural Design (Chichester: Wiley, 1993). The philosophical link is explored with some difficulty in Andrew Benjamin, Time, Question, Fold, Basilisk, Issue 2, http://www.basilisk.com/V/virtual_deleuze_fold_112.html.

13 Just as it is wrong to confuse avant-garde form with avant-garde thinking, it is wrong to assume that formal complexity will be followed by occupational complexity. As Lefebvre continually reminds us, spatial (for which read social) complexity is down to far more than mere formal or physical attributes.

14 This point was well made by Dagmar Richter in her presentation during the EAAE symposium that discussed these essays, i.e. potential customers, aka students, take a dim view of schools without 3D printers to make little blobs. The term 'edutainment', which she used to describe the current state of architectural education, underlines this need for freshness.

15 Jacques Ellul's work still has relevance here; Langdon Winner's writings identify the problem of technological determinism in the contemporary age. Jacques Ellul, The Technological Society, [1st American ed. (New York: Knopf, 1964), Langdon Winner, Autonomous Technology : Technics-out-of-Control as a Theme in Political Thought (Cambridge, Mass: MIT Press, 1977), Langdon Winner, The Whale and the Reactor: A Search for Limits in an Age of High Technology (Chicago: University of Chicago Press, 1986).

16 Robin Evans, "Mies van de Rohe's Paradoxical Symmetries", in Translations from Building to Drawing and Other Essays (London, Architectural Association, 1997), p 269

17 Ibid., p 270

18 Will Hughes, "De-Professionalised, Automated Construction Procurement", in The Professional's Choice: The Future of the Built Environment Professions, ed. Foxell (London: Building Futures, 2003). His scenario in particular should be required reading for all architectural students and academics. His point about the necessity of the development of judgment in education is also made by other authors in the book.

19 Lefebvre notes how even the word 'user' abstracts the citizen for the purposes of architecture, making it easier to subject them to instrumental theories such as functionalism. However, it is beyond the scope of this essay to reconsider this terminology. See Henri Lefebvre, The Production of Space, trans. Nicholson-Smith (Oxford: Blackwell, 1991), p 287.

20 M.A Wilson, 'The Socialization of Architectural Preference', Journal of Environmental Psychology 16 (1996).

21 Rosie Parnell's prizewinning essay in the last EAAE Prize raises these issues, and suggests ways out of the dilemma. See Rosie Parnell, "Knowledge, Skills and Arrogance: Educating for Collaborative Practice", in Writings in Architectural Education, ed. Harder (Copenhagen: EAAE, 2003).

22 As contained in section 24. See Edward S. Casey, The Fate of Place: A Philosophical History (Berkeley: University of California Press, 1997).

23 For a summary of the issues, see for example Stephen White, Political Theory and Postmodernism, ed. Geuss, Modern European Philisophy (Cambridge: Cambridge University Press, 1991), pp 35-38. The charge was first made in Lacoue-Labarthe, Heidegger, Art and Politics, trans. Turner (Oxford: Basil Blackwell, 1990)., reinforced in Victor Farias, Heidegger and Nazism (Philadelphia: Temple University Press, 1989)., and reassessed in Richard Wolin, The Politics of Being: The Political Thought of Martin Heidegger, 1927-1966 (New York: Columbia University Press, 1990).

24 The charge is lead by Adorno. Theodor W. Adorno, The Jargon of Authenticity (Evanston: Northwestern University Press, 1973).

25 Henri Lefebvre, Critique of Everyday Life (London: Verso, 1991), p 264.

26 The idea of situation in architecture has been developed by Dalibor Vesely. See Architecture in the Age of Divided Representation (Cambridge, Mass: MIT Press, 2004).

27 This chimes with Michel Foucault's almost playful homage to curiosity: "Curiosity is a vice that has been stigmatised in turn by Christianity, by philosophy, and even by a certain conception of science. Curiosity is seen as futility. However, I like the word; it suggests something quite different to me. It evokes 'care'; it evokes the care one takes of what exists and what might exist; a sharpened sense of reality, but one that is never immobilised before it; a readiness to find what surrounds us strange and odd; a certain determination to throw off familiar ways of thought and to look at the same things in a different way; a passion for seizing what is happening now and what is disappearing; a lack of respect

for the traditional hierarchies of what is important and fundamental. I dream of a new age of curiosity." Michel Foucault, "The Masked Philosopher", in Politics, Philosophy, Culture. Interviews and Other Writings 1977-1984, ed. Kritzman (London: Routledge, 1988), p 328.

28 Maurice Merleau-Ponty, In Praise of Philosophy (Evanston, Ill.: Northwestern University Press, 1963), p 60.

29 Freire, p 53.

30 See Jeremy Till, "Contingent Theory: The Educator as Ironist", Stoa 1 (1996). "The greatest triumph, but also the greatest sacrifice, for a teacher is to be no longer needed."

31 There is not sufficient space to develop the argument here, but it is neatly summarised by the French architect Jean Renaudie, who writes: "The stubborn refusal of some people to admit to the influence of politics on architecture, and the narrow assertion of others that architecture is politics and nothing else, result in the same thing: inefficiency in practice".

32 Koolhaas's pithy reminder is apt here. "Once we were making sandcastles. Now we swim in the sea that swept them away." Rem Koolhaas and Bruce Mau, S,M,L, XI (Rotterdam: 010 Publishers, 1995), p 971. The problem is his ambivalence as to how to deal with the condition.

33 The first version of this paper left this hanging, and ended with a practical proposal that one small way of recovering judgment would be to abolish the standard critic/jury system in the schools. The 'jurors' of this essay prize rightly felt that this ending was a cop-out, and so this final section attempts to address this. Nonetheless, the small practical proposal concerning the critic/jury remains valid. It is something that we have done at the University of Sheffield. See http://www.shef.ac.uk/architecture/main/activities/sr_revr.shtml for the argument and some alternative methods of reviewing work.

34 Zygmunt Bauman, Alone Again: Ethics after Certainty (London: Demos, 2000), pp 7-8.

35 John D Caputo, Radical Hermeneutics (Bloomington: Indiana University Press, 1987), p 238.

36 Karsten Harries, The Ethical Function of Architecture (Cambridge, Mass: MIT Press, 1997), p 291. My emphasis.

37 Writing this passage on the third anniversary of the establishment of the Guantanamo Bay prison camp may have made me especially sensitive to the actions of the US Capitol. There is no doubt that Harries includes the picture without a trace of my concerns or of irony. "What Heidegger says of the Greek temple, that it lets the god be present, has its analogue in the ... presence of shared values in civic monuments – think of the Capitol, of the Washington, Jefferson and Lincoln memorials, or of Civil War monuments." Ibid, p 291

38 Ernst Bloch, The Principle of Hope, trans. Plaice, Plaice, and Knight, 3 vols. (Oxford: Blackwell, 1986), p 737. "The bogus freshness of 'modernity' with which polished death is administered like the gleam of morning."

39 Roberto Mangabeira Unger, False Necessity: Anti-Necessitarian Social Theory in the Service of Radical Democracy (Cambridge: Cambridge University Press, 1987), p 331.

40 Roberto Mangabeira Unger, Social Theory: Its Situation and Its Task (Cambridge: Cambridge University Press, 1987), p 15.

41 Zygmunt Bauman, Postmodern Ethics (Oxford: Blackwell, 1993), p 13. These cursory quotes do not even begin to do justice to the extraordinary power of Bauman's work. For readers who do not know him, do not be put off by the word "postmodern" in the title. Bauman's postmodernism is very different from Jenck's: it is best summarized by his argument that "postmodernity is modernity without illusions". I intend to develop the discussion of Bauman and Unger in my book Architecture and Contingency (forthcoming, e.t.a late 2006).

42 Ibid., p 84.

43 This refers to the two stone masks from the Tsimshian people in NW Canada. One mask, now in Paris, has its eyes open; the other, now in the Canadian Museum of Civilisation has its eyes shut. The two were brought together for the first time in 1975, when it was discovered that the 'seeing' mask fitted exactly inside the 'dreaming' mask. One interpretation is that the two faculties (of reason and of imagination) represented by the masks are complementary and interdependent.

44 Zygmunt Bauman, Intimations of Postmodernity (London: Routledge, 1992), p 204.

MENTION THOMAS WIESNER DENMARK

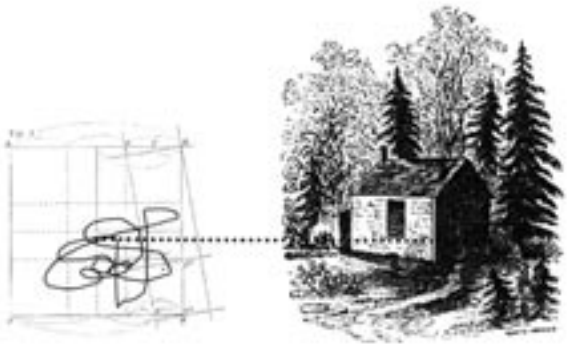
MENTION

(re)Openings to Quintessence

Longings for simple fissures, alternative revelations and appropriate footholds within the abundance of new knowledge and sophisticated know-how in architectural education.

THOMAS WIESNER

Kunstakademiets Arkitektskole, Denmark



Only those who attempt the absurd will achieve the impossible.
M.C. Escher

01 ACTUAL CONDITIONS
Ubiquitous, in fact:

A vast array of sophisticated tools, related professional paraphernalia, and extensive relevant knowledge are, with surprising ease, not only within reach, but also commonly transmitted and used in architectural education today.

Where there is a school (of architecture), there will be a relatively comparable set-up. The seemingly varied architectural modus vivendi et operandi are today smoothly but firmly harmonized into a well-toned body. An amalgam of professional planning and construction methodology, growing levels of sociological, historical, philosophical and scientific understanding, in addition to an ever-increasing panoptical familiarity with architectural endeavours throughout the world, is the established standard in most institutions.

In the recent past, the growing anxiety in most European architectural education communities about being stigmatized for being provincial, combined with a well-meant compliance with overall EU harmonizing policies, led to an increasing, ongoing and fruitful cross-fertilisation, through exchange programs on all levels. Faculty and student transfers, conferences, seminars and successful workshops.

And, first and foremost: the indispensable amplified flux of the flying circus of architectural notabilities, disseminating their latest palette of achievements and subsequent methodologies, applicable in copy-paste mode.

Actually, there is nothing novel in this luxurious, enjoyable state of things. It just shows a natural reverberating quest for new applications and knowledge, as in any era.

It is the actual speed and quantification of this knowledge and know-how, along with their simultaneous transferences, that distinguishes the present era from the past.

As with any other human activity, this craving is not necessarily primarily about substance, but often concerns the acquisition of imagery, and the various methodologies deployed for the quick attainment of desired results.

Furthermore, the increase of and enhancement toward more relevant and superior academic research in architecture, combined with the simultaneous demands by the profession for more effective and rational problem-solving, is rapidly shifting the scope of building (architecture). A shift from a more mundane humanistic and "artistic" craft toward a more "scientifically" grounded academic technocracy is underway.

Within the abundance of constantly updated tools, media and knowledge, a certain unease seems to have inched into architectural education. While the transference of know-how regarding the use of relevant tools and the conveyance of relevant knowledge is being dealt with rather effectively, the actual process of successful synthesis and/or innovation in design-studio work often lingers behind in originality.

One possible reason for this might reside in the status anxiety and general disorientation of the involved institutions and students alike:

The educational institutions' knife-edge walk between academic status and budgetary and professional qualification requirements, manoeuvring within a fluctuating realm of constant restructurings;

Faculty, often downcast by the many curricula restructurings, baffled by the implementation of new and old architectural "media" and the vigorous unpredictability of globalized life, yearn for renewed modus operandi;

The students, eager to manage and respond to questions and demands on a relevant and competent basis, yearn for quick and effective "methodologies" – both regarding know-how and knowledge.

Thus the substantial changes presently occurring in architectural education and practice call for new pedagogical methods and content.

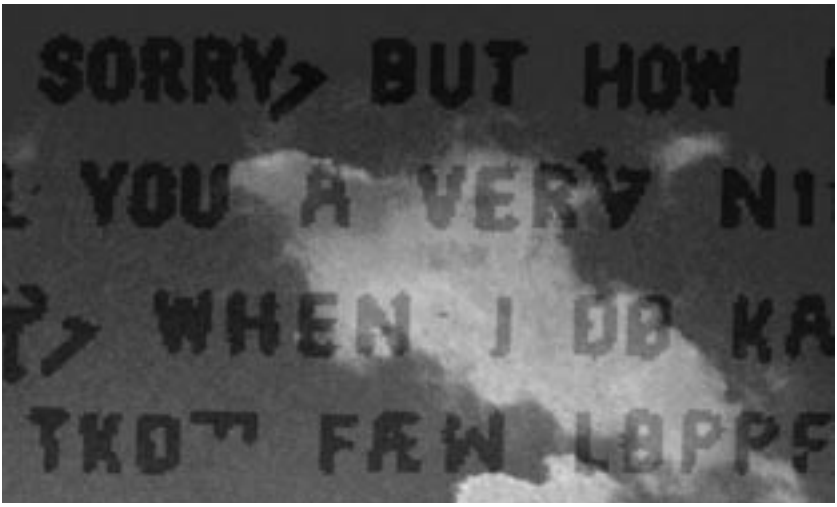
This brings into question the actual efforts currently being made in these areas.

02. STANCE

If you aspire to building a ship, do not drum up the men to gather wood, divide the work and give orders. Instead, convey to them the yearning for the vast and endless oceans.
Antoine de St.Exupery

While acknowledging the blessings of increased speed offered by new technology and parallel professional media, any qualitative personal architectural reflection, assessment of conditions and "adequate" response nevertheless requires certain important prerequisites: focus, dedication, lateral tools, and first and foremost: bold obliqueness. These prerequisites do not per se enable any directional operativeness; rather, in connection with inspired parallel ongoing dialogue, a simultaneous field of focused thought for later implementation into design can emerge.

This field, or working aura, is fragile indeed, and must be handled gently but firmly in the ever more effectively harmonized education curricula.



For in this realm, certain surprising conditions will emerge, will question the prevailing rational, "function"-based knowledge, and direct activity. In an altered quote from Louis Kahn, any noteworthy design project or "architectural" endeavour.

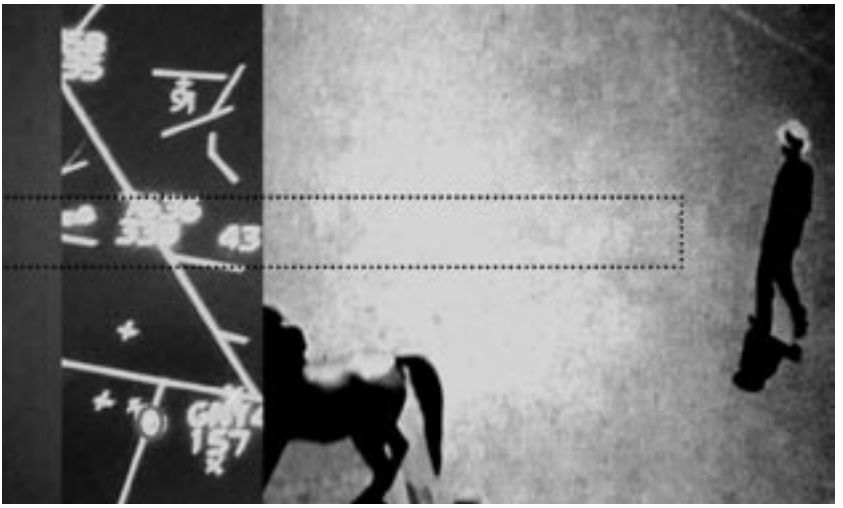
...must begin with the immeasurable, must go through measurable means when it is being considered and in the end must be immeasurable.

The question to be asked, in the ongoing profusion of new knowledge and evolving know-how in architectural education, is at once banal and multifaceted: is it (still) possible to successfully induce the oblique discovery and subsequent maintenance of the immeasurable in pre-design processes? An awareness conveyed in such ways as to broaden the general architectural outlook and enable new, subjectively broader transformations into reality.

Such a commitment presupposes, as a point of departure, that this engagement in many ways is already present in various schools and curricula. Yet, considering the fact that the most "successful" models quickly mutate into "branded" modus operandi and frantic, fashionable "schools," "styles," or "isms," the description of oblique approaches must refrain from the urge to become a mode of "instant applicability."

Rather, this stance represents a possible set of short-circuiting "perceptions" that, in connection with a wide variety of tools, might ultimately give way to a new range of future endeavours and applicable results.

A further presupposition is the acknowledgment of certain fundamentals: general drafting skills, CAD and other forms of IT know-how, a basic technological overview, and the byways



of architectural history/theory/philosophy. Thus the description of channels for the realization of "oblique architectural attitude awareness" revolves first and foremost around certain aspects of parallel design-studio practice; and presents itself as a plaidoyer for future implementations of smaller studio laboratories or enclaves within architecture schools, in which this awareness can be individually cultivated and refined.

03. POSTULATES

The essential things in life are seen, not with the eyes but with the heart.
Antione de St.Exupery.

I: equilibrium
Complementary tools, yet often dislocated:
The varied, "fast" array of IT applications;
The traditional, "slow" battery of architectural avenues;
The vast dispensary of theoretical knowledge;

In between the body and the world: the mind.

The increasing overload of theoretical knowledge, from whatever point of view, numbs action.

Yet it also represents the pinnacle of academic endeavour.

In between the mind and the body: revelation(s) in space.

And all disillusions, virtual or real.

II: revelation

Within any architectural exercise, applied, concrete, abstract or philosophical, the creative act is more than ever hemmed in by an overload of supposedly indispensable knowledge and know-how.

The revelation of the pure creative act's intrinsic irrationality often comes as a shockwave, despite its often very gentle character.

This tender and vulnerable noesis is swiftly embalmed in subsequent rationalization, structured, categorized, quantified and filed away on the appropriate shelves.

Yet its basis is more often than not straightforward:

Conditions are always what they are:

Present
yet often
un-sensed
un-seen
un-touched
un-smelled
un-heard
un-tasted

thus in many ways remain
un-realized.

Blocked by the "meaningful" array of combined knowledge, know-how and pictorial/dramatic projections.

In many ways: a paradox.

Should and could any education propagate the lateral thinking in the unmeasurability of such subjective domains, without falling into the unscientific pits of derision or the unprofessional?

It should.
It must.

Not as a prerequisite, but asa crucial supplement, indispensable balancing rod and stepping-stone for the braves' (re)discoveries of uncharted territories.

Yet:
This endeavour should not have easy replicable, easy-to-disseminate modus operandi. Rather, it should provide active shelter for the obliquely open, whatever its employed stratagems and methods, and for qualitative investigations.

04 IMMERSION

The acceptance of the penetration of smaller enclaves into the broad body of architectural education will be similar to the insertion of acupuncture needles in meridians: a stimulus directed at certain responsive parts of the system, producing a needling sensation and setting off a reflective cascade of activities that ultimately might radically enhance architectural outlooks.

The architectural enclaves must be seen as benevolent supplements, encompassing a variety of oblique approaches. They will be alternative appendages, coexisting with the core curriculum.

The enclaves' work must both maintain and constantly reposition the status of their autonomous approaches and effectiveness within the schools.

The proposed needling will thus simultaneously act as a parallel track and a potential redirector of vital energy impulses.

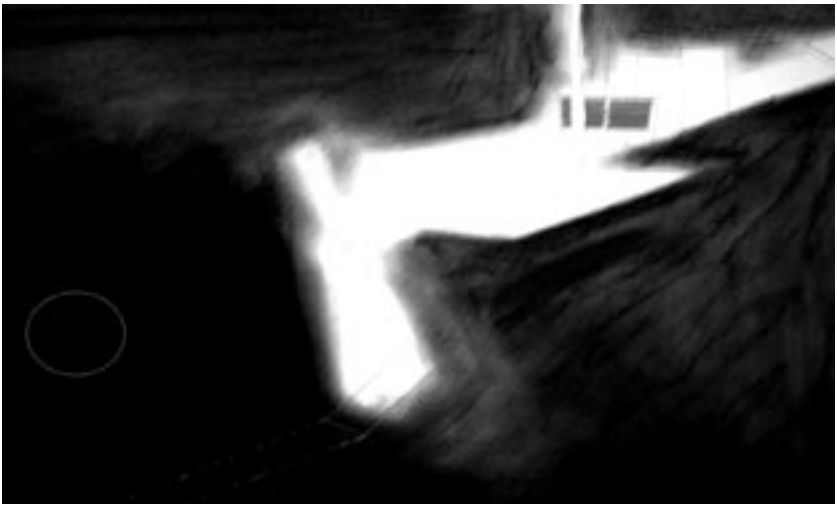
The acupuncture model is to be considered as a series of alternative simulation grounds, with oblique, "a-functional" rationales and procedures, ensuring more clearly defined positions, where the playfulness of "what" and "how" supersedes the "whys."

05 PRECIPITATION

The acknowledgment of any architectural education institute's cosmogony will also reveal a certain number of "black holes." These tend at times to become gravitational fields where matter and mind fuse into lemming race-grounds. Cutting-edge industrial technology, the latest information-technology applications and philosophical sub-structuring are for the moment gravitational fields in architecture.

The presence of the oblique enclaves might function as short-circuit ontology laboratories: cloud formations in the troposphere of educational establishments, enabling momentary precipitations. Orbiting the same gravitational fields, yet viewing them differently.

Openings to unorthodox awareness levels;
Openings to an alternative spatial consciousness;
Openings to genuine solutions.



06 AUTONOMY

The strategies of smaller enclaves should, in any school, be left to the discretion of the enclaves themselves. The development of free thought and making requires the greatest possible freedom of movement, unbound by any preset requirements. It is therefore vital that the enclaves focus on dedicated, intrinsic, ontological work and research into spatial conditions, circumstances, situations and environments involving the human body.

The obliqueness of this kind of approach implies that the development of actual architectural solutions to "problem complexes" should be entirely avoided, in favor of developments and highly qualitative appreciations of new forms and means of comprehension, "readings" and "translations" of existing situations and conditions.

While this stance certainly might encounter difficulties in the foundation phase, it is definitely a crucial outlook that needs to be carefully put into practice. In an education that traditionally is focused on a basically utilitarian translation and synthesis of relevant data via creative energies, the educational foundations often rely on the quick transformation of "data" into pre-assumed functional conversions.

The borderlines between the foundations and the translations are more often than not blurred, due to increased demands for the rapid deployment of architectural "solutions," often purely retinal and subliminal projections onto whatever subject is at hand.

The source of any creative act lies primarily in the careful and thoughtful discovery, acknowledgment, and immersion in the substance of a given circumstance or condition. Subsequently, it lies in the qualitative "utterances" of the transformations into new vistas and

prospects that will enable new outlooks. An apparent straightforward situation, which nevertheless needs to be nourished and constantly brought into renewed awareness.

07 NOVELTY

If we knew what we were doing,
it would not be called research, would it?
Albert Einstein

In the quest for innovation, it appears that the creative and critical faculties often have difficulties coexisting in their highest perfection. The creation of something new is not necessarily accomplished by the intellect, but by a playful instinct springing from some inner necessity, and resulting in the elation of finding rather than in seeking.

Novelty is thus not something to be planned, but to be recognized as utterly beneficial "collateral damage" of the arduous activities one is engaged in. Yet a careful establishment of a framework within which these activities can be performed is essential to the foundation and subsequent development of "new" pedagogical approaches in architectural education.

The difference is one of attitude. Exactly this difference will determine whether new ideas and procedures can be successfully cultivated or not. A skeptical or hostile environment will not do, and without doubt would hamper creative thought and implementation.

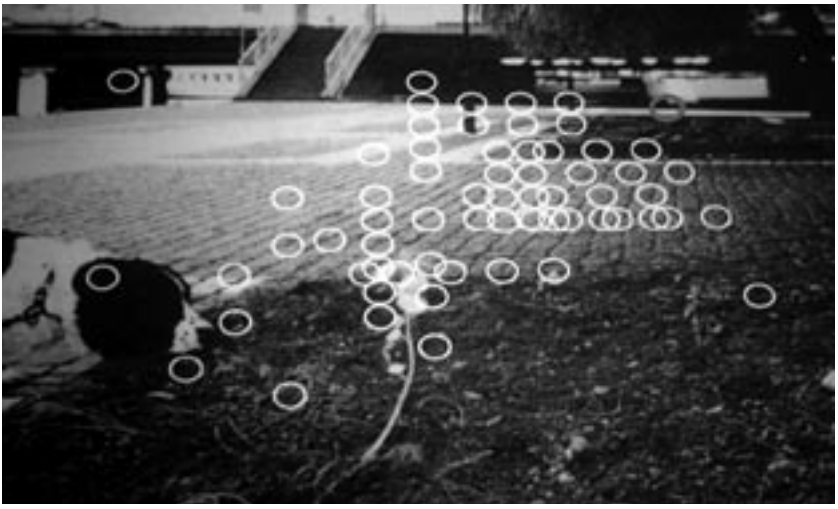
The establishment of benevolent curricula frameworks within which the enclaves can operate freely requires the participating architecture school's constant and generous bravery:

The bravery of allowing work to be initiated and to proceed, in spite of the fact that the actual comprehension and categorization of these endeavors might defy the usual understanding of what a "reasonable" architectural curriculum should consist of, and especially of what practical purposes these enterprises should lead to.

Once this attitude and the necessary framework is established, "silly questioning" and "inconsequential playfulness" can be initiated. Both are essential to the first intimations of radically new developments.

08 PARALLAXES

Art
I noticed that the large windows between the paintings (in the Musee d'Art Moderne) interested me more than the art exhibited. From then on, painting as I had known it was finished for me.
Ellsworth Kelly



During the last quarter of the twentieth century, the increased yearning by artists for formulating and encompassing distinctive spatial aspects brought about a significant number of works directly dealing with inherent spatial qualities, aloof from the pragmatic utilitarian stance that has traditionally been an integral part of architecture.

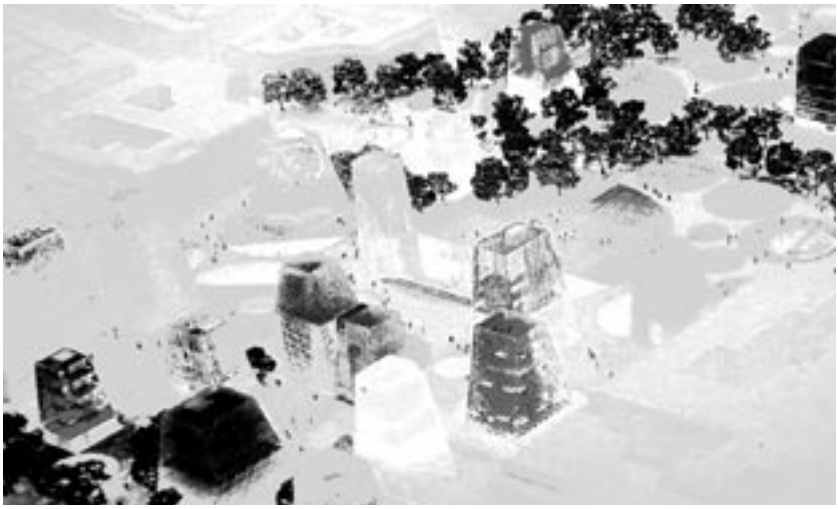
The primordial qualities of these spatial works represent a significant shift in the formulation and investigation of spatial consciousness since the introduction of "abstraction" in modern art.

It is interesting to note that theses changes in outlook were initiated by artists who broke out of the boundaries of representation and stepped into the world of tangible realities, and not by architects, with some spectacular exceptions.

While the architectural community registered this shift, and swiftly managed to incorporate some of these works' visual aspects into the molds of otherwise programmatic briefs, the actual interest in the ontological exploration of crucial spatial conditions and their insertion into more mundane situations are mostly still left to architectural dissertations, if treated at all.

While artists can explore these issues within the free framework and boundaries of "art," architects are limited by practical requirements and financial conditions.

The pursuit of the basic substantial issues of spatial awareness requires a fresh, generous and oblique approach by architects, a detached, yet immersive search for the immeasurable in a world slowly being suffocated by stiff theorizing, superficial imagery, spectacular form, and an ever-growing, greedy commercialization.



Other realms, however insignificant, must be exposed, in order to become unbound territories of exploration.

Longing

While the plaidoyer for the establishment of stimulating enclaves with autonomous agendas in architectural education can be considered a generic longing, the particular handling of these frameworks will make the crucial difference.

However, any precise description of particular management strategies will irrevocably obstruct the opportunities for truly liberating openings for further innovative thinking and development.

Thus the framework can and should be the only conceptual basis of an understanding.

Tools

The use of relevant tools in architectural education, regardless of their media or state of advancement, can rapidly degenerate from adequate proficiency into highly professional techniques, obscuring the possibilities of radical changes in meaning and content.

The more ingrained the level of skills, the more "professionally" standardized the procedures, the more numerous the pitfalls into collective contractions.

Any playfulness is potentially subject to seemingly "absurd" short-circuiting on all levels: a constant bending of rules, reassessments, and a gamut of trial and error that will ultimately produce different material.

Practice

Technique is what you fall back on
when you run out of inspiration.
Rudolf Nureyev

While the setting up of adequate enclave frameworks must be left to the generous and bold discretion of the individual architectural school and its positive attitude toward the endeavor, the internal practice of the enclaves must be subject to genuine selective and rotating flexibility, so as not to degenerate into methodology.

Responsibility

If a man does not keep pace with his
companions, perhaps it is because he hears a different drummer.
Let him step to the music which he hears,
however measured or far away.
Henry David Thoreau

In order to achieve tangible, novel results, and to be managed efficiently, the enclaves will require staff with great dedication, motivation, and patience.

Most academic institutions tend to refrain from employing people with unusual CVs, in favor of those with highly specialized academic or professional achievements. The "risks" seem too great, and the potential outcome(s) too diffuse to allow any strange elements into the curricula. Yet it is precisely in the nature of the wisdom of courage to incorporate the "uncertain" and as yet unimaginable into daily life and thus allow for the potential emergence of alternative views that will make a lasting difference.

The longing for a suitable, genuine space in which to ask proper questions must supersede the urge for accessible solutions and pre-planned results via approved methodologies or centrally planned research topics. With proper engagement, pataphysical seriousness, and recognitions of states of serendipity, the emergence of different views and patterns will ultimately reveal a series of stepping stones for future research and further developments in a more traditional design-studio context.

09 POSSIBILITIES

"There is no use trying," said Alice, "One can't believe in impossible things."
"I daresay you haven't had much practice," said the Queen.
"When I was your age, I always did it for half an hour a day. Why, sometimes I've believed as many as six impossible things before breakfast."
Lewis Carroll, Alice in Wonderland

This essay's short proposal for the establishment of limited, alternative structural studio settings within European architecture programs limits itself to presenting the outlines for some feasible options on future practical actions to be considered.

With the implementation of the Bologna Declaration, more standardized curricula, and comparative bachelor and master degrees, the possibilities of establishing the proposed enclaves are indeed within reach, yet require careful consideration.

Within the realm of practical possibilities, a brief checklist can be established, a memento of the essentials:

- An optional agreement on the establishment of limited sets of smaller experimental enclaves in European architectural education over a trial period of six years.

- The enclaves' work scope is to be primarily ontological, and serve no apparent traditional architectural "utilitarian" or "functional" purposes, yet should center around daily life situations conducive to an oblique comprehension, charting, and new assessment(s) of relevant data and facts.

- The enclaves' activities and work and/or research strategies require a relative freedom of action from traditional curriculum and research. However, each school, after due consideration, should enable, nurture, and embed the enclaves in their respective curricula. The work of the enclaves should function as a supplement rather than a prerequisite, targeted at responsive faculty and students alike, with the obvious possibilities of cross-fertilizing through inclusion or direct participation in related academic fields.

- The enclaves could be mainly inserted into the masters level of architectural education, as the bachelor studies in the future may not have the elbowroom required to reach substantial depths; nevertheless, attempts to include oblique approaches should also be attempted on bachelor level.

- I also propose a certain number of alternative publications on the enclaves' work. Over a two-year timeframe, within the suggested trial period of six academic years, workshops and informal conferences could be organized, leading to a fertile exchange of work in progress. After the trial period, a larger, more formal conference/workshop coud present more substantial, compiled results for a broader debate and audience.

It might very well be that some of the results first accumulated turn out to be "failures," i.e. camouflaged traditional approaches, such as a fashionable mannerism, avid to be consumed or to serve as yet another "brand" to market the respective architectural school in the ever-growing field of edutainment. Yet the attempt should be made, for the appearance of the genuinely "new" will immediately generate developments far beyond the scope of the presently imaginable.

CONCLUSION

Il faut cultiver son jardin.
Voltaire, Candide, ou l'optimiste

The present paper permits itself the liberty of residing somewhat outside both the scope and format of traditional academic papers, and the descriptive modus operandi of studio/research work;

Yet it represents a conscious position.

Globally, architectural education and practice are presently undergoing vast changes at such a voraciously rapid pace that any attempts to make postulations about them or give answers or solutions, adequate they may for the moment seem, can border on a blend of naivety and megalomania.

These changes will invariably include a much more profound impact on education of the building industry's norms for industrial procedure and practice, as well as academia's own attempts to install more ivory towers;

Both these future developments will be brutal and practical;
yet they will represent a schizophrenic duality with the latent potential of relegating genuine architectural endeavors to the byways of construction and building practice methodology, design and academic "branding."

Thus the stance presented in the paper is simply a benevolent reminder of a very limited scope of action that might be undertaken in respect to the upcoming openings and standardizing taunts that will be part of future European architectural education.

It might well be an optimistic stance:

The future is beautiful . . .

MENTION DAVID S. WILLEY UK

MENTION

Architectural Education in the Digital Environment

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ARCITECTURAL EDUCATION IN THE DIGITAL ENVIRONMENT

It is tempting to see digital architecture as a new, young, emerging and pliant arena. However, it was formed over forty years ago as Computer-Aided Architectural Design (CAAD) in the USA by Johnson's contribution[1] to the Sketchpad project at MIT,[2] whilst in Britain, facilities-allocation computer programmes were being published by pioneers Whitehead and Eldars.[3] The mainframe and then the microcomputer have long since been replaced by the personal computer, and the internet is ubiquitous. The hardware and software environment that has emerged, particularly over the last twenty-five years, is not now likely to change radically. We can expect more and more products to be developed that will exploit the potentials offered by cheap computing power, access to the web and continued improvements in the interface between the digital world and its users.

COMPUTING IN ARCHITECTURAL EDUCATION

Three conditions now characterise the digital environment in which architectural education takes place.

Firstly, the learning environment within the university has become digital, with the internet being the first point of call for students rather than the library. Teaching and learning materials are now routinely posted onto web pages to be accessed at the students' convenience.

Secondly, the working environment within the world of architectural employment has become digital. This is still largely a 2D environment of production drawings, but is likely to become, over the next five years, a 3D environment centred on a shared digital model of the project from which 2D images can be automatically generated.

Thirdly, it is inevitable therefore that the world of architectural education must also become digital. And, in general, this is already the case. Most of our final-year students' work is digitally produced, and many students develop 3D models, renderings and fly-throughs. Hand-drawn work is now regarded as idiosyncratic, quirky even, and it is recognised that, close to project-completion deadlines, it is difficult to adjust or amend work that is handmade.

However, it is far from clear that every aspect of architectural education should have a digital base, or which aspects of the digital environment should be prioritised. What is the role of physical modelling or of sketching with a pencil? Should students be making 2D digital drawings of plans, sections and elevations, as a kind of equivalent to word-processing, or should they be making full 3D computer models? What is the role of the handmade drawing in a digital architectural education environment?

We have reached a point where the ideas that drove the digital revolution in the sixties and seventies now need to be replaced by concepts and theories appropriate to the digital world that has emerged. The nature of those theories and concepts will be touched on here to provide the setting for this essay's main concern: the way in which architectural education

may be reoriented to deal with learning and teaching in a digital environment. The essay will be centred around the design studio, where students are expected to creatively synthesise their experience and understanding of the whole range of concerns that constitute architecture. The essay will also, therefore, discuss the interaction between two different modes of creativity and the characteristics of the manual and digital tools now available.

INTEGRATED CAAD SYSTEMS

The idea that architectural computing has shifted from a concern with CAAD systems to a computer-facilitated design environment was initially explored in 1999.[4] Computer-Aided Architectural Design research in Europe was first established in the late sixties by teams at the universities of Liverpool, Edinburgh and Strathclyde.[5] They employed the 'classic' CAAD conception that the computer would carry out the role of central record-keeper for the design project. This model would be available to a whole host of specialist design-analysis programmes that would access the model and produce accurate predictions of capital cost, daylight, heating costs and structural design, as well as generate all the contract drawings and the bill of quantities. The model could be simultaneously accessed by all the members of the building team, thus greatly improving communication and efficiency.

The problems of representing building geometry and attaching construction and materials to it within an integrated system supposed to be capable of modelling any kind of building became the main research focus, and soon led to attempts to reduce this complexity by restricting the building types or the building systems that would be modelled. There were no quick solutions, and the heroic vision of the integrated digital building system was destined to remain a vision. Aart Bijl wrote his pivotal critique, in truth an obituary, of these integrated CAAD systems in 1979,[6] in which he indicated that professional behaviour by its very nature cannot be encoded in a fixed computer system, because professionals are characterised by working with integrity in situations that are unfamiliar or atypical. Thereafter, Bijl's Edinburgh group began to search for ways in which to provide the computer system with more flexible and intelligent characteristics that better matched the professional orientation of the architect. However, the challenge of creating more intelligent systems was also very great, and at the time very little substantial progress was made.

THE DIGITAL ENVIRONMENT OF ARCHITECTURE

The concepts that to a greater or lesser extent are still employed to organise our understanding of architectural computing were created in the late sixties. Their underlying assumption can be described as follows: the designer conceives and the machine computes. A number of issues emerged from this position. Firstly, there was an assumption that what was required was an integrated digital model of the building being designed, that is, a model that contained a complete description of a building's geometry, materials, construction and costs. Secondly, there was a tension concerning whether the digital model of the building should be focused on the sketch-design process, in which the building's form and organisation were settled, or on the later stages of the design process, in which a design was being refined,

materials were chosen and costs calculated. Thirdly, there was an issue which seemed to escape the CAAD pioneers, namely that the conceive/compute division makes little sense within architectural design. The architect can legitimately ask 'compute what?' There is nothing, hardly, for the computer to do. The computer-aided design paradigm is inadequate, for what aid does it provide?

The conceive/compute division lay at the heart of seventies CAD, and whereas engineering design does contain a large element of computing and a relatively low level of three-dimensional complexity, architectural design contains a low level of computation and a high level of three-dimensional complexity. The conventional wisdom can and has applied to engineering design, but if we look at architectural design it is clear that 'there are too many steps which have to be retraced, the generation of ideas is a poorly understood and highly complex process, and the design problem is normally only fully revealed during the design process itself'.[7]

SKETCH DESIGN

In 1976 I argued that if computers were to help architects to design, they would have to operate during sketch design:

The sketch-design stage of the architectural design process is plainly critical to the development of a satisfactory building. The important issues, such as the building's siting, volume, shape and constructional system, are all decided upon during this period, thus largely dictating the construction and running costs, the completion date and the environmental impact of the project. If CAAD systems are to provide the architect with real help in controlling design, they must operate during the sketch-design process.[8]

The real paradox of this idea that CAAD should operate at the sketch-design stage, where ideas are fluid, half-formed and only partially described, is that computers are very poor at operating with partial information. People can operate in such an environment, as they can assume or guess what is missing, but computers are certainly no better at guessing than people. They generally cannot use their 'advantages' of high-speed computation or ability to sift through of large volumes of information.

COMPUTER-FACILITATED ARCHITECTURAL DESIGN: CFAD

When SKETCHPAD was invented, computers were seen as machines that did something, like calculations. CAAD systems were therefore also expected to do something: be the AID part of computer-aided design. Thirty-five years on, computer systems are, paradoxically, much more passive. The computer's role in e-mailing consists in automatically managing the routing of the message to anywhere in the world. But it does nothing to the message. Who needs computer-aided e-mail? It could well be accurate to speculate that 'computer-facilitated architectural design' captures our current condition.

It seems possible that the future could easily lie with CAAD systems that have almost no intelligence and make no attempt to aid the designer. They simply need to store and communicate design information and allow the designers to do what they know how to do, that is to design.

Computer-aided design was devised in a world with a few expensive, isolated computers, and was based on the assumption that computer modelling of the manual design process would form the basis of CAAD. The computers, both hardware and software, would belong to design or client organisations. The discipline was replete with modernist concepts of optimal solutions, objective design criteria and universal design standards. Now CAAD needs to proceed on the basis of the postmodern ways of thinking and designing emerging from digital techniques: the internet, multimedia, virtual reality, electronic games, distance learning. There needs to be less emphasis on owned computer systems and more on digital environments that are open to change and modification, that allow multiple forms of representation and that are rich in manipulation tools. In this paradigm, communication is much more central to designing than computing. The main conclusion has to be that computing in architecture is no longer a question of how to use a computer-aided design system, but is about how to operate in a digital environment to facilitate design.

Systems which simply facilitate storage and communication are, of course, not quite as simple as they seem. It is true that e-mail does nothing to the message, but the new medium has transformed the way many people, especially academics, now work. If we want to examine the way in which the architect office of the future might operate, we have only to look at the range of computer-based work undertaken in schools of architecture.[9] We might also look at Maher's work, which is a fascinating discussion of how computer tools can change tasks and how those tools can be designed. As for this new tool, Maher asks an important question: 'Does it need to replace necessarily, or run simultaneously?'[10]

Once we recognise that we should not necessarily replace current practice with new practice, but run them simultaneously, then we can have paper and pencil, screen and mouse, the airbrush elevation and the digitally enhanced photograph, the real napkin as well as the electronic one, the incomplete pencil perspective and the photo-realistic fly-through. We also restore to centre stage the human being (the much-maligned designer), who was only ever implied by the phrase "computer-aided design."

MODES OF CREATIVITY

In developing a view about the character of a design studio in a school of architecture, it is necessary to distinguish at least two different modes in which students have to operate at different times. On the one hand, there is an activity which is slow and reflective, largely intellectual and at least in part logical and rational. This reflective process is dominant for most of the design process. It is found in the early stages of a project, where the design situation is being explored and developed; where a site is being described and recorded; where a building brief is being articulated and nuanced; and where an architectural position is being shaped. Later it is found where spatial organisation is being fixed and environmental conditions are being laid down or an elevation is being adjusted. The second activity is active, fast, quick, sharp and lucid, with few pauses and almost no time for breath. Here the basic creative ideas that infuse a project are located and drawn out. This reactive process is often manic and far from logical or rational. There is no time for that. These two processes have a symbiotic relationship, but they each require very different mindsets and tool sets.

REACTIVE DESIGN TOOLS

At the heart of the reactive design process is the need to quickly externalise all of the ideas that are bursting out from it. There is a need for a notation that is rich and fast. Architects have long been recognised as being more interested in line drawing than in other forms of drawing, and line is expressive, richly interpretable and quick. The technique is also often associated with working on transparent or semi-transparent papers that encourage tracing and the partial redrawing of an image. These techniques value clarity over accuracy. Line drawing requires interpretation, and so the images are laden with meaning and significance for the drawing's creator, and thus support the development of work that is personal and intimate. However, it takes some time for a designer to acquire this skill; schools of architecture often organise still- and life-drawing classes to help their students develop the necessary dexterity.

The problem for architectural education at the moment is that there is, as yet, no digital equivalent for this fast, intimate and personal technique. A pen or pencil gripped between finger and thumb marking a surface provides haptic as well as visual feedback to the designer, and digital tools, of necessity, have to sever that link.

REFLECTIVE DESIGN TOOLS

At the centre of the reflective design process is the need to accurately represent the current state of the building design. There is a need for a notation that is rich and accurate. This kind of representation is essentially observational. Architects use the camera and the sketchbook to observe and record the real world.[11] Corbusier illustrated his Vers une Architecture with his sketches and photographs.[12] Graves has developed his sense of the connection between his observational activity, its manipulation and his design work.[13] Whilst observational drawing remains difficult in digital forms, the opportunity to take digital photographs and the ability to manipulate them opens new avenues for the designer.

The representation of a building during the design process has traditionally taken the form of plans, sections and elevations, physical models, perspective drawings and sketches and diagrams. The model and the perspective drawing have been prominent design tools for Mies van der Rohe,[14] whilst plans, sections and elevations with sketches and diagrams have been used by Richard Ried[15] and Michael Graves.[16] Much time is spent by students in schools of architecture developing their skills and understanding the conventions of these traditional forms of representation.

Digital drawing and modelling techniques are well-suited to the task of representing buildings to support reflective design work. The ability to create light sources and to cast shadows, to match colour and accurately represent translucent materials offers a new tool for examining the qualities of a design during its development. If it is a requirement of the digital design studio that it contain a variety of techniques and tools in parallel, then it is important to recognise the different characteristics of 2D and 3D computer techniques.

THE DIGITAL 3D MODEL

3D modelling of a building in terms of the quality of the representation and the time and

skill it takes to construct needs to be understood as being much closer to physical modelling than to drawing. The 3D model is complete, consistent and slow to make. Its completeness requires it to carry a large amount of information that it is difficult to change. It is therefore suitable for the reflective passages of the design process but unsuited to the hurly-burly of reactive design. It is a temptation for students to make the 3D model their only representation of their design, simply because it seems to contain all the information and content of the projected building. However, a 3D model cannot accommodate a switch by the student from a reflective to a reactive phase in the design process. The student is prone to stick with an early idea, often identified at the start of the design process, when the complexity and subtlety of the design situation have not really emerged. It is vital for students to understand their own creative processes as switching between these two modes of design, each feeding the other, and not to see their design as a simple linear process in which a flash of inspiration at an early stage provides the impetus for the rest of the project's development.

A NEW KIND OF DIALOGUE

Where students create 3D models, the tutor enters a new realm of discussion not otherwise available except perhaps with a modelscope and a physical model. We can ask the students to show us the view from, into or across any space in their building. This opens up a new kind of dialogue. In the past the tutors would need to say, 'I think this room is dark, the colour scheme is oppressive and the window head is too low', and the student could agree or disagree with the diagnosis. Now the situation is clear to both tutor and student, and a different kind of conversation can develop that naturally includes the view through the window, how the experience of the room changes as the room is viewed from different positions, and how the sunlight passes across the floor in different seasons and at different times of the day. The room has colour and may even contain representations of materials. It becomes easier to discuss the relationship between the room and its qualities, as well as the student's intention for the project as a whole. This kind of discussion is at the heart of reflective design. Such discussion in a hand-drawn environment was almost always restricted to the final, post-completion review, when a full description of the project is available, but when issues of assessment and judgement bear down on the debate and restrict its usefulness.

DRAWING IN CAAD

However, it is also the case that 3D modelling systems turn the role of drawing on its head. Drawing, in the creation of a digital 3D model, is a way for the designer to communicate to the machine what the building is like, whereas drawing by hand is a process of exploration in which the architect is trying to find out what the building is like. Thus for the architect, drawings are collections of clues, hints and reminders: they are fragments, some resolved and some not. Some represent overall planning solutions while some involve the threshold detail. All are simultaneously held adjacent to one another on the sheets of paper. A 3D modelling system like this remains an ambition. Manual systems preserve, perhaps even

encourage, an engagement with a wide range of issues. A dilemma articulated in 1976 still seems to be relevant: 'by their very nature computer systems remove from the designer the freedom of action which pencil and paper techniques provide.[17]

2D REPRESENTATION

By the end of the seventies 'simple' 2D graphic systems were being marketed by commercial groups. These graphic systems targeted the production rather than the design process in architectural practice, and allowed 2D drawings to be stored, amended and reproduced using (still expensive) minicomputer systems linked to high-quality graphics workstations. These 2D systems remained close to traditional manual methods, as they allowed sheets of paper to be represented, and supported work across a range of images.

2D plans, sections and elevations are a fragmentary description: they are potentially inconsistent, fairly easy to make and relatively easy to change. This applies to both hand-drawn and digital methods. The importance of the fragmented nature of traditional architectural drawings is that the amount of information present in the drawings is relatively small. The use of the conventions of architectural drawings allows a large amount of information to be implied rather than represented. It is then possible to change a scheme with a modest amount of redrawing in order to change the nature of the assumed information, or, by providing an additional drawing, cause that information to be reinterpreted. This flexibility may cause problems on building sites when inconsistencies between drawings become apparent, but as a feature of the design process this two-dimensional tradition has clear benefits in allowing amendment to take place. These two-dimensional drawings also provide an easy point of contact and departure when moving from a reflective to a reactive mode of work.

The ability to easily edit a digital drawing makes the use of digital 2D drawings a clear advantage in the latter stages of a project, when changes are likely to be local and modest rather than radical.

PRESSURE ON THE TIMETABLE

What impact will the acquisition of CAD skills have on architectural education? For much of the eighties and nineties it was possible to slip the necessary CAD skills into existing graphics, drawing and design projects. High-level skills could be honed in elective projects. The situation has changed over the last five years: the software systems commercially available to students now offer a complex matrix of tools that cannot be learned in a couple of afternoons. Students need a substantial amount of time to understand them. Consequently, learning traditional drawing skills is now under pressure in the timetable. Students have to devote time to the acquisition of both manual and digital techniques, with the result that they are taking longer than in the past to develop the dexterity they need.

There is probably a need to link the acquisition of different techniques with reflective and reactive practices. It is also the case that reflective techniques require longer projects. This would suggest that, for example, 3D modelling should be a representation technique lim-

ited to the final two years of an architectural course. The desire of students to engage with the latest digital techniques means that it is very difficult to structure a course in this way. Students want to see their work represented using the best tools available. And as teachers we should seek to support their position.

DIGITAL DETAIL DESIGN

We are finding that where projects have a requirement to show how construction, structure and services contribute to the architecture,[18] students are ready to employ digital techniques. The advantage for the students is that their design projects are often strategically settled by the time they begin to develop their technical drawings in detail. As the technical details change and are refined, the digital representation can be easily modified. This means that students are prepared to seek advice even at a late stage in their projects, as they can make minor modifications to a drawing, thickening a wall of structural blockwork or repositioning a heating duct or even completely redesigning an eaves detail without having to redraw an entire set of drawings. In a learning environment this has major benefits, as the student is able to continue with development beyond the timescales that were available in a handmade environment, where, with a complete set of general arrangement drawings at 1:100, with a critical section at 1:20, as well as details at large scale, it was necessary to fix the work and allow at least two weeks to execute the project drawings. In a digital environment the 1:20 drawing and the details can remain fluid until just a few days before the deadline.

A digital drawing, much like a digital essay, appears to be complete even when the author intends to make some revisions. If they never get made, the essay can still be printed. It is complete, if not entirely finished. And from the students' point of view, their detail drawings are always 'ready to print', so the production of the complete set of project drawings takes place in a reassuring and secure situation. This encourages them to seek advice and also enables the teacher to adopt a more critical position when offering advice, as identifying a need to make changes is not a disaster for the student. All the project drawings as they are completed are ready to print, but held in a digital format they can be altered at the last moment, just prior to printing.

FRAGMENTARY AND COMPLETE DESCRIPTIONS

In developing the discussion of reflective and reactive design modes in a digital environment, it has been necessary also to distinguish between two types of descriptions of projects: those that are best understood as collections of fragments (traditionally plans, sections and elevations) and those that are best understood as being complete (traditionally the accurate physical model and digitally the 3D model).

Figure 1. maps the introduction over time of digital techniques into this matrix of complete and fragmentary building descriptions and reflective and reactive design modes. The term 'rough' in describing models should be understood in a positive way to indicate a use of resources that effectively matches the model's purpose.[19]

The near future, already entered by some, offers students the opportunity to carry out all their work in a digital environment.

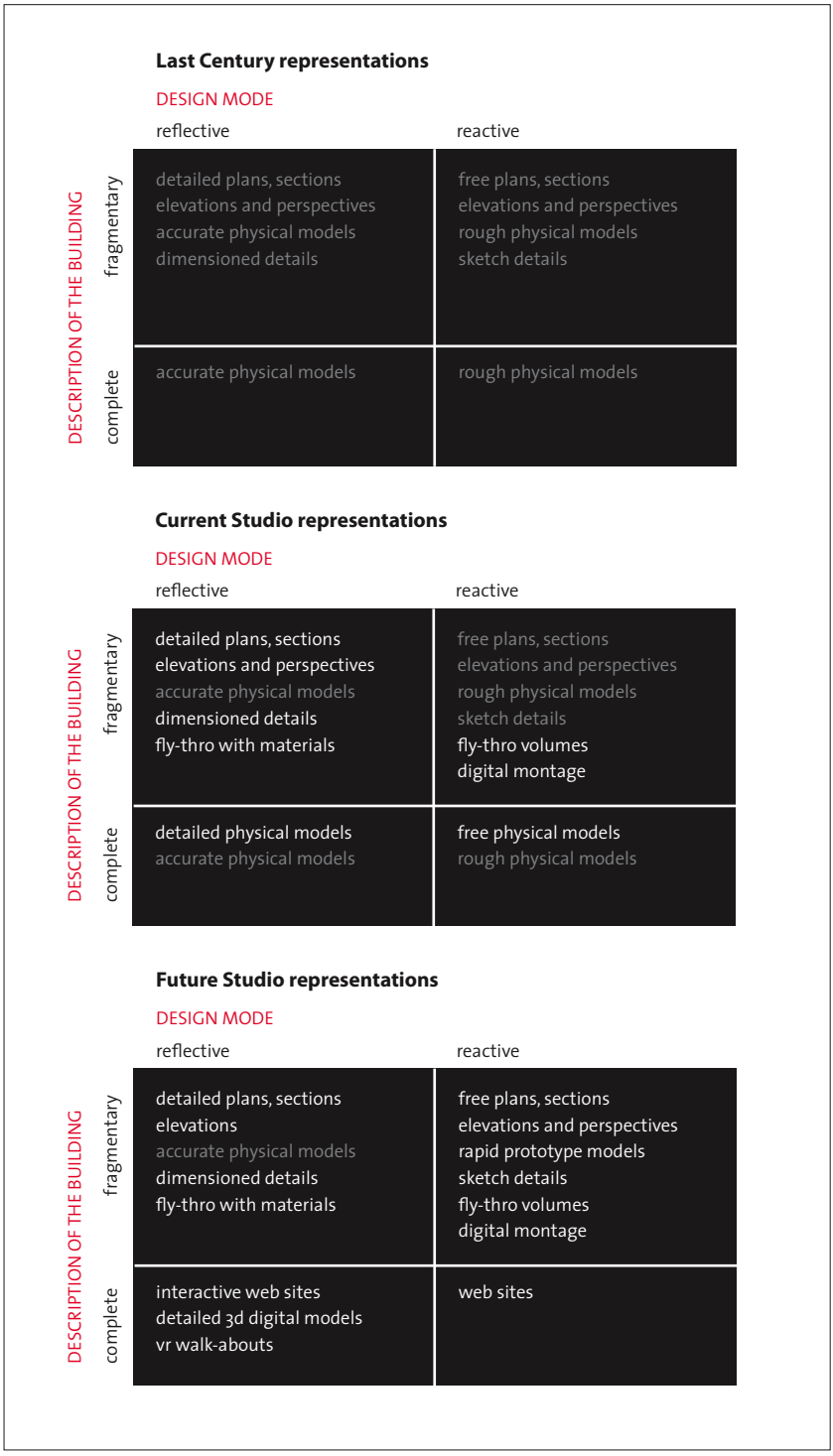

Figure 1. Studio representations (white text indicates digital techniques)

NEW REPRESENTATIONS

What is becoming clear as the digital environment becomes more and more familiar is that students are able to invent new ways to represent their work. It is still arguable that the digital environment is denuded in comparison to the graphite environment. On the other hand, it has to be recognised that much the same was said when printing emerged and eliminated the use of the decorated capital letter. It may be necessary to identify the new techniques that will supersede our interest in line drawing.

The most likely candidate at the moment is the use of montage techniques in drawing packages like PhotoShop, where fragments from a picture library, perhaps created by the designer, can be layered, clipped and organised into new compositions that deal effectively with surface rather than line. Such a technique ought to be especially important to architects, who are always trying to represent space and surface in plan, elevation and section. It is possible to see the digital camera as an input device in a design process which will resemble editing rather than designing.

It is also clear that this new situation encourages students to use mixed forms of media to communicate. The division between the written and the drawn becomes increasingly blurred when both the picture and the writing are held digitally and can be either scaled or moved independently. In a recent design submission in the third year, a student was able to draw the general arrangement drawings digitally but render them by hand. From a 3D model he made a set of digital images of significant sequences of spaces in which the buildings around the outside of his design could be viewed through the windows. He also made a book that contained an image of the interior of every occupied room. He made a version of his 3D model in which the internal walls were represented as lightly translucent, so that all the services could be easily seen and followed through and then presented as a group of internal perspectives. Large-scale construction details in plan and axonometric and a 1:20 section were simple 2D drawings. There were models at several different scales. He is a well-organised and very industrious student; his methods have not gone unnoticed by other students or by staff, and will quickly become the norm for project work in the next academic year. What is clear is that several elements of his submission were not thinkable as forms of representation without the ability to model effectively in 3D or to transform materials using the system of layers in a digital model.

THE RE-ORIENTATION OF ARCHITECTURAL EDUCATION

Supporting students during both the reflective and the reactive phases of their design work is the key to effective learning in the design studio in a school of architecture. It has been argued here that 3D digital models are not well-suited to the reactive phase of the design process, and students should be discouraged from employing them. This kind of reactive work is probably best supported by hand-drawing. This means that it is important to maintain a tradition of observational hand-drawing in a school of architecture in order to support one of the crucial creative processes.

The traditional conventional drawings of plan, section and elevation (generally at a scale of 1:100) remain key drawings for students to make during their education. They are fragmen-

tary descriptions, and therefore are an economic way to store information and allow reasonably easy modification. These properties of hand-drawn drawings are retained in a 2D digital drawing environment, and it is argued here that these traditional drawings should be encouraged. They form a bridge between the reactive and the reflective design phases, and should be seen as the main outcome of any reactive design phase.

It is likely that the digital environment will generate new forms of architectural representation, and, whilst it has been argued that most current digital techniques do not support the needs of reactive design for rapid and rich representation, it is suggested that montage techniques focused on space and surface can support a rich dialogue between the designer and an image. Students should be introduced to these image manipulation techniques early in their course and encouraged to do work that is quick and fluid.

Most of the traditional representational techniques for reflective drawing require a large time commitment and a lot of patience. This is also true of reflective digital techniques. A 3D model cannot be quickly constructed if it has any ambitions towards a realistic representation of a building's spatial character or surface qualities. However, given that both hand and digital techniques require an input of effort, patience and skill, the quality of the image generated from a 3D model is generally much greater than can be produced by handmade drawings. It is very likely therefore that 3D models will become increasingly important as tools to create the students' final project drawings. Where the model can be created earlier in the design process, there are opportunities to engage with the student in a dialogue that is richer and more detailed than could exist in a hand-drawn environment.

Figure 2. suggests that digital techniques in general support both complete and fragmentary descriptions of a design project, but that the majority of these techniques are best employed in projects with a long duration, as the techniques require a substantial effort.

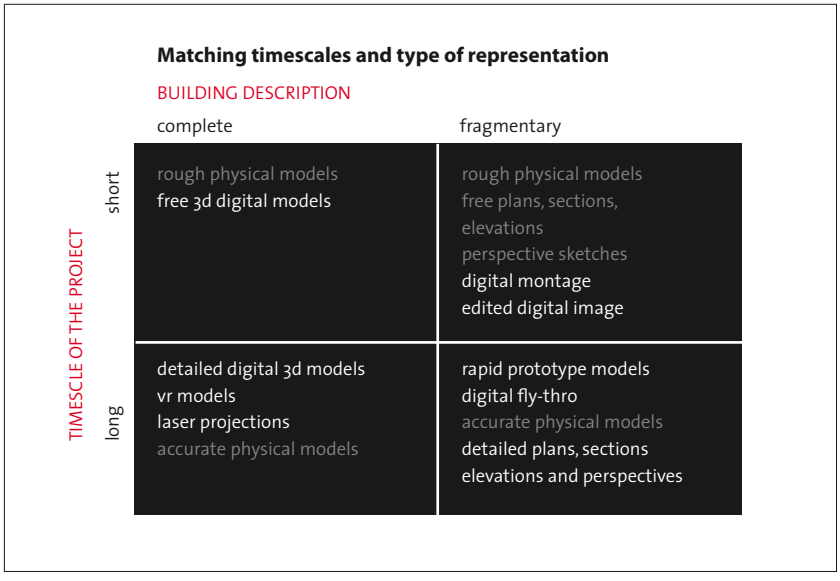

Figure 2. Project timescales and type of representation (white type indicates digital technique)

Effective use of digital techniques suggests that projects with reasonably long time spans of, say, at least five or six weeks are needed. This will require the initial teaching regimes in many schools of architecture to be recast, as they tend currently to provide students with many short projects that expose them to a range of issues and concepts with an underlying assumption that the skills and techniques needed for designing are present in all projects. Acquiring good digital skills will require longer projects or a much more structured approach to skill acquisition.

It is also the case that reactive design is a necessary part of a creative design process. Ensuring that students have the skills and techniques to exploit this design mode requires that they retain high levels of manual dexterity in drawing and model-making. It is also clear that design projects will have to create the conditions in which this mode can be entered. Although reactive design is in itself of limited duration, it is not normally something with which design begins, as it requires the designer to be familiar with a wide spectrum of facets of the design situation. It may well be that the longer projects needed to exploit digital techniques are also required to accommodate the reflective gestation, reactive formation and reflective refining of a project.

A key to forming a bridge between reactive and reflective design, and between manual and digital techniques, is to recognise the importance of the conventions of traditional representation and their role in enabling fragmentary descriptions of projects. Fragments allow, perhaps encourage, change, reassessment, even misunderstanding, and reformation. The lack of completeness invites continued creative intervention by the architect. Digital techniques have opened up more possibilities in terms of complete descriptions, and their impact in this area should not be underestimated, but the critical area in the design studio remains the fragmentary description, which is the site for creative intervention.

The printing press eclipsed the manuscript, but the web has not replaced the book. It is to be hoped that digital drawing and the 3D digital model will not eclipse the hand-drawing or physical modelling, and that a rich, mixed mode method of architectural representation can emerge in which techniques are matched to intentions, timescales and design modes.

NOTES

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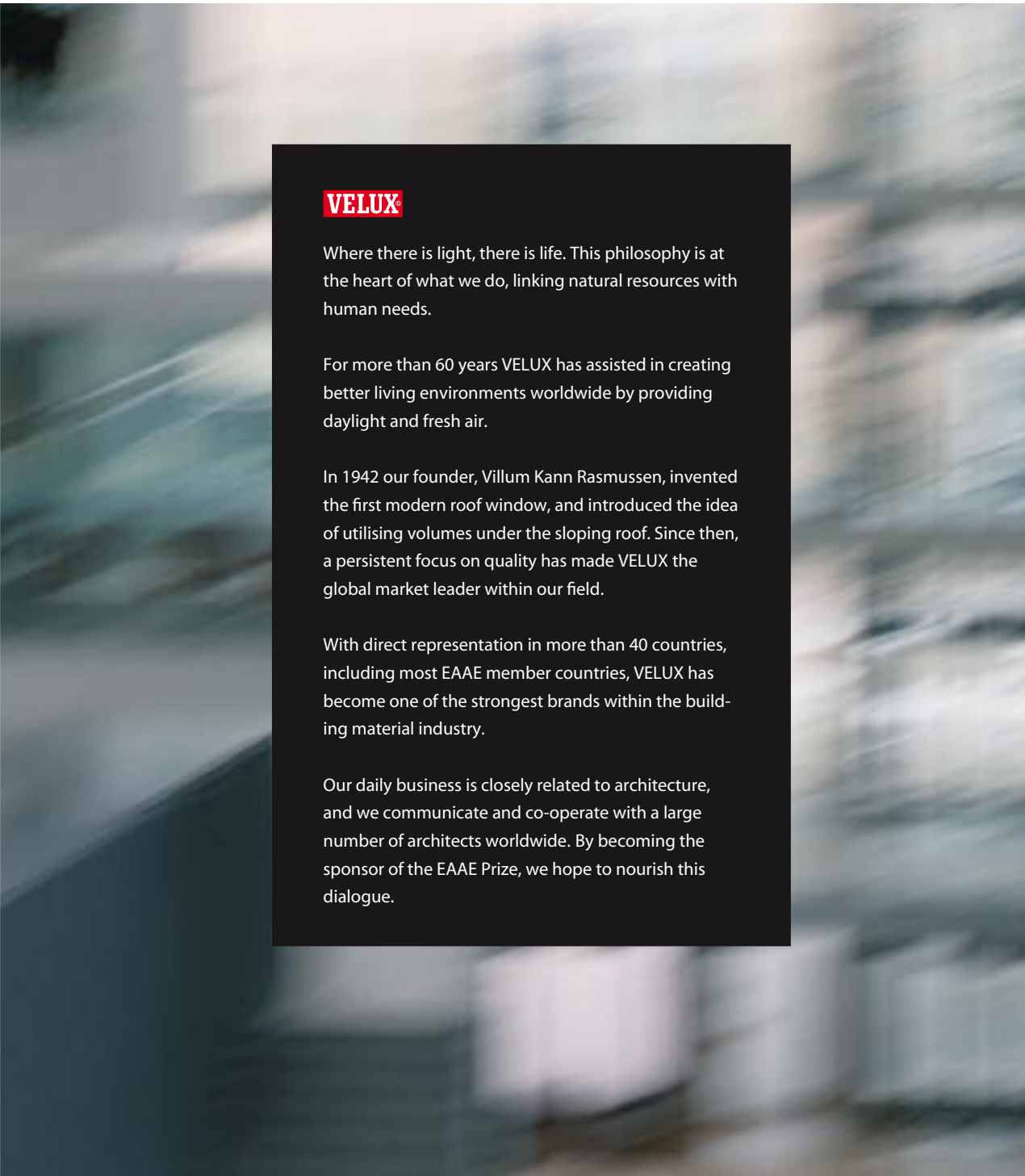

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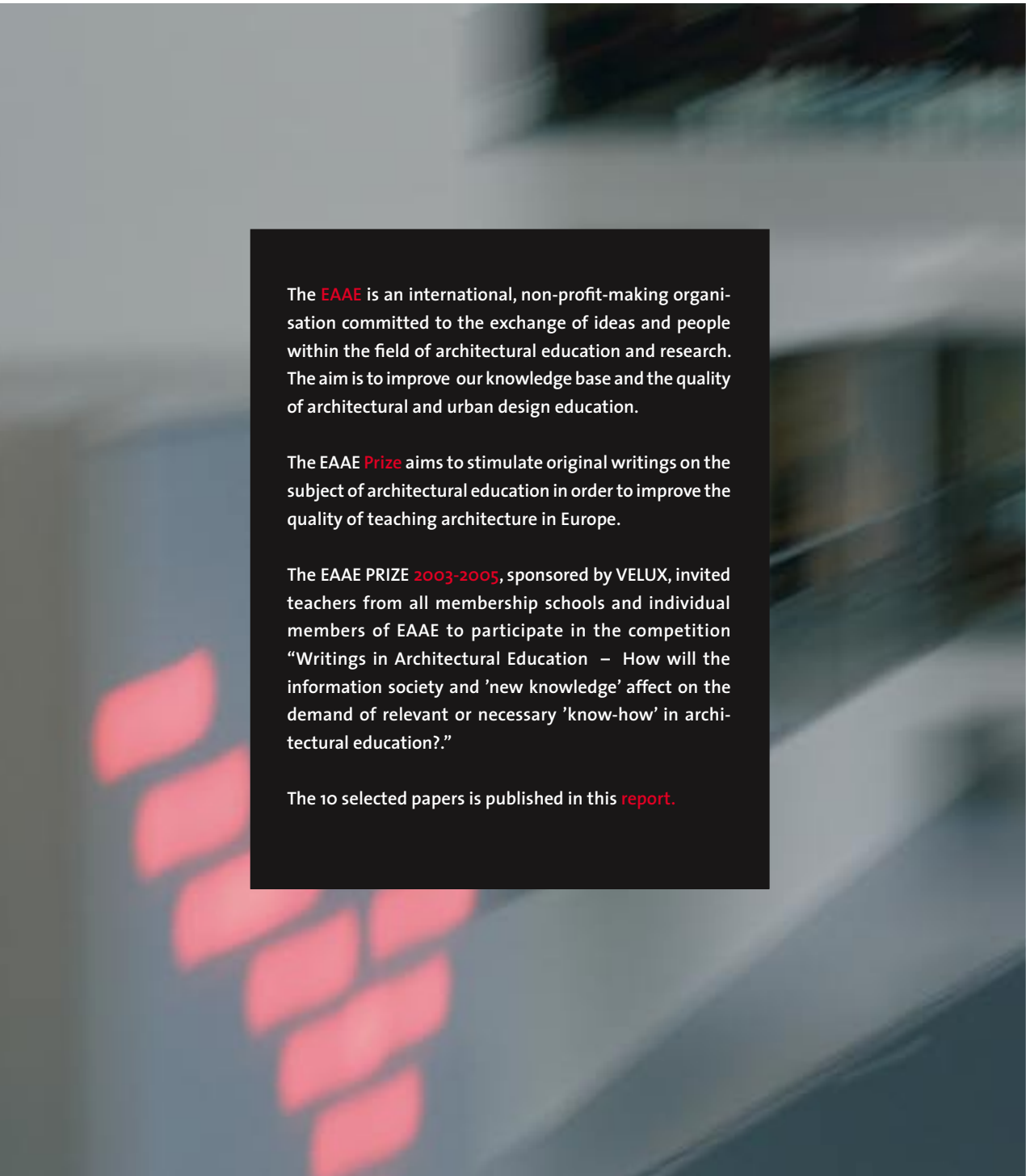

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The 10 selected papers is published in this report.