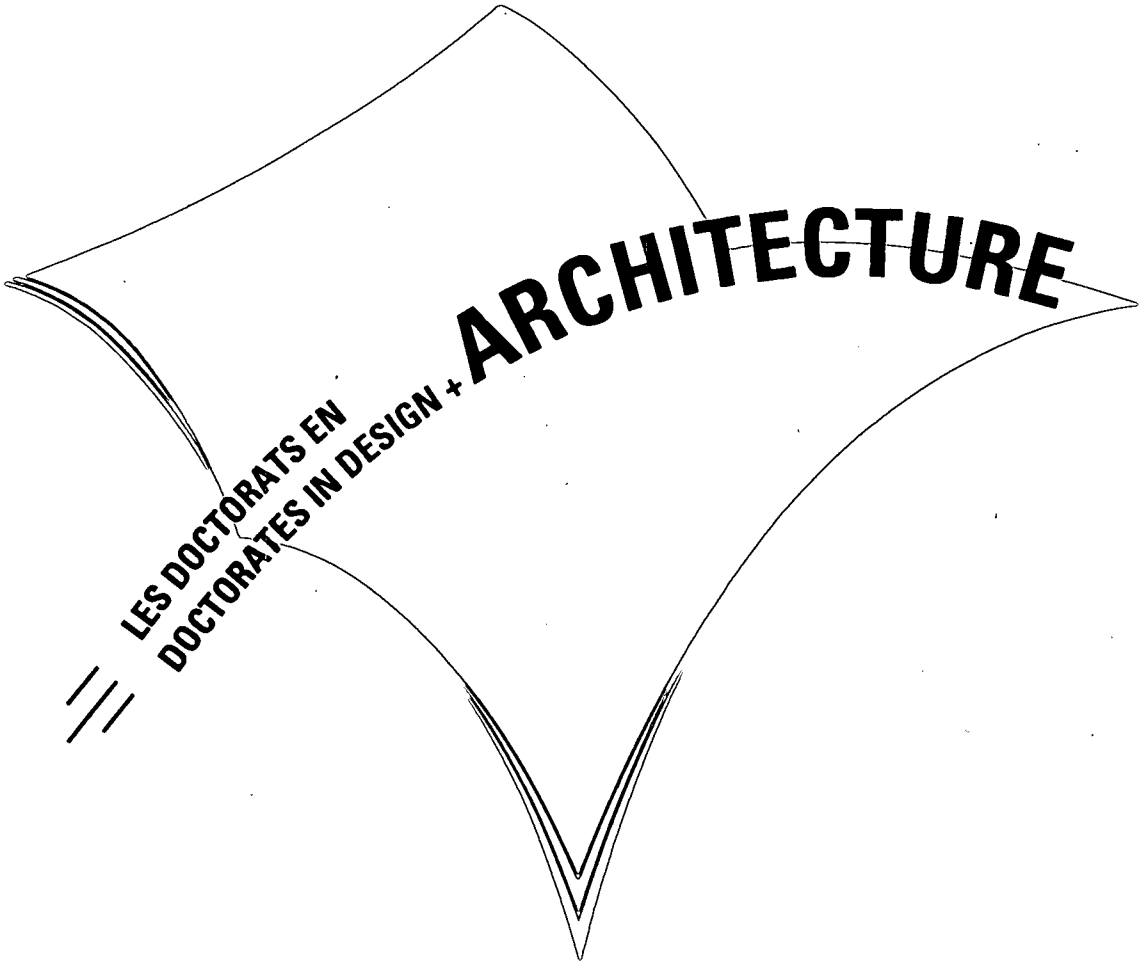

Proceedings Volume 1
State of the Art

Doctorates in Design and Architecture

Proceedings Volume 1

The State of the Art

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The EAAE is an international, non-profitmaking organisation, committed to promoting the exchange of ideas and people within the field of architectural education and research, and to encouraging the development of the subject throughout Europe. The Association respects the pedagogical and administrative approaches of the different schools and countries. It has two official languages: French and English.

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Doctorates in Different Countries: A Comparative Analysis

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Introduction

What are currently the themes being handled in doctorates in design and architecture? What is the impact of doctoral research on the formation of theory, education, building practice, a career as a scientist or lecturer? Is it the architects themselves or is it mostly other disciplines which undertake doctoral research in the area of architectural design? What kind of research methods are used ? And what are the results? These are the main questions dealt with at the EAAE conference on Doctorates in Design and Architecture. That these questions are very much at the centre of attention internationally was reflected in the keen interest shown in the conference: over 150 participants from 23 different countries attended.

In Volume 2 of the Proceedings, a detailed look is taken at the purpose and content of design research, education in research and design, and the place of research in the various phases of the design process. Volume 2 also contains the papers on the structure and (provisional) findings of current or recently completed doctoral research.

Volume 1 of the Proceedings groups together contributions which give an overall view of the current State of the Art in Europe and the United States. The way in which doctoral research in design is organised throughout the universities and faculties in eleven countries is one of the main issues here. Statistics on numbers of doctorates, leading themes, research funding, criteria for selection of candidates, criteria for the acceptance of a piece of work as a doctoral thesis and so on, are all points deserving attention. In this Editorial Preface we have summarised the major findings according to theme.

Table 1: Participants at the EAAE-conference			
The Netherlands	40	Greece	6
Belgium	12	Turkey	3
Germany	3	Austria	1
France	16	Switzerland	4
UK	20	Poland	5
Denmark	9	Czech Republic	6
Norway	2	Russia	1
Sweden	4	USA	9
Finland	3	Canada	1
Italy	5	Taiwan	1
Spain	3	Malta	1
Portugal	2		
		Total: 158	

Themes of Doctorates in Design and Architecture

Themes vary considerably. Theoretical concepts, monographs of interesting architects, spatial solutions for social problems, are recurring themes. There is no clear connection between the country where the doctoral degree is granted and the choice of subject, although certain themes are dominant.

Topics are history of architecture and town planning, architectural theory, town planning and urban design. Architecture and urban issues in third world countries is also a popular theme. Tool-development on the other hand is fairly rare. Compared with the amount of time spent on management problems in a design consultancy, research on the decision making process in design and building has also been given insufficient attention.

Criteria for acceptance of a thesis

Apart from the promoter, in many countries a commission of three to six professors judge the thesis in advance of an oral examination. Although there is a lack of information on this, it appears from many papers that most countries have criteria requiring that the thesis:

- identifies a specific problem or a limited set of interrelated problems in a certain field;
- is the result of original research;
- makes a consistent and original contribution to the field;
- possesses clarity of thought, findings and conclusions;
- is economic in formulation;
- has valid and reliable research methods;
- defines quality observations, analyses, and interpretations (normally backed up by sound statistics);
- provides definition of the value system;
- is based on empirical evidence;
- is verifiable i.e. subject to confirmation or falsification.

Some papers mention additional criteria such as 'addressing the topic in a number of ways' (Heynen), 'embedded in the research programme of the faculty' (Van der Voordt

& Van Wegen), 'degree of utilisation, applicability, ethical acceptance' (ditto), and, with reference to design research, 'a designers way of looking at reality and extensive use of pictorial and graphical presentation' (Neuckermans, Vol. 2).

One point of discussion is how far a design is acceptable as a PhD thesis. Would it be right for example to award a doctorate for the Robie House of Frank Lloyd Wright or la villa Savoye of Le Corbusier? Yeomans observes that if some design activities can be regarded as research, then it ought to be possible to have a PhD in design. He suggests that, for this purpose, the practice of architecture as a craft needs to be distinguished from architecture as an art. According to Yeomans, as well as the Dutch contribution, for a design to be recognised as a PhD it needs to be accompanied by a written analysis with notes on the various steps in the design process. The design must point to a solution for a class of problems and generate new knowledge or show how existing knowledge can be applied to new design variants. Problems may arise when someone is part of a design team and as an individual still wants to do a doctorate on the design involved. Neuckermans also points to the fact that a doctorate has the format of scientific writing. Consequently a poem, a painting, or a masterpiece of music cannot be a PhD, no matter how wonderful they are, no matter how great a contribution they make to architecture. Each of these media may reveal in its own way some aspects of architecture, but they cannot be interchanged. As Neuckermans says: a doctorate is a doctorate is a doctorate.

Organisational issues

Time schedule

In most countries a period of three or four years is the norm for a PhD for a candidate with a full-time appointment. For part-timers, a period of five to six years is usual. In reality, these periods are often greatly exceeded. In the case of an earmarked doctoral position, the appointment is mostly terminated and a doctoral thesis completed in the students' own time, paid for by themselves from their own resources. Often the first year is reserved for a closer orientation on the theme by means of literature research and working out the research structure. Research education is also concentrated in this year.

Selection of candidates

The selection method of candidates for a doctoral position varies from a fairly closed procedure - the promoter puts forward a suitable candidate - to an open applications procedure. In Italy, competitions are regularly organised for this purpose. Candidates are given a research subject and asked to write an essay about it. If they are accepted, they can then choose the doctoral subject themselves. Usually there are many candidates and few positions. Selection is therefore very stringent. The requirements which candidates have to meet vary from country to country but have much in common.

- diploma of a university study (e.g. as a civil engineer/architect);
- prepared to teach and capable of teaching;
- being outstanding in his/her career (sometimes formalised in the demand for an honours degree, or a M.Phil. degree);
- professional experience relevant for the research.

Education in Research
Not all schools of architecture have a PhD-programme. Most schools have traditionally emphasised the value of practice as the main source of professional and pedagogical competence. At times the atmosphere at the school may even be anti-intellectual, making it impossible to get PhD programmes off the ground. Conversely, non-architectural schools sometimes allow for doing a doctorate in design and architecture. In many countries the first year is largely used for schooling in research methods, scientific theory, theoretical concepts, the writing and presentation of a paper, and so on. Design theory and design methods may also be part of the curriculum. A small part of the teaching is specifically linked to the theme of the doctoral thesis. Many universities are still looking for an optimal curriculum.

Supervision
Apart from a fixed supervisor -the promoter- many countries have possibilities for additional supervision (where the doctorate is part of a composite research programme), or one or more practical supervisors (when there are links with industry), Nevertheless, supervision is not always adequate. Some universities try to resolve this problem by working with others, locally and abroad. Another solution is the development of a structure providing for the monitoring and support of postgraduate students. In the UK and the Netherlands this structure is built around a "learning agreement" between student and tutor.

Funding
Funds come partly from the universities themselves and partly from grants from public or private organisations. Examples are the National Fund for Scientific Research and the Collective Fund for Fundamental Research in Belgium, the Economic and Social Research Council and the Engineering and Physical Sciences Research Council in the UK, the Studienstiftung des Deutsches Volkes in Germany, and the Swedish Council for Building Research in Sweden. Studies taking a designers view often fall between Councils and these may need to get funding from other sources. In Italy, the doctoral schools are financed by the Ministry of Scientific Research and Education. Part-time studies are often funded from the postgraduate's company and by the students themselves.
Because there is practically no tradition in doctorate design, when it comes to raising funds, difficulties arise in having to compete with other disciplines for grants. The often highly qualitative nature of design research and the use of case studies also makes it difficult to get funding (see Swanson's paper in Volume 2).

Impact of PhDs
According to various authors, PhD programmes are extremely important for making the profession into a real discipline. Knowledge, theories, methods, all these essential elements for a good professional approach require in-depth research. Not only that; knowledge is power. If architecture is to stand its ground and not be pushed aside by peripheral disciplines, it will need to have its own body of knowledge.

The contribution of research to education is not without its problems. Architecture is often taught as intuition and experience-based and less as knowledge-based. In most courses the accent is on professional training (practical skills, learning by doing, knowledge and action) and on research findings and the formation of theory are given too little attention. Research and education are relatively autonomous and are conducted by different people with different interests, skills and motivation. According to Lundequist, the distinction between the theorist and the practitioner has been made too much of. This has led to fundamental opposition between the kind of knowledge that is offered to the students in the field of research, and the kind demanded in their future professional practice. With reference to the philosophers Peter Winch and Donald Schön, Lundequist pleads for a new concept of architectural research. Its goal should be to clarify the fundamental concepts of architecture in order to articulate architectural practice, i.e. the rules which governs man's behaviour in situations where architecture is of significance. This requires a new concept of the social sciences that aims to clarify the concepts people use when they think and communicate. This could help architects in identifying, clarifying, and adapting the client's problems and improve their ability to manage conflicts on values.

The impact of research on design is also dealt with by Duffy. Using an autobiographical approach, Duffy describes how design commissions inside his own practice generate new research requests and new research findings, mostly for office buildings, which are integrated into the design process. According to Duffy, research in the universities is too far removed from professional practice. Research and design should be more interactive and take place within a single organisation or bureau and be more practical.

The value of a PhD for the candidates themselves varies from country to country. In Belgium and many Mediterranean countries, a doctorate is a sine qua non for an academic career. In many countries it is at least an added attraction. This, moreover, means that excellent architects, prepared and capable of transferring their knowledge and insights to others, are threatened with exclusion. Take, for example, someone like Le Corbusier! In professional practice, a doctoral degree is much less of an asset for a successful career. The time when a PhD was more of a hindrance than a help - because bureaus distrust those who avoided 'getting their hands dirty' through experience - is now a thing of the past. To make it more attractive for architects to obtain a doctorate, Milne makes a plea for a National Academy of Architectural Science. The objective is not to duplicate existing PhD programs, which are academic and research-oriented, but instead to create a new kind of professional degree for architects, similar to the M.D. and J.D. degrees in medicine and law. The long term goal of Milne's proposal is to create a growing cohort of architects whose technical expertise and integrated design skills will raise the level of architectural services.

Statistics

Some countries have practically no tradition in doctorates in design and architecture. In other countries, the process has been going on for a long number of years. This, of course, is of considerable influence on how many candidates complete their thesis. Other factors are the size of the country and the funds available. Distinctions made in the kinds of doctorates also plays a part. Up to quite recently for example, Belgium had

three different types of doctorates in architecture, depending upon the underlying basic diploma of the candidate. University trained engineers could obtain a PhD in applied sciences, or architecture. Architects could either obtain a PhD in architectural sciences, or in urbanisation and planning. Until recently, the British doctorate in design and architecture has been the conventional Doctor of Philosophy (PhD or D.Phil.). Under pressures from industry and government, a new British doctoral programme has been developed, which is industry based and known as a Doctor of Engineering or an Eng.D. The United States has doctorates in liberal arts and doctorates in design. To be able to evaluate the merits of the doctorates in design and architecture that a country produces, each year we need also to look at associated studies. The figures below give an impression.

The Netherlands
The Netherlands has two schools of Architecture with a PhD programme. At the Faculty of Architecture in Delft, 46 doctoral theses were completed between 1991 and 1995, i.e. almost ten doctorates per year.

Belgium
In Flemish universities, the tradition of taking a doctorate as a civil engineer/architect goes back to 1969. The first doctorate in architecture was awarded in 1973. The University of Leuven has produced 35 PhDs in architecture since 1969, only two of which have been obtained by women.

France
Doctorates in design and Architecture do not exist as such. A tradition still has to be developed in this. An alliance between the schools of architecture and the universities is aimed at.

Germany
In the period from 1990 to 1995 a total of 200 doctorates were awarded in 10 Faculties of Architecture. The percentage of female doctorates is 4%. The University of Hannover scored the highest with 41 doctorates in five years .

Sweden
Sweden has three Schools of Architecture: in Stockholm, Gothenburg, and Lund, each linked to a Faculty of Technology. About 50 research students participate in the research education programmes at each school. The annual output in Stockholm is about four to five doctors of technology, and four to five licentiates.

Switzerland
Since the 1920s, about 150 doctorates have been awarded in architecture, 121 of these by the University of Zurich (since 1921) and 39 by the University of Lausanne (since 1974). About 65 doctoral theses are in progress. It is estimated that 50% of the students come from abroad (Italy, Germany, Greece, third world countries). There are only a few women PhD-students.

Italy
The number of theses at the end of the course year 1992-1995 varied from three Doctorates in Architectural Composition at the University of Chiety to 44 Doctorates in Architectural Composition at the Venice University Institute. For seven universities together, 124 doctorates were counted in the fields of Architectural Composition, Questions of Method in Architectural Planning, Technical Innovation and Architectural Design, and Urban Design.

Turkey
Between 1948 and 1956, 24 qualifying theses were awarded at the University of Istanbul. In the period 1961-1996, 212 theses were completed.

USA
Only 18 out of 118 architectural schools have both professional architectural programs and doctoral programmes. The first non-architectural history PhD was awarded in 1956. Between 1974 and 1988, there were 346 doctorates in architecture from architectural PhD-programmes and 140 from non-architectural PhD-programmes (32 per year in total). In 1994, a total of 380 doctoral students were enrolled at 14 universities, 62% male and 38% female; 42% were non-US citizens. The number of students from minority groups is negligible. In 1990-1994 a total of 190 students graduated (an average of 38 students per year, two to three per university). This is rather low in comparison, for instance, with doctoral graduates in the engineering disciplines (70,000 doctoral students during the same period!). In the past few decades, the number of doctorates in design and architecture has been on the increase. A surge in these is sometimes seen in reaction to societal concerns such as the energy crisis in the 1970s.

Concluding remarks
Many countries are struggling with the same questions. What do design and architecture include? Where does architectural research come in? Should we redefine the aims, goals and methods of the research education system? In Volume 1 and 2, many valuable ideas have been put forward, contributing to an answer to these questions. More clarity now exists on the kind of criteria that doctorates in design and architecture should meet, particularly as regards obtaining a doctorate on a design. Practically nowhere does research have an impact on education and practice. Linking the research more directly to practice in the design process, and to the questions this raises, could help improve the situation. The number of doctorates awarded per country varies from one or two to a few dozens a year. Apart from the size of the country, this has particularly to do with whether or not there is an already established tradition in design research. In the past few years, a clear increase in this has been seen across the board.

Jan Heeling, sub dean of the Faculty of Architecture (left) and Francis Duffy, keynote speaker (right)

The Value of a Doctorate in Architectural Practice

Francis Duffy

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A Direct Question

For a prestigious keynote speech at the opening of what is undoubtedly a most important conference, I must confess that the question I was asked to address was put in a characteristically Dutch way – direct, personal and sceptical. "What **is** the value of a Doctorate in Architectural practice?", is what I heard.

I shall try as honestly as I can to explain how my Doctorate has influenced my career. Unfortunately this will give a highly autobiographical tone to this paper since. Because of the scarcity of PhD's in my architectural generation I am forced to draw on my own experience as a very particular kind of architect, on the history of the highly specialised practice that I helped to establish, DEGW, and finally on what I learned during my never to be repeated excursion into professional politics as President of the RIBA.

However, despite this personal colouring, the real objective of this talk is to explore what Doctorates in architecture symbolise for all architects : the growth of knowledge based architectural practice in an increasingly knowledge based society. To do this has tempted me– unfortunately without the full intellectual equipment that the problem deserves – to attempt to establish what is characteristic and special about architectural knowledge. I have to do this to demonstrate the damage that is done by treating architectural knowledge, and hence architectural doctorates, as if they must follow the same rules as other disciplines.

The Doctorate in My Own Career

How has my Doctorate influenced my career? What I am going to describe is certainly not intended as a model. What my career does illustrate very well, however, is how very different architectural thinking really is.

I was trained at the AA School in London between 1959 and 1964. There was absolutely no question within that fiercely independent, highly competitive and paradoxically elitist school about the primacy of architecture and the necessity of excellence within architecture. It is also true that in the AA of the time, once the primacy of architecture was acknowledge, a consequential balance of interests was recognised between design, user requirements, and the professional structures necessary to deliver design to the users. Despite the formidable intellectuals teaching at the AA School at that time – the Smithsons, Ken Frampton, Alan Colquhoun, Cedric Price, Roy Landau, Robert Maxwell – the chief medium of discourse was the design project. Design was what we lived for. Design took up practically all our time.

When between 1967 and 1970 I enjoyed the luxury of graduate education in architecture in the totally different intellectual environments of Berkeley (Alexander, Rittel, Ehrenkrantz) and Princeton (Graves, Vidler, Gwathmey, Eisenman, Frampton, Gutman), I realise with hindsight that, despite the tremendous stimulus of access to other disciplines, I behaved in relation to these disciplines precisely as I had done in relation to external intellectual stimuli at the AA. Life became a series of more or less protracted raids on Industrial Engineering, Psychology, Sociology, Anthropology etc. to pillage ruthlessly whatever seemed most likely to throw light on the one thing I was really interested in – the advancement of my understanding of architecture.

What gave me the confidence, perhaps misguided, to raid these other disciplines was the underlying belief, drummed into me at the AA, in my own architectural skill. Access to other disciplines was far from being the displacement activity which sometimes turns promising but less confident architects, seduced by the attractions of other disciplines, into second rate historians, second rate sociologists.

What gave pattern and order to my raids on other disciplines was my growing commitment to a single research topic : the relation between the demands of office users and the physical characteristics of office layouts. This obsession grew into the research design for my PhD – the testing of a classical sociological model of organisational types in relation to a model of variation in office design.

My Princeton dissertation still seems to me, at least, to be an elegant piece of work. What it demonstrates is that sociological ideas and techniques can be used to explain architectural phenomena. It taught me the difference between two very different forms of ratiocination : the cool, analytical, descriptive method of the social scientists and the hotter, open ended, prescriptive mode of thinking of architects.

Above all my PhD taught me the craft of research which is, or course, quite as demanding in its own way as the craft of architecture that I learned in the studios of the AA.

In order to earn my living in my final years at Princeton I had to learn yet another craft – survival amid the jungle of New York space planning and interior design and in the even more exotic and extensive rain forests of corporate real estate and corporate politics. I became a part time consultant to JFN Associates, one of the brightest and most inventive of the New York space planning firms that had exploded to fill the rapidly expanding opportunities created by the huge increase in the Sixties in office work. Hacks, Philip Johnson called such sub-architectural enterprises. I found space planning a great stimulus, totally different from my academic interests in Princeton. What mattered was the user; data and politics were mixed; always the aim was to get something done. Research was valued but it was research in the context of practice, very goal orientated and quite different to what Princeton intellectuals understood by research. Such user research was also very different to the top down, utopian, centralist work in such sectors as Housing and Education that was the best that the UK could produce at that time.

My doctorate was very important to me and remains so. I hope I have described, firstly, how my PhD was only one element in a much wider educational process and, secondly, how much the substantial benefits I derived from my doctorate depended upon my design training which encouraged me to understand how design variables can be systematically related to user priorities and to user objectives.

The Doctorate in the Context of Practice

A research training, conventionally understood, is the preparation for an academic career. If someone today asks me whether Practice or the University provides a better environment for conducting architectural research, I should not have the slightest hesitation in saying, "Practice". Practice besides giving access to real questions, the real data, is an excellent vantage point for exploring how design imagination opens up future possibilities.

In my case the attractions of an academic career were outweighed by the risks and pleasures of architectural practice. DEGW grew out of the London branch of JFN Associates that I was invited to found in 1971. DEGW never was a conventional architectural practice. From the very beginning our destiny was bi-modal : we have always been a design practice, shaping buildings and interiors; we have always been a consultancy, advising clients on design strategy and preparing the research that is the essential basis of such advice. To continue design and consultancy in one practice is tremendously difficult – by no means the most obvious or easiest path to success. Totally different patterns of people are necessary in each; totally different kinds of remuneration result; totally different time scales, levels of uncertainty, dimensions of risk are involved.

However, the benefits to DEGW of operating in this dual way have also been enormous. DEGW's consultancy, in matters to do with user requirements, has been constantly tested by the designer's responsibility to hammer research conclusions into hard design decisions. Insights are not enough; physical consequences are all too visible. Equally DEGW's design has been constantly checked by its relevance to the user based discourse that our consultancy work stimulates. Nothing DEGW does in design should be remote from the advice we give our clients nor from the research that the advice is based on. Nothing we do in consultancy should be divorced from the physical consequences of such investigations. Such are the stringent criteria that hold DEGW's design and DEGW's consultancy together.

DEGW's research tradition began very early. One of our first consultancy and research projects was for the British Government, into space standards for Civil Service offices, an exercise stimulated by my Princeton research. The first design project we carried out was for an advertising agency which wanted to use design to stimulate organisational change. From the very beginning DEGW's consultancy and design were linked together.

DEGW were also beneficiaries, from the very beginning of our specialised practice, of the outstanding tradition in Britain in the 1960s and 1970s of technical journalism which, at that time, was far superior to anything available anywhere else in the world.

Our first book, *Planning Office Space*, was serialised in the *Architects Journal*. Such journalistic pressure did us no harm at all. Slightly later *Industrial Rehabilitation* appeared, produced in exactly the same strenuous monthly way, extending our range of enquiry from the world of work, into the economics and the sociology of the regeneration of the fabric of the inner city.

In the very early 1980s we discovered another way of financing architectural research in practice – the multi-client study. This is a powerful means of directing the research endeavour not just in terms of what architects think they want to know but in response to the emerging and increasingly urgent demands of clients willing to pay to learn how accommodate the one phenomenon they all have to recognise, change, stimulated increasingly by Information Technology.

ORBIT was the first of these multi-client experiences in DEGW. We learned a lot from the electronics industry, from Butler Cox and from EOSYS, about how to present the case for research funding to those who needed the findings most.

ORBIT 1, carried out in the UK in 1981-2, and ORBIT 2, carried out in North America in 1985, were DEGW's first two multi-client research successes. Inevitably our research, based upon corporate users requirements, attracted the increasingly intelligent interest of developers such as Olympia & York, Rosehaugh & Stanhope – in that somewhat overheated, highly competitive, wonderfully stimulating developmental climate of London in the late Eighties.
DEGW responded well. As well as producing award winning designs (for Lloyds Bank, for Lloyd's of London, for British Nuclear fuels) we were able, through direct user research, to lay down the criteria not only for the new generations of office buildings which made it possible for the City of London to compete successfully with Frankfurt and Paris, as well as New York, Tokyo and Los Angeles for the accommodation of global financial services organisations.

DEGW's entirely non-academic research from the early 1980s produced *ORBIT 1 & ORBIT 2, Eleven Contemporary Office Buildings, The Changing City, The Responsible Workplace, The Intelligent Building in Europe, The NEW Study* (New Environments for Working), *The Intelligent Building in South East Asia*, as well as numerous client sponsored studies of what users want from office buildings.

When I look back on this body of work, so sharply and practically directed towards the contemporary issues of the impact of Information Technology upon Office Design, I find it difficult to locate many comparable endeavours by any organisation, academic or commercial, North American or European.

Occasionally DEGW's research programme has attracted criticism. Surely people say this body of research could have been made more public earlier. We have been accused of allowing commercial values to suppress important findings. Given DEGW's narrow fields of interest, nothing could be further from the truth. Our record of publication is excellent.

The Special Characteristics of Practice Based Research

The kind of architectural research I value most fits uncomfortably with academic models of what research ought to be.

DEGW's research and consultancy work is very user orientated and very physical. It is characterised by the restlessness, the untidiness, even the instability, that stems from straddling the dynamic interface between Demand, ie what users say they want, and Supply, ie what kinds of buildings architects (and engineers and others) like to construct. This restlessness is deeply connected with time because both clients and architects are always scanning the horizon, trend spotting, attempting to anticipate what is likely to happen next. Openendedness and incompleteness go hand in hand. The issues we address are inherently value laden. We need longitudinal data, collected over long periods of time, which is expensive to assemble, hard to control. Our willingness to cross interdisciplinary and international boundaries, to deal with the relationship between people and buildings on as many broad fronts as possible only serves to make matters more complicated.

A holistic, openended search for connections needs discipline. Discipline comes from DEGW's methodological bias : our emphasis on the comparative method to pinpoint relationships between buildings and organisations; our love of typologies to introduce order into complex organisational and architectural phenomena; our fascination with the generic; our insistence upon the importance of deriving practical techniques (such as Building Appraisal) for the measurement of how effectively and efficiently clients use buildings over time.

We know the systematic collection of data is vital and that our future both as a consultancy and a design practice depends upon our skill in accumulating and marshalling such data. Meanwhile in practice so much data passes through our hands, slips through our fingers, every day that we are hardly aware how rich and yet how prolifically wasteful we really are with such data.

This sketch of our experience of applied consultancy reveals how very different DEGW's intellectual tradition is from research in other more academic disciplines, influenced by the rigours of the natural sciences, whose exclusion of variables, control of the context, emphasis on minute and highly quantifiable testing of hypotheses, makes our world seem chaotic, even Rabelaisian, by contrast.

There are, of course, real, potential defects in the DEGW approach. Are we always careful enough? Why is there never enough time? Do we need another level of cooler, more distant intellectual scrutiny? Are we parochial because of our high degree of specialisation? Are we too subject to client influence, even in multi-client studies where we can set the research agenda? Is it possible that some of our results are distorted by short term, user influence? We are certainly entirely dependant upon our clients' money – which can be volatile – and in our worst moments we wonder whether our ambitious programme is sustainable.

The Doctorate in the Context of the Profession

I am now in a position from which I can address the hardest of the three issues I wanted to raise. I have talked about my own experience of a doctorate in practice. I have tried to explain how my research experience led me to devise a particular form of practice which combines both research and design. I am aware of the very different research modes appropriate in architectural practice compared to the universities. Now I want to examine the possible contribution to the development of architectural knowledge of yet another, potentially even more powerful, intellectual device : the professional institute, that strange, cooperative, 19th Century invention based on the voluntary sharing of knowledge among practitioners.

The RIBA, the Institute of which I was President for two years (1993-5), has played a leading part in the development of architectural education since its foundation in 1834. Many of the ways in which architecture is taught internationally have been deeply influenced by the RIBA. What I want to argue is that the RIBA, and other similar architects' Institutes, could have at least as important a role to play in the development of more powerful ways of accumulating and disseminating architectural knowledge, appropriate for the increasingly knowledge based society of the late Twentieth Century. However, to do this means reforming the Institutes, the Schools of Architecture, and, last but not least, the conduct of practice. In other words we have to redesign professionalism.

What I found when I became President was that many of my colleagues were more interested in boundary maintenance, ie in protecting architects' interests, than in expanding the role and the influence of architects. Should architects redefine their role in modern society then the leverage of the proper application of architectural imagination to the solution of contemporary social and economic problems could be terrific. Knowledge is power. It is the architect's duty as well as opportunity to exercise imaginative power to help people make the best use of their physical surrounding's, now and into the future.

It was this task of the reinvention of the role of the architect in changing society that I attempted as President of the RIBA through the medium of *The Strategic Study*, our attempt to redirect the future of the profession.

The first two phases of the RIBA's four year study of architectural practice in the UK, the *Strategic Study,* were full of harsh lessons for architects. The first phase (1991-2) was designed as a *tour d'horizon* of contemporary practice and turned out to be a severe critique of certain unintended consequences of the managerial revolution in architectural practice that stemmed from the RIBA's quaintly titled but seminal 1962 study, *The Architect and His Office.* Models of good practice which had been established with great effort and good will in the UK in the Sixties turned out to have been subverted in the totally different conditions of the late Eighties and Nineties.

Phase 2 of the RIBA Strategic Study (1993) concentrated on discovering what the best contemporary clients think about architects and also on discovering the secrets which had made it possible for certain architectural practices to succeed even during the re-

cession. From our studies of what clients think of architects the RIBA has learned that clients really do like and value design ideas but that they dislike very much the ways in which architects tend to deliver what they have designed. This is partly because clients find it difficult to disassociate the architect's contribution from that of the rest of the construction industry and partly because architects, by the inherently enthusiastic nature of our calling, often succeed in raising clients' expectations without really having the power or the managerial control to provide all that we have appeared to promise. Worst of all, in the RIBA's detailed studies of the performance of the most "successful" architectural practices, we found that the cleverest, the most able architects still do not feel impelled to relate their design skill to what design achieves for their clients.

Such are the findings, which some architects found so depressing, of the first two phases of the RIBA *Strategic Study*. Instead of being depressed, we drew the obvious practical conclusion and made very sure that the third phase of our work (1994-5) would be marked by building on our collective strengths, by being willing to rethink together what it is that architects should be trying to achieve in modern society. This was done with the optimism characteristic of that great gift that comes from our long architectural training – the belief that, given a problem clearly stated, we architects can somehow design a way to solve it.

Operationalising Architectural Knowledge

A profession, and all the status and public esteem that traditionally go with it, cannot be defended in terms of preserving the *status quo* and even less in terms of protectionism, boundary maintenance, or self elected exclusivity. The architectural profession, in particular, can only justify itself in terms which relate to the unique nature of architectural knowledge, that is to using building design to anticipate the unfolding demands of users, clients, society for the buildings that they need to house themselves and all their activities in the most effective, beautiful and sustainable way.

To make this argument fully operational in the competitive and consumerist environment of today it is absolutely necessary for architects to *redefine architectural knowledge* in a way which commands public respect. Our title, our mode of remuneration, our ways of working, our relations with clients, our position in the construction industry, our educational programme all depend upon this.

Architectural knowledge relates what we know about design to what we know about users; it is inherently interdisciplinary, touching many disciplines but absorbed by none; it is solution based, demanding answers; it is about what ought to be not just about what is, it is, therefore, fundamentally about ethics, inherently openended and future seeking, not easily boxed in. Architectural knowledge is subversive, always questioning the *status quo.*

The third part of the *Strategic Study* (1994-95) consisted of setting up an ongoing series of client architect workshops – organised on a sectoral basis, Housing, Universities, Health Buildings etc – designed to explore what kinds of buildings, what stock of space, would best match clients' unfolding requirements and changing priorities in the first decade of the Twenty First Century. Such a collective, exploratory research pro-

gramme, organised on a voluntary basis, uses DEGW research methodology to bring up to date of the best and most lasting aspects of Nineteenth Century professionalism.

I am delighted to say that these workshops, once the architects learned to listen, have become a success and are rapidly becoming established as an ongoing basis with results being published and disseminated throughout the RIBA's membership through the Institute's Journal, through our programme of compulsory Continuing Professional Development (CPD), and through improvements in the curriculum of the Architectural Schools. Both workshops and dissemination, of course, will benefit enormously from Information Technology, which will make the creation and the sharing of precious professional knowledge so much easier.

Conclusions

The RIBA, DEGW's, and my own experiences have been recounted at some length to emphasise that architectural knowledge, systematically gathered and organised, is of enormous practical importance to architects and clients. However, architectural knowledge is a very special commodity indeed which, like architectural education itself, does not necessarily flourish well in a conventional academic environment I am terrified of an alien mode of transmitting knowledge being forced onto architects and thus denying architectural values. My fears extend to the acceptance, in an unqualified way of the format of the Doctorate, as a routine part of architectural education.

My point can be illustrated by a presentation, three years ago, at the Conference of the Heads of the British Schools of Architecture on the subject of architectural research. The speaker explained the current British academic funding system and offered advice on how to present proposals through various funding agencies. What was obvious to me was that such well crafted applications might well attract research funding but that the work funded would not, could not, address successfully any serious architectural problem because the very terms of the funding, specifically excluded the openended, interdisciplinary, deontic nature of architectural knowledge.

What is the value of a Doctorate in Architectural Practice? The question is poorly framed, introduces a *deus ex machina*, assumes a solution before expressing the problem. Are doctorates relevant to architecture? My answer is only a qualified yes. My own experience has been positive but my research training would be sterile without my wider design ambitions. The wrong sort of doctoral programme could subvert rather than release talent.

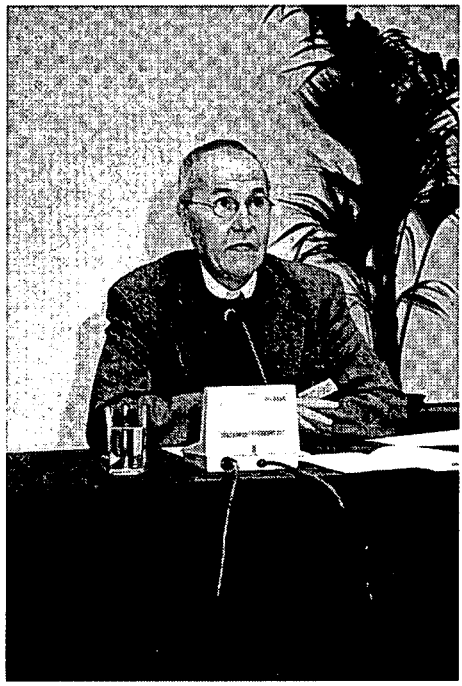
Are conventional Academic frameworks antithetical to the development of architectural knowledge? I warn you that, in my opinion, they almost certainly are because they assume forms of knowledge which are very different to the way architects should be trained to think.

What are the best conditions for the development of architectural knowledge? Both Practice and the Universities must be involved. Also reformed professional Institutes must have a vital role in managing developing and disseminating architectural knowledge. We need partnerships of a most unusual and innovative kind.

Am I optimistic about the potential for the future development of architectural knowledge? I am positive under the condition that architects remain true to their own intellectual tradition.

Architects are responsible for our own collective intellectual destiny. The wrong kind of doctoral programmes could mean the destruction of architectural talent. Such programmes could lead to gross distortion and waste of resources within architectural schools. On the other hand we have it in our power to invent better forms of doctorate, better programmes, designed to respect the particular nature of architectural knowledge. We architects need to invent our own models, our own future, in our own way.

I very much hope this conference will be able to address these great issues and to make some progress at what I know is a critical moment.



Alexander Tzonis (left) and Dirk Frieling (right), chairs of the plenary sessions

Doctorates in Design and Architecture in The Netherlands

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Graduate studies in Architecture

In the Netherlands, doctoral studies in architecture centre on two Universities: The Delft University of Technology and the Technical University of Eindhoven. In both schools the study of architecture involves a course of five years. Each school has an extensive research programme and an educational programme, spread over different departments. The teaching and research programmes of both faculties focus on building and the urban environment, emphasising the integration of design, research and technology. Because the doctorate programmes are approximately organised on the same lines we shall restrict ourselves to the Faculty of Architecture at Delft University of Technology.

In Delft the first two years make up the compulsory basic programme of the course with three years for specialisation in one of de following subjects:

- Architecture;
- Building Technology;
- Real Estate & Project Management;
- Urbanisation;
- Housing.

Characteristic of the study of Architecture is its wide scope and the large number of main subjects. The research carried out by the faculty covers the entire field of planning, building and management. Within these, three sections can be distinguished:

- Building engineering research
  The main subjects of building research are construction engineering design, product development, the 'skin' of the building, building management and information technology. Within this field, research is also done on renovation, restoration and re-use.
- Design research
  Design research focuses on the objectives and methods of architectural design at the architectural and urban development level. The stress is on functional and conceptual design research as well as research into the design process and design strategies. The application of Information
  Technology and Computer Aided Design in the design process are major subjects here.
- Urban and public housing research
  Central to this field are the programming and realignment of urban space, buildings and infrastructure. Urban restructuring and urban renewal, market develop-

ment and public housing policy, housing stock distribution and management, are the major themes here.

Postgraduate courses

Up until a few years ago, it was quite rare for someone to obtain a doctorate in building engineering in the Netherlands. Interest in this subject, however, has been growing in the last few years thanks particularly to the creation of a special post for this purpose, the four year AIO ('assistant in training'). Since 1986, it has been as an AIO possible to do a four year post graduate research training culminating in a promotion. Candidates can obtain their doctorate on the basis of a method with practical applications, a technical product or technical system, or on the basis of theoretical, fundamental or strategic scientific research. Candidates are appointed as four year AIOs in training to a subject with the aim of obtaining the title of doctor under the guidance of a promoter. Following a selection procedure, postgraduates (AIOs) participate in the faculty research programme.

Traditional Doctorates still exist and can be done in isolation from the university's research programme, and are conducted in personal consultation between the PhD student and the supervisor.

Themes

Between 1991 and 1995, 46 doctoral theses were completed. Of these, nine were AIOs. The doctorates were distributed over the six major themes as follows:

- Housing 14
- History 10
- CAD/CAM 6
- Urban Design 6
- Building Technology 5
- Architecture 4
- Unclassified 1

Housing heads the list with 14 doctorates, followed by History. Doctorates obtained on the theme of Housing were on subjects such as "Self-Help in the Social Rented Sector in the Netherlands" and "Technical Management in the Private Housing Sector". Examples of historically-oriented theses are "The Faubourg as the Medieval Antecendent to the Squatter" and "Historical Analysis of Willemstad, Curaçao". The number of doctorates on the theme of CAD/CAM has been on the rise in recent years. This, among other things, has resulted in a doctorate "On the Conceptual Feasibility of a CAAD/CAAI Integrated Decision Support System" and "A Framework for Comparing and Controlling Number-Based Design Reasoning Systems". Examples of doctoral theses on themes like 'Architecture' or 'Urban Design' are respectively "The Structure of Architectural Theory: a Study of Some Writings by Gottfried Semper, John Ruskin and Christopher Alexander" and " The Urban Mosaic. A Translation of Preferences of Urban Population Groups into Spatial Environments."

Organisational issues

Yield from the current doctoral research is on the low side. Of a total of 24 AIO candidates in the period 1987-1992, only two completed their doctorates. Of the rest, seven

failed to complete it. Many of the rest exceeded the stipulated period of four years. The major reasons given for this were:

- choice of another job
- insufficient research experience, quality, or affinity with the research
- insufficient guidance and/or lack of clarity about the promotership
- inadequate training programme
- thesis not suitable for a doctorate

Application

To arrive at a better doctoral policy, the Faculty of Architecture introduced the following procedure:

- Promoter and candidate jointly submit an application form to the Sitting Committee for Scientific Application.
- This committee evaluates the application and reports its findings to the promoter, the candidate and the faculty heads. It can make its recommendation in three different ways:
  1. negative: the application is turned down:
  2. positive, but with reservations, or the application is put on hold;
  3. positive, and accepted if possible.
- Depending on the recommendation made and the funds available, the application is accepted or rejected; at the same time an attempt is made to achieve a balanced spread of candidates over the different subject areas.

Selection criteria

Each proposal is to be submitted by the supervisors to the Scientific Committee and judged on the following criteria:

- fits into the faculty programme
- innovation: how far the proposed project contributes in an innovatory way to current research
- relevance: contributes to the clarification of major theoretical and methodological questions
- utilisation: how actual the problem is and how far it can be applied to problem solving: how far the project can be concretely applied both in research as well as in practice
- clear statement of the problem and the methodology
- suitability of the candidate
- supervision (qualities of the research group, expertise, other candidates, facilities).

The criteria which weigh most heavily are innovation and applicability.

Supervision

Supervision is an essential part of the process. Inadequate supervision can lead to the candidate failing to complete the doctorate within the set period of four years and may adversely affect the quality of the doctorate. It is essential therefore that several people supervise the candidate. Basically the promoter is responsible for supervision. Also part of the process is a semi-annual progress evaluation talk. This is important particularly in the first year, since any problems arising can be detected at an early stage and cleared up. Apart from the promoter, the candidate also has to give the name of a men-

tor who can be of help with the content and organisation of the study when the promoter is absent.

Progress control
All four-year AIOs are given a one year contract with the possibility of extension subject to progress and successful completion within the four year period. Seven to eight months after appointment, the AIO submits an interim report to the Scientific Commission. This report must be accompanied by a written assessment by an external examiner. In addition, the promoter must indicate whether the research is developing in a favourable way and whether the candidate will be able to obtain the doctorate within the stipulated period at the TU Delft. In the second, third and fourth year of the PhD research, the Scientific Commission also evaluates progress in the above way.
Intermediate examinations or assessments and presentations are held. If the research project is completed and accepted by the supervisor, the candidate is judged by a committee of external scientists of different disciplines followed by a written or oral examination.

Funding
The faculty finances its research largely from its own resources.
The research capacity of the faculty covers:
- a fixed number of 45 candidate positions
- a postgraduate PhD capacity of 26 positions

In addition, the faculty participates in research, financed by the Netherlands Organisation for Scientific Research (NWO), or conducts research at the behest of the government, the building industry, building corporations and other public or private institutions.

Research Schools
A new feature in the PhD area is 'Research Schools,' which co-ordinate and structure the organisation of interdisciplinary research between different faculties. The Faculty of Architecture is co-founder of three schools of research:
- the BOUW research school for construction in the building industry (in collaboration with the Faculty of Civil Engineering);
- the NETHUR research school for research in the field of housing and urban development (in collaboration with the State University of Utrecht, the University of Amsterdam, and the University of Technology in Eindhoven);
- the TRAIL research school for research in the field of transportation, infrastructure and logistics (in collaboration with different faculties of the Delft University of Technology and the Erasmus University in Rotterdam).

The faculty of architecture has taken the initiative for a planned fourth research school of Design and Computation, dealing with design research in relation to computer use.
Each research school has its own research programme and training plan. A small team of managers handles the organisation. There is also a consultatory body through which promoters and candidates can keep informed and report on the progress of the research and express their opinion of the training programme.

Design as PhD

In principle, it is possible to do a PhD in design at Delft. In practice, hardly anyone obtains a doctorate on a test-design, certainly in the area of architecture. In part, this has to do with the lack of a research tradition embracing design as a valid form of scientific research. In part, it is also due to the fact that as a category, design is not properly defined in the research output. If design is to be considered a legitimate research activity, some method has to be established for assessing its value.

Recently an assessment committee was set up with the task of elaborating an operational definition of a design and of submitting proposals for the application of a weighting factor dovetailing with the university's financial distribution model. Although it is difficult to arrive at a generally acceptable operational definition of technical design, according to the committee it basically involves: "invented solutions, based on technological, scientific knowledge and methods, for solving real problems of a social or economic nature". This implies on the one hand assessing its technological level, the originality and the efficacity of the solution, and on the other its utility, in the sense of the efficacy of the solution, partly measured on the basis of the urgency and importance of the underlying problem (Dirken, 1995).

Essential criteria are:

- originality/innovatory character
- description of the design (problem, working method, solution utility)
- general scientific requirements such as inter subjectivity, reliability and testability
- ethical acceptability

The description of the design should at least make clear:

- the steps and decisions taken sequentially in the design process
- the consideration given to alternatives
- the generation of solution variants
- a description of the research conducted to acquire new knowledge for the creation of the design, as well as the findings of this research
- final assessment

In the assessment, use is to be made of peer-rating, subject benchmarks and the standard doctoral committee.

Concluding remarks

Since the new assessment and selection procedure has come into effect, the position has been reversed. The number of doctorates being done is on the increase. The number of students opting for a building technology or design technology subject is also on the increase. Especially since research schools have been set up and the university has its own Research School for Design and Computation, the number of doctorates in Design should receive a stimulus in future. The discussion initiated on design as a form of research and the need for a research methodology also appears to be having an inspiring effect.

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Doctorates In Architecture: The Belgian Situation

P.M.J.L. Lombaerde

Prof dr ir arch, Henry van de Velde-instituut, Hoger Instituut voor Architectuurwetenschappen en Produktontwikkeling. Mutsaertstraat 31, 2000 Antwerpen, België

Introduction

First of all, I would like to point out that this paper only refers to the doctorate in architecture or a doctorate in applied sciences, with a specialisation in architecture
The scope of the paper is also restricted to the current situation and not the prior history of the legislation. That subject would justify a study in its own right.

The information available to us was provided by Belgian universities, where doctorates in architecture or in applied sciences with a specialisation in architecture do exist. These are, in the Flemish region:

- Universiteit Gent/University of Ghent (UG);
- Katholieke Universiteit Leuven/Catholic University of Leuven (KUL);
- Vrije Universiteit Brussel/Free University of Brussels (VUB);

and in the French-speaking region:

- Université de Liège/University of Liège (U. Lg.);
- Université Catholique de Louvain/Catholic University of Louvain (UCL).

We did not receive any information from the University of Mons.
A number of colleges of architecture also volunteered to take part in the discussion about a doctorate and research in architecture. These are the:

- Henry Van de Velde Institute, Hogeschool Antwerpen/Antwerp College;
- Institut Supérieur d'Architecture de la Communauté Française "La Cambre"/Higher Architectural Institute of the French-speaking Community;
- Institut Supérieur d'Architecture Saint-Luc de Wallonie. St. Luc Higher Architectural Institute, Wallonia;
- Institut Supérieur d'Architecture St-Luc/St. Luc Higher Architectural Institute, Brussels.

We are most grateful to all these institutions and the heads of department responsible for providing us with the necessary information.

Since the subject is complex and broad, we needed to restrict ourselves to a number of questions:

- what is the specific educational situation of architectural education in Belgium, and what role do doctorates play?
- what possibilities are there of taking a doctorate in architecture?
- what is the relationship between doctorate and research? How is funding arranged?
- how many doctorates have already been awarded in architecture, and what were their specific subjects?
- what are the conditions for admitting an applicant to a doctorate course and how is the doctorate student coached during the preparation of his/her doctorate?

- what advantages are connected with a doctorate in architecture?
- what different views are there of a doctorate in architecture?

The Belgian Situation in Architectural Education: a Brief Outline

There are four items that contribute to the complexity and structure of architectural education and taking a doctorate in architecture in Belgium:

1. *two sorts of architectural training each with their own historical background:*

- on the one hand, there is architectural education at universities (5 year course), that has only been provided in its present form in a limited number of Belgian universities since the 1960s.;
- and on the other hand, there is training to become an architect, which is also of academic level, which is dispensed by the academies and St. Luc colleges. This training is far older, and in the case of the Henry van de Velde Institute in Antwerp, it even dates back to 1663, the date when the Antwerp Academy was founded. The duration of these courses is also five years

2. *differences in the composition of the course programmes:*

there are differences both between architecture training courses at universities and the higher architectural institutes, and between courses at institutions of the same type. Universities train people to become civil engineers/architects, while higher architectural institutes train architects. Although the option of civil engineer/architect was originally very close to that of civil construction engineer, in recent years the training programme for engineer/architect has increasingly been oriented towards architecture itself and towards designing. The latter is the main block of training courses to become an architect at the higher architectural institutes.

3. *differences between the Flemish and French-speaking education systems:*

since the 3rd revision of the constitution in 1988, the Flemish and French-speaking Communities have been responsible for their own community's education. The universities so far have little experience of this, but architectural education is structured differently in the Flemish and French-speaking Communities. From mid-1995, "Hogescholen" or colleges were set up in the Flemish Community, and architectural institutes are now part of them. On the French-speaking side, the architectural institutes have so far managed to maintain their greater autonomy.

4. *doctor of architecture(sciences) versus doctor of applied sciences, with specialisation as a civil engineer/architect:*

there are two possibilities for taking a doctorate in architecture. One option is to take a course as a civil engineer/architect at the Applied Sciences Faculty in a subject connected with architecture or possibly also town planning. Or at some universities (KUL/UCL), it is possible for an architecture graduate to take a doctorate in architecture(sciences). On the Flemish side, this option will cease to exist in 1999: a special programme is being developed so that architects will then be able to take a doctorate in Applied Sciences in a subject related to architecture (see below).

It is also striking how the number of students differs at universities and higher architectural institutes. This is shown in Table 1 for the 1994-95 academic year.

Table 1
Number of architecture students at universities and higher architectural institutes (Flemish and French speaking committies) for the 1994-95 academic year

	universities	*higher architecture institutes*
Flemisch	713	2823
French	345	2510
Total	1058	5333

Five times more candidates study at higher architectural institutes than in universities. The success of the course option engineer/architect also differs sharply between the Flemish and French-speaking universities. The latter only produce half the number of engineers/architects produced at Flemish universities. Virtually the same number of architects are trained at the Flemish and French-speaking architectural institutes, taking account of the differences in population.

Doctorate in Architecture and Doctorate in Applied Sciences with an Option in Architecture

By law, doctorates can only be awarded by universities. The tradition of taking a doctorate as a civil engineer/architect is not that long-standing, either. In Flemish universities, a civil engineer/architect was first awarded a doctorate in 1969, and on the French side only in 1989. As far as the doctorate in architecture or in architectural science is concerned, this was awarded from 1973 at a Flemish university (KUL) and only in 1994 at a French-speaking university (UCL).

There are no doctorates at higher architectural institutions. However, it is true that some assistants or young lecturers are given the opportunity at these higher education establishments to attend a university in Belgium or abroad to obtain a doctorate in architecture. So at present, an assistant lecturer from the Institut Supérieur d'Architecture de la Cambre is currently doing a doctorate at the University of Venice, under the guidance of Giorgio Grassi. On the Flemish side, the 1995 decree on "hogescholen" allows full-time assistant lecturers to devote at least 50% of their time to preparing a doctorate. So far, this important incentive to take a doctorate has not been seriously studied. Due to far-reaching cuts and reorganisation in higher education, the question may even be asked whether an architectural institute can afford to allow its assistant lecturers to lecture only part-time.

As far as the numbers of doctorates are concerned, there are once again major differences between universities and between the Flemish and French-speaking Communities. It should also be pointed out that at some universities doctorates in Town Planning and Land Use are awarded by the Architecture Department and can be considered as a separate specialisation in architecture. The following table gives an overall view of this:

Table 2:
Number of doctorates in applied sciences (architecture option) in architecture and in town planning (as a subset of architecture), obtained at the universities of the Flemish and French-speaking Communities

	Flemish	*French*	*Total*
applied sciences (option eng./arch.)	20	7	27
architecture	11	2	13
town planning	7	not specified	7
total	38	9	47

This data refers to all doctorates awarded so far starting from the introduction of the civil engineer/architect option and the special degree in architectural sciences.

It can be deduced from this statistical data that more than 4 times as many doctorates were awarded by Flemish universities as in the French-speaking Community. The number of doctorates in architectural sciences is very high on the Flemish side, but this number is almost entirely accounted for by doctorates in 3rd world issues awarded at the Postgraduate Centre for Human Settlements (KUL). It was mostly foreign students who obtained their doctorate there.
It should also be pointed out that a number of doctorates are currently in preparation but not included in this table. Some universities are catching up fast. Around the year 2000, no less than 6 new doctorates are anticipated at the U.G., whereas this university has only produced one doctorate in the architectural option so far.

Content of the Doctorates
Table 3 shows a breakdown of doctorates over the various Belgian universities by their specific content. The following major conclusions can be drawn from the table:
- non-technical subjects predominate;
- construction and architectural issues in Third World countries account for the preponderant number of doctorates (10 in all) in this field; the KUL has a particularly high score in this field due to the award of the title of doctor in architectural sciences to candidates coming exclusively from the Third World countries concerned. The question could be asked whether this number of doctorates does not give a distorted picture of the overall situation in Belgium;
- if the above-mentioned doctorates are taken out of the equation, the largest number of subjects are town planning (8) and the history of architecture and town planning (7);
- architecture theory and design theory are spread across 3 of the 4 universities where a doctorate was obtained in an architectural subject;
- at the KUL, a number of doctorates were awarded specifically in building physics. They clearly fit into a well-organised research programme;
- the VUB has doctorates about materials, which are clearly oriented towards tool development;

- a number of specific themes have not been dealt with so far in a doctorate, such as ecology, sociology or psychology of building and living; garden and landscape architecture, study of form and colour in architecture etc.

Table 3:
Themes and content of doctorates in architecture(sciences) and town planning and of doctorates in applied sciences

		KUL	*UCL*	*UG*	*VUB*	*Total*
1	Architecture theory and art theory	3	2	1*	-	6
2	History of architecture and town planning	7	-	-	-	7
3	Monographs about architects/architecture	1	-	-	-	1
4	Town planning	5	3	-	-	8
5	Design theory and design methodology	1	2	1	-	4
6	Building rationalisation and building economics	2	-	-	-	2
7	Building physics	4	-	-	-	4
8	Equipment for buildings and techniques	1	-	-	-	1
9	Architecture and urban issues in the Third World	9	1	-	-	10

* *From the data available, it is not clear whether this doctorate was awarded at the UG or the Technical University of Delft*

Organisational Aspects and Funding

What are the criteria for the selection of candidates and a final product that is worth the award of a doctorate?

Taken overall, the following selection criteria apply to the doctorate in applied sciences, with an architecture option:

- the candidate has a degree as a civil engineer/architect;
- they have been outstanding in their academic career; for a number of universities this requirement is converted into the requirement for having earned a distinction grade during their degree course;
- the subject must be original: at the VUB it is also allowed for the originality of the thesis to be based on scientific research or work of a technical nature. This must be

acknowledge as important by the Faculty and they also relate to subjects that are taught in the engineer/architect option. In this university, the oral defence of an argument is also required. This is an assertion with a clearly original scientific character, in which the doctorate student confirms something positive or negative. This confirms that the candidate has broad scientific knowledge.

At the ULg, the doctorate in applied science is also awarded to non-civil engineers in application of the Royal Decree of 30 September 1964, on the basis of a preparatory trial of 1 year, in which applicants obtain at least a distinction. The candidates must demonstrate their competence in practising science independently. This university has still not awarded any separate doctorates in architectural sciences.

As far as the doctorate in architectural sciences at the UCL and KUL is concerned, the following requirements apply:

UCL:

- the architect must carry out further research/education at the faculty; they must also develop multi-disciplinary research in architecture;
- a preparatory year leads up to the doctorate (the 1 year may be extended to 2 years). During the year, the basic training of the architect is supplemented and his powers of abstraction are developed. A specific standard programme is drawn up for each candidate. At the same time, a thesis is produced, that is designed to develop the competency for synthesis. The subject is the same as that for the doctorate.

KUL:

- the candidate must obtain a distinction during his/her pre-doctorate year;
- the candidate must have relevant professional experience for the research.

The doctorate in architectural sciences is being phased out at the KUL, and will be discontinued in 1999. From then on, architects will obtain a doctorate in the same way as a civil engineer/architect with an architecture option. The KUL stipulates that a doctorate training course is essential. This consists of 1500 hours spread over several years, and of which between 300 and 600 hours involve face-to-face teaching. For the other hours, the candidate can take part in research or tutor theses which relate to the research field of the doctorate. The programme is devised by the promoter together with the candidate and is monitored by a coaching committee. At the UCL, the candidate may be involved in a promoter's research unit, or the work is monitored by a specially-formed coaching committee. At the UG, no compulsory doctorate training course is currently being operated.

There is no concrete data about the duration of the doctorate. However, they last at least two years and a period of 4 or 5 years would be considered normal.

The doctorates are funded in various ways:

- some universities like the UCL do not receive funding from the NFWO (National Fund for Scientific Research) or FKFO (Collective Fund for Fundamental Research); neither is industry involved in subsidising doctorates; at the KUL only one doctorate was funded with an NFWO grant;

- in some universities like the VUB, doctorates are always funded by a grant or a university mandate;
- at the KUL, 8 of the 11 doctorates in architectural sciences are subsidised by an ABOS grant;
- external candidates who meet the necessary selection conditions can obtain a doctorate with no financial subsidy.

It can also be seen that some universities send their qualified engineer/architects to foreign universities to earn their doctorate in the appropriate specialist field. The VUB offers a clear example of this.

As far as combining doctorate and research is concerned, there are significant differences between universities:

- KUL: doctorates subsidised by ABOS mainly involve ongoing research, organised by the Postgraduate Centre for Human Settlements; doctorates may be prepared concurrently with applied or basic research, as in various instances of doctorates in town planning and land use; doctorates can also be prepared in assistant lecturer posts;
- UG: doctorates are only combined with research programmes;
- VUB: here there is a clear linkage;
- UCL: here too, the link is essential and well-organised, as can be seen from the existence of various research working groups: Architecture and Climate, Town Planning and Land Use, Architecture and Developing Countries, Architecture and Design and Architecture Theory.

Advantages of a Doctorate:

As far as the benefit for the candidate's personal career in science or practice, the following remarks can be made:

- there is no overall evaluation yet: the phenomenon of taking a doctorate in architecture is a very recent phenomenon and is still developing fast;
- for a civil engineer/architect, it is a sine qua non condition for having an academic career . So, both the doctors at the UG (of which one obtained a doctorate at the Technical University of Delft) are both senior lecturers at this university. The only doctor from the VUB also embarked on an academic career at that university. At the KUL there is, in a manner of speaking, a profusion of doctorates in relating to the scientific and academic posts to be filled;
- at the higher architectural institutes, there is no requirement to have a doctorate in architecture. A degree in civil engineering is sufficient, or possessing a certificate of professional, scientific or artistic competence (law of 7 July 1980). Starting from the decree of 30 June 1994 at the Hogescholen in the Flemish Community, having a doctorate is also an essential condition for civil engineers to obtain an academic post or appointment;
- for a career in research, obtaining a doctorate in architecture or applied sciences with an architecture option is also required. No civil engineers or architects have been appointed as researchers at the NFWO (National Foundation for Scientific Research); these posts traditionally go to construction engineers;

- as far as the private sector is concerned, we do not have much data; however, a number of doctors at the VUB have been recruited to top positions in large construction companies or consulting engineering companies.

There is no data about the contribution by the content of these doctorates to science and practice. However, most doctors have a well-filled curriculum in teems of scientific lectures and guest lectures at Belgian and foreign universities, they are involved in scientific publications and take part in or run various research activities.

The current Discussion About the Profile of Doctorates in Architecture
In general, it can be stated that universities are devoting increasing attention to rigorous doctorate training courses. However, there is no clear consensus between the universities on this point.

The criteria for selection of candidates are mainly described in general terms. These will have to be specified in greater detail in the context of European harmonisation on doctoral theses.

With regard to the actual profile and content of doctoral theses in architecture, these need to be put on the agenda as a matter of urgency, for the following reasons:
- at universities where doctorates are awarded in architectural sciences, these are being phased out as part of rationalisation of higher education, and being replaced by a doctorate in applied sciences, with an option in architecture. This is a clear shift in the profile of the doctorate towards applied sciences. This trend is diametrically opposite to the new requirements and options currently offered at the higher architectural institutes of the Flemish Community. There, to teach theoretical subjects, holding a doctorate is now an essential requirement, and assistant lecturers are offered the opportunity to devote at least half of their time to the preparation of a doctorate. Due to the more design-oriented nature of architectural institutes, there is a risk that specific themes in architectural training will no longer be available as such for a doctorate in applied sciences. It is not inconceivable that this requirement will be circumvented by reclassifying a number of theoretical subjects as artistic subjects. To be able to teach these subjects, a doctorate is not required, and an artistic knowledge recognised by specially-established committees is sufficient. At that point, there is a risk that a doctorate would no longer be essential for architectural education at colleges;
- actual designing has so far not figured prominently in doctorate courses. However, this is essential for training and research in architecture. In this field, the higher architectural institutes can call on extensive experience but (usually) do not have scientific criteria at their disposal. The problem is not simple, because the combination of artistic and scientific criteria in the field of architecture still needs to be clearly defined. This calls for a broad and intensive discussion.

Doctoral Research in Architectural Sciences at the KULeuven

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Abstract

The Katholieke Universiteit Leuven has delivered some 35 PhD's in the field of architecture since 1969. The doctoral research carried out at this university wins its empirical basis from case studies, which are based either on laboratory experiments or in situ-tests, on the investigation of historical (archival) material, on field work, on the study of the existing literature or on a combination of these things. The case studies are approached by an architectural way of thinking, stressing the importance of rationality and of spatial sensibility. The interpretation of the case study material is often informed by recent developments in specific areas of history and theory. The objective is to contribute something new to the further evolution of science and the humantities.

The paper gives a theoretical argument as to the importance of architecture as a field of knowledge that can offer a rich input to other disciplines. Against this background the principles and practices of doctoral research in Leuven are sketched. The last paragraph refers to some examples which can illustrate this case-study based approach.

Architecture as the object of investigation and reflection

Architecture - it has been known for quite some time - is neither a real science nor a real art. Architecture is not simply a theory but it is neither to be reduced to a purely practical knowledge about how to build buildings. There exists, as Geert Bekaert has been arguing in a paper presented at a seminar in Leuven in 1985, a very long tradition of reflexivity and critique in architecture. The history of architectural writing is - from Vitruvius to Tzonis one could say - full with claims of scientificity. Bekaert referred not only to Vitruvius, but also to Alberti, Perrault, Laugier, Durand, Viollet-le-Duc and a whole bunch of more recent authors who consider the focus of their work - architecture - to be a fully developed object worthy of scientific attention. Nevertheless this claim has never been granted completely. Architecture has proven to be too slippery a thing to fit without problems in the rigid systems of science. And even within the humanities it is not quite clear where the study of architecture belongs. It is typical that in the various attempts within philosophy to set up an encyclopedical system that would give a place to each art, architecture is again and again the discipline that causes embarassment and ambiguity. For a history of these attempts, I gladly refer to Daniel Payot who, in his book *Le philosophe et l'architecte*, unravels the intricate relationships of the concept of architecture with philosophical thinking.

The reason for architecture's resistance to categorisation might be - and again I paraphrase Geert Bekaert here - that the object of architecture, its 'essence' so to say, is not easily identifiable. One can indeed discuss endlessly about the exact meaning of the

word, whether, e.g., we understand architecture to refer to the whole of the built environment or just to a very specific part of it that is informed by some reflexive theory. And even if it would be possible to agree on this topic, then the fact remains that the study of architecture requires an initiation in so many different fields and disciplines that the exact focus on an autonomous reality called 'architecture' anyhow becomes blurred.

Bekaert however proposes to see this situation not as a negative condition, but as a real opportunity. He argues that in recent epistemological literature and in the philosophy of science, doubts have arisen about the exact nature of science and the humanities, as well as about the criteria of demarcation as to what is to be considered science and what not. Within such a context, architecture might even become a pilot discipline instead of a problematical field, a pilot discipline in that it demonstrates throughout its long and complex tradition how one can come to terms with ambiguities and paradoxes.

What does this mean for the issue of doctorates in architecture? Both indeed - doctorates and architecture - do have a very long history, but they did not meet on a regular basis. It has not been a common thing to grant PhD's in architecture or design. Untill rather recently most universities subsumed architecture under some major discipline such as the history of art or - as is the case in Leuven - polytechnical sciences (engineering). Nevertheless there is much to say on behalf of the hypothesis that architecture constitutes a very rich scientific field, and that disciplinary thought as well in science as in the humanities can gain enormously from an intensive confrontation with architecture.

As one argument in favour of this hypothesis, I want to refer to a book by Horkheimer and Adorno, on the *Dialectics of Enlightenment*. In a passage which is severely indebted to Benjamin, Adorno and Horkheimer explain how during the course of history the character of language underwent radical change. Originally, they claim, sign and image formed, under the form of the symbol, a unity in language, as can be seen from Egyptian hieroglyphs in which signification is the result of the merging of abstract reference in a sign and imitation in an image. This original unity dissolved and both modes of signification developed separately. The sign became decisive for the development of language as denotation - in science and scholarship that is - whereas the realm of the image has been reduced to that of art and literature:

"For science the word is a sign: as sound, image, and word proper it is distributed among the different arts, and is not permitted to reconstitute itself by their addition, by synesthesia, or in the composition of the Gesamtkunstwerk. As a system of signs, language is required to resign itself to calculation in order to know nature, and must discard the claim to be like her. As image, it is required to resign itself to mirror-imagery in order to be nature entire, and must discard the claim to know her"[1].

Horkheimer and Adorno do see the divorce between sign and image as a disastrous development, because reason in the fullest meaning of the word cannot be reduced to pure calculation: in that case its degenerates into a purely instrumental rationality, with

the irrational consequences that follow. The same goes for the image: when the image becomes pure depiction and is no longer governed by a rational impulse, it is also inadequate and cannot bring about any genuine knowledge of reality. Nevertheless:

"The separation of sign and image is irrremediable. Should unconscious self-satisfaction cause it once again to become hypostatized, then each of the two isolated principles tends toward the destruction of truth"[2].

According to Horkheimer and Adorno, it is possible both in art and in philosophy to confront this fissure between sign and image, and to attempt to bridge the gap. Philosophy operates at a conceptual level, the level of the sign, whereas art works at the level of aesthetic appearances, that of the image. Inasmuch as art and philosophy both aspire to provide knowledge of truth however, they may not hypostatize their own form of knowledge as absolute: philophy cannot only operate with concepts, while art is obliged to be something more than pure depiction, more than just a reproduction of what exists.

What Adorno and Horkheimer state here about the relationship between philosophy and art, should be understood as instructive for the relationship between scientific thinking and architecture as well. Architecture is, more than any art, the place where an artistic input is controlled by all sorts of rationalities. At the same time it is a discipline where rationality alone can never explain completely the results of the design process, nor the way people actually use their buildings and relate to them. Therefore architecture seems to be a favorable spot as to the investigation of the difficult relationship of what Adorno and Horkheimer called 'sign and image'.

The fact that architecture can act as a most distinguished object of scientific thought, however, does not imply that standards of merit and rigidity in science and the humanities should be lowered. There is a tendency among architects to enter science and the humanities in an almost freewheeling way, as if their very specific object of interest - architecture - allows them to get rid of precautions and working methods that are considered necessary within the community of scholars. I would argue that just because architecture is a very specific field that forms a real challenge to accepted ways of working in research, it is all the more required to settle with the normal standards. It is only from within a scientific way of working, that architecture's capacity of disturbance and resistance can gain actual force. Therefore I consider it necessary to approach architecture from a most rigorous and disciplined point of view. Only in that case can its variety and multiple identities enrich research and thought in the humanities as well as in science.

Doctorates at the KUL: principles and practices

Until recently the rules and customs for PhD-research were based upon the medieval model in which the dissertation grows out of a close collaboration and intellectual exchange between the PhD-candidate and his advisor. It was, so the say, a man-to-man model referring to the individual relationship between master and disciple. As far as architecture was concerned doctorates could be obtained within the faculty of engineering, the so-called faculty of applied sciences. Officially there were three kinds of doc-

torates relating to architecture in this constellation, depending upon what was the basic diploma of the candidate. University trained engineers could obtain a PhD in applied sciences, architecture. Architects on the other hand could either obtain a PhD in architectural sciences or one in urbanism and planning, both of which were held a bit lower in esteem by university officials.

Statistics learn that since 1969 - the year after the split between KUL and UCL - some 19 PhD's have been granted in applied sciences, architecture, 11 in architectural sciences and 7 in urbanism and planning. This makes up for a total of 35, of which only 2 have been gained by females.

Quite recently the system has somewhat changed. Candidates starting their research now will all obtain a PhD in applied sciences, architecture, regardless of their basic degree or background. Non-university educated architects however are required to succesfully finish a pre-doctoral program (the equivalent of one year of study) before they can enter doctoral research. Within the doctoral programme the unique focus on the dissertation itself is shifting. The present procedure requires that a candidate participates in seminars, does some course work, attends conferences and prepares papers and publications. The idea behind this change is to exchange the medieval man-to-man model for an approach that is more team-based and that very regularly exposes candidates to discussions of recent developments in their field.

Compared to the American situation, however, the dissertation itself is still considered to be the most important and energy-consuming part of doctoral studies. Whereas in many American programs much time and energy is devoted to course work and seminars, which have to broaden the intellectual horizon of the students in order to prepare them for teaching jobs covering a wide field, the accent in Leuven is still on the elaboration of doctoral reseach as such, and not on the course work.

The dissertation is assumed to be the result of original research, necessitating the equivalent of some three years of full time work. The research can be based on several things, such as a study of literature, work in archives or empirical research. The latter can consist e.g. of fieldwork, of experiments and tests or of computer programming. There are therefore several possibilities which in terms of methods and rules can be quite different. Nevertheless one can distinguish some common principles and expectations.

The idea is that a PhD-dissertation identifies a very specific problem - or a limited set of interrelated problems- within a certain field and that it adresses this problem (or set of problems) in a number of ways, thus making a consistent and original contribution to the scientific discourse on that particular topic. Each word in this statement is important. *Identifying a specific problem within a certain field* implies that one has to circumscribe the field one is working in and that one has to be familiar with its questionings, its working methods and the already existing literature. It means that one has to insribe one's work within a certain framework that allows to formulate disciplinary references and coordinates of one's research. *Adressing the topic in a number of ways* means that in most cases it will not suffice to try out just one approach or just one kind

of test. Most dissertations dealing with aspects of architecture indeed make combinations of several methods and try to gain knowledge about their topic from different point of views. *Making a consistent and original contribution to the field* means that the dissertation must withstand easy criticism and must be recognized by authorities in the field as an important new step with respect to the topic it adresses.

These exigencies and requirements imply that a doctoral dissertation in architecture is not a self-evident affair. Especially the first point - the identification of a specific topic - requires in many cases quite some effort. It is encouraged e.g. that people from developing countries work on a topic related to their own context, but this does not at all facilitate the circumscription of their subject, nor does it make it any easier to frame their work within some disciplinary basis.

Anyhow it will be clear that such a kind of research can only be carried out in an environment that offers a wide range of tools - from libraries to testing equipment to computers - as well as a stimulating intellectual climate. The university is still the only institution which can guarantee these conditions. Apart from the fact that the university houses a long tradition and considers innovative research as one of its core tasks, there is also the circumstance - especially in the Belgian situation which differs in that respect from many others - that it offers the very valuable presence of almost all disciplines of science and the humanities. This enhances a climate which is favourable for interdisciplinary exchange and which encourages the disclosure of intellectual boundaries.

Some examples

In order to illustrate these somewhat abstract principles, I want to refer to a series of dissertations that were presented in Leuven during the last fifteen years. I will focus specifically on some theses in the field of history and theory, since this is the field I am most familiar with myself.

André Loeckx, presently holding the chair of architectural theory in Leuven, presented his PhD in 1982 under the title 'Model and metaphor: contributions to a semantic-praxiological approach of building and dwelling'. Loeckx relied upon a theoretical framework informed by Lacan and by some anthropological theories, to read architecture as a text in which a process of signification is taking form. He used this framework to develop a detailed reading of three environments in Kabylia: a traditional village, a colonial town and a string of six hill villages connected by a single road. His thesis was that in the latter case a most fruitful interaction took place between elements of tradition and modernity, causing the appearance of a new kind of culture and a new kind of environment.

Francis Strauven presented his PhD on Aldo van Eyck, which was reworked into the well-known book, in 1986. This is one of the few examples of a monographic PhD-dissertation. It was very appreciated because of the depth of his understanding of the work of Van Eyck and the very extensive and detailed way in which he situated this work within the whole of modern architecture and the avant-garde.

My own dissertation, presented in 1988, set out to develop a confrontation between critical theory - represented most of all by Walter Benjamin and Theodor Adorno - and modern architecture. At its core was the problematical relationship between dwelling, modernity and architecture. The dissertation, which is presently being reworked into a book, develops an argument to understand this relationship as a complex interaction whereby architecture is being informed in a mimetical way by as well dwelling as modernity.

In 1992 Chaolee Kuo finished his dissertation on "Identity, tradition and modernity. A Genealogy of Urban Settlement in Taiwan with a case study on Lukang". His central topic was the issue of 'identity', especially identity of Chinese architecture. His theoretical framework relied upon structuralist and poststructuralist thought and allowed him to develop the argument that the identity of Chinese architecture is not stable or fixed, but is constituted by the constant interaction between different poles in a complex constellation.

The most recent PhD that was finished was the one by Bruno Demeulder in 1994, focussing on "Reformism at home and overseas. History of the Belgian planning in a colony (1880-1960)". Demeulder undertook a re-interpretation of the history of Belgian Congo from the point of view of architecture and urban planning, informed by an intellectual framework mostly based on the work of Foucault.

Of course it is not possible to show the richness and qualities of these various PhD's by describing them in five lines. What I just wanted to hint at is the fact that in these examples you always have an intensive interaction between, on the one hand, a theoretical framework that can be either well-elaborated or rather implicit, and; on the other, an in-depth reading of case study material that informs in its turn a switch within the theoretical framework. This kind of work is very demanding and requires a more than average intellectual capacity of the candidates, as well as an environment which stimulates critical thinking. It is this kind of work that is necessary to stimulate critical awareness of architecture and to lay bare some of its fundamental links with our experience of reality.

References

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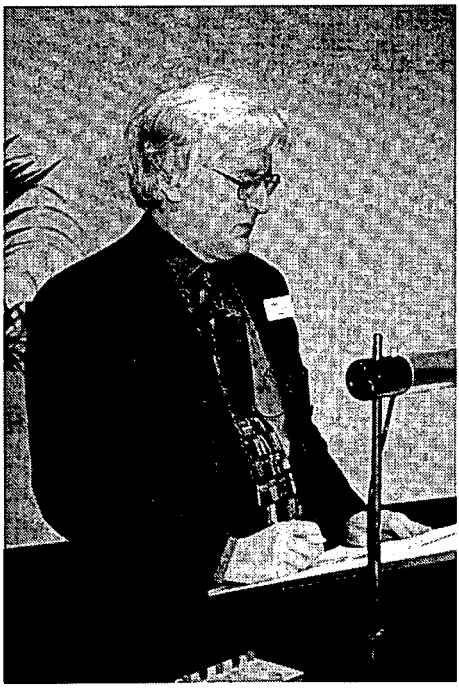
Daniel Payot (1982), *Le philosophe et l'architecte*, Aubier, Paris

Francis Strauven (1994), *Aldo van Eyck. Relativiteit en verbeelding*, Meulenhof, Amsterdam

Notes

1 *Dialectic of Enlightenment*, p. 17-18; German version: "Als Zeichen kommt das Wort an die Wissenschaft; als Ton, als Bild, als eigentliches Wort wird es unter die verschiedenen Künste aufgeteilt, ohne dass es sich durch deren Addition, durch Synästhesie oder Gesamtkunst je wiederherstellen liesse. Als Zeichen soll Sprache zur Kalkulation resignieren, um Natur zu erkennen, den Anspruch ablegen, ihr ähnlich zu sein. Als Bild soll sie zum Abbild resignieren, um ganz Natur zu sein, den Anspruch ablegen, sie zu erkennen.", *Dialektik der Aufklärung*, p. 40.

2 *Dialectic of Enlightenment*, p. 18; German version: "Die Trennung von Zeichen und Bild ist unabwendbar. Wird sie jedoch ahnungslos selbstzufrieden nochmals hypostasiert, so treibt jedes der beiden isolierten Prinzipien zur Zerstörung der Wahrheit hin.", *Dialektik der Aufklärung*, p. 40.



Piet Lombaerde, Belgium (left) and Sabine Chardonnet Darmaillacq, La France (rigth)

Formation Doctorale et Recherche Architecturale en France

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La question des doctorats en architecture se pose en France depuis longtemps, depuis la naissance de la recherche architecturale. Mais, aujourd'hui encore, les doctorats en architecture restent une question parce que précisément ils n'existent pas. Pourtant, les éléments qui pourraient leur permettre d'exister sont connus de chacun. La crise institutionnelle que subit actuellement le secteur de l'architecture française, à la recherche d'une éventuelle politique architecturale, à la recherche d'un nouveau souffle pour l'enseignement de l'architecture, dévoile une acuité particulière pour l'émergence souhaitée de ces doctorats en architecture. En cela, une telle manifestation devient même une opportunité pour affirmer l'urgence d'une véritable politique de formation à la recherche architecturale.

La France est en effet un des rares pays qui a vu se développer une recherche architecturale, pendant 25 ans, sans que ne soit institué un seul doctorat en architecture. Parce que relativement éloignés de la culture universitaire, l'enseignement de l'architecture et la recherche architecturale n'ont pas trouvé ce trait d'union qui caractérise tout enseignement supérieur.

Ces jours-ci en effet, en France, nous pourrions fêter un anniversaire. Un anniversaire et une commémoration à la fois. Chacun sait que les français sont très friands de commémorations. La recherche architecturale a aujourd'hui 25 ans : au début du mois de février 1971, la commission réunie autour du professeur Lichnerowicz remet au ministre d'Etat chargé des Affaires Culturelles, Jacques Duhamel, le rapport fondateur d'une politique de recherche architecturale. Ce jour-là, on enterrait également la perspective des instruments de formation à la recherche : les doctorats en architecture. Pourquoi?

Le rapport Lichnerowicz est pourtant, parmi la multitude des rapports d'initiatives ou de réforme destinés à tracer le chemin d'une véritable politique architecturale, le rapport le plus éclairé. Mais les conclusions de la commission n'abordent pas une seule fois le sujet des doctorats, et ce malgré la conviction des membres de cette commission. Le contexte ne le permet pas. Dans le milieu des nouvelles Unités Pédagogiques, issues de l'éclatement de l'Ecole des Beaux-Arts, la ferveur des étudiants et des enseignants pour une reconnaissance intellectuelle de leurs préoccupations, pour une approche résolument anti-professionnalisante, pour une conscience pluridisciplinaire de type universitaire, s'oppose radicalement aux orientations du ministère des Affaires Culturelles. Abordés par cette Commission ministérielle de la Recherche Architecturale, le sujet des doctorats en architecture aurait souligné l'importance évidente du rapprochement avec le système universitaire ; le sujet des doctorats en architecture aurait été une erreur tactique qui aurait compromis tant la publication du rapport que la stratégie

politique globale susceptible d'engager rapidement et massivement des crédits de recherche dans les multiples secteurs liés à l'urbanisme et à la construction.

A ce stade, il est important de souligner l'enjeu de ces crédits de recherche. Et n'allons pas croire en effet, au début de ces années 70, que l'ambition de maîtrise qualitative du cadre de vie est la "chasse gardée" du département ministériel en charge de la tutelle de l'architecture, c'est à dire le tout jeune ministère des Affaires Culturelles créé il y a une petite douzaine d'années. Non, c'est d'un élan commun qu'il s'agit, une conscience partagée, notamment par les grandes administrations que la planification des années d'après-guerre et les urgences de croissance ont rendues quelque peu scrupuleuses. Les puissances d'argent et l'industrie du bâtiment ont tôt fait de soulever les enjeux d'une telle politique de recherche de la qualité, et le gouvernement de Jacques Chaban-Delmas ne s'est pas fait prié pour mettre en oeuvre cette politique et dégager les crédits nécessaires.

Au début du VIème Plan (1971-1975) en effet, nombreux sont les secteurs de l'appareil d'Etat qui participent à cet effort collectif de planification : la qualité plus que de quantité. Les crédits de recherche accordés à la direction de l'Architecture du ministère des Affaires Culturelles sont modestes : ils sont investies de deux manières différentes. La première orientation de ces dotations budgétaires concerne la participation de cette direction de l'Architecture au budget d'une nouvelle structure interministérielle, le Plan Construction, rattachée puis absorbée par l'administration du grand ministère de l'Equipement. Cette structure a été expressément mise en place pour initier la recherche, l'expérimentation, l'innovation en matière d'habitat et de performance de la construction. La deuxième orientation de ces dotations budgétaires (plus de cinq fois moins conséquente) donne effectivement naissance à la recherche architecturale, telle qu'elle existe aujourd'hui, associée aux différents établissements d'enseignement de l'architecture.

On comprend dès lors que ce sont les grandes initiatives d'Etat, les politiques de planification et les rivalités entre départements ministériels qui sont à l'origine de la nature, excentrée autant que marginale, de la recherche architecturale qui se développe par la suite sous la tutelle du ministère des Affaires Culturelles. Les ambitions nationales de recherche, ambitions collectives, ambitions partagées, ambitions jalousées, ont arrêté les limites institutionnelles de cette recherche architecturale. Elles ont définitivement distribué les tâches, fractionné le champ d'action relatif à la transformation du cadre de vie, et finalement, doté le ministère des Affaires Culturelles de responsabilités relativement limitées en la matière.

Consacrant malgré tout l'hégémonie permanente de l'innovation technologique sur la pensée architecturale, la conséquence d'un tel partage de compétences est un avortement programmé de la recherche doctorale. En effet, le consensus politique qui donne naissance et légitimité au Plan Construction matérialise paradoxalement les conclusions du rapport Lichnerowicz sur les objectifs forcément opérationnels de la recherche. La réflexion principale de cette commission Lichnerowicz se concentrait sur l'urgente nécessité de maîtriser l'ensemble du processus opérationnel de la production architecturale. Les conditions de la recherche architecturale était alors déclinées,

depuis la recherche fondamentale jusqu'à l'expérimentation en vraie grandeur, en passant par "la recherche immédiatement utilisable" ou recherche appliquée et la recherche opérationnelle. Le rapport insistait en particulier sur le fait que ces conditions de recherche architecturale ne pourraient être remplies que s'il existait de véritables relations entre recherche et pratique et, en amont du projet architectural, une nécessaire formation de la maîtrise d'ouvrage. Les conclusions étaient ambitieuses, trop ambitieuses ; elles étaient utopiques, volontairement utopiques : elles remettaient en question l'ensemble des modes de production du construit.

En France, la recherche architecturale est, à de rares exceptions près, synonyme de recherche fondamentale en architecture. Pourquoi ? Parce qu'elle est la seule des dimensions de la recherche globale prônée par les conclusions de la commission Lichnerowicz. Loin des préoccupations de formation des architectes, les autres dimensions ont été développées par des ambitions différentes, qui n'avaient pas pour priorités le renouvellement de la pensée architecturale et de la réflexion urbaine... Ainsi, en dehors du petit milieu de la recherche architecturale dont il est précisément question ici, il existe de nombreux autres modes de production scientifique liée à l'architecture qui empruntent des canaux de financement distincts ou parallèles. C'est donc à une partie relativement modeste des investissements de recherche concernant l'aménagement de l'espace que l'on accorde la cristallisation officielle de "Recherche Architecturale". On pourrait même aller jusqu'à dire que sa position institutionnelle est guidée plus vraisemblablement par une revendication administrative isolée, résignée de ne pouvoir cerner les autres dimensions de cette recherche architecturale globale, que par une identité plurielle, correspondant aux larges investigations de ce que l'on appelait à l'époque "la fonction architecturale". Cantonnées dans l'isolât des services du ministère des Affaires Culturelles, n'ayant apparemment pas d'horizons d'application et d'action sur la production du cadre bâti, les perspectives scientifiques d'une recherche doctorale n'apparaissent pas, au yeux de la puissance publique, comme prépondérantes : au cours de ces années 70 — années de mutation, années de refondation — les finalités de la recherche fondamentale en architecture ne sont pas perçue comme ayant de pertinentes relations avec la pratique architecturale. Et pourtant...

L'éventuelle mise en place de ces formations doctorales a toujours été liée aux relations statutaires que l'enseignement de l'architecture aurait pu entretenir avec le système universitaire. Mais la particularité française a instauré également, depuis l'origine, une fracture au sein même des relations entre enseignement de l'architecture et recherche architecturale. Cette fracture, on l'aura compris, n'est pas tant le fait de distorsions entre les acteurs, enseignants et chercheurs, que celui de véritables incohérences structurelles dans la gestion administrative. Le paradoxe de la situation soulève, dès la fin des années 60, un décalage extrême entre une dynamique endogène de rénovation de la profession d'architecte et une absence totale de clairvoyance politique. Tandis que les relations entre enseignement et recherche se tissent de manière spontanée dans les Unités Pédagogiques d'Architecture, la distance entre les services du ministère des Affaires Culturelles ne s'amenuise pas, au contraire... De 1968 à 1978, l'administration en charge de l'enseignement de l'architecture n'aura pas de lien structurel avec la direction de l'Architecture. Pendant les dix années les plus probantes du renouveau de la réflexion architecturale, la tutelle des 22 Unités Pédagogiques réparties sur le territoire

français (le service des Enseignements de l'Architecture et des Arts Plastiques, rue Saint-Dominique) n'est que très peu investie dans la gestion de la nouvelle recherche architecturale (dévolue au service de la Création Architecturale, rue de Valois). On peut donc saisir les difficultés intrinsèques qui ne pouvaient en aucune façon mettre l'administration du ministère des Affaires Culturelles en position de négocier avec l'Université l'éventualité de doctorats en architecture.

En 1978, la direction de l'Architecture est transférée au ministère de l'Equipement, rebaptisé momentanément ministère de l'Environnement et du Cadre de Vie : elle regroupe les attributions relatives à la recherche architecturale et celles qui concernent l'enseignement de l'architecture. Mais ce n'est que très récemment, lorsque le statut des enseignants des écoles d'architecture a été mis en place, lorsque que le renouvellement du corps enseignant est devenu un problème incontournable, que se sont posées les questions du mode de recrutement, des méthodes de sélection et, par là, des critères de type universitaire... Les titres, les valeurs, et particulièrement la thèse universitaire sont devenus le sujet d'achoppement pour toutes les expressions de reconnaissance. Les querelles épistémologiques et les particularismes disciplinaires se sont exacerbés. Il s'agissait en effet de titulariser, sur critères universitaires, tous ces enseignants depuis plus de vingt ans contractuels.

A l'analyse, on perçoit en effet que cette recherche architecturale concerne presque uniquement les premières générations d'enseignants de "l'immédiat-après-68". Il s'agit de ceux qui, avant même la dissolution du système anti-intellectuel de l'Ecole des Beaux-Arts, ont été les acteurs d'une reconstruction de l'enseignement de l'architecture. Animées par une synergie autodidacte précoce, les premières initiatives de recherche architecturale sont en effet concomitantes de la restructuration profonde de la formation des architectes. Il faut même insister sur cette articulation essentielle, qui permet d'inscrire dans les gênes du nouvel enseignement de l'architecture la portée de revendications intellectuelles et de productions scientifiques qui sont à l'origine des premières initiatives pédagogiques et didactiques.

Cette articulation a permis d'identifier, au fil des années, des comportements, une éthique professionnelle partagée entre la pratique, la recherche et l'enseignement ; une éthique dont chacun sait mesurer les difficultés, l'âpreté et la richesse du cheminement ; une attitude, une aptitude, dont Yannis Tsiomis peut facilement être tenu ici pour le représentant. Mais ils ne sont pas nombreux ceux qui ont su tisser la maille de cette culture professionnelle, en dehors de toute cohérence de structure administrative, en dehors de toute articulation institutionnelle. Ils ne sont pas nombreux, et ce sont même des exceptions : cette notion, maintenant désuète, de "fonction architecturale" a été progressivement fractionnée en de multiples segments, dont la spécialisation n'a parfois d'égale que l'autarcie intellectuelle. Des segments qui ont cependant le mérite d'exister, dans la diversité, dans la richesse du vaste panorama des acteurs qui interviennent sur "l'environnement sensible" : ces segments, on les appelle communément "les métiers de l'architecture".

Et, en l'occurrence, à propos de ces métiers de l'architecture, il y a au moins un élément qui les réunis de manière organique, c'est l'argent public de la recherche. Mais, dans

une situation française qui n'a pas encore trouvé tous les chemins de la décentralisation des compétences, les postes de dépense en matière de recherche, et particulièrement de recherche sur l'environnement construit, sont à la merci des coupes budgétaires, des alternances, des réorientations administratives. A l'échelle d'un pays comme la France, dans lequel la recherche est éminemment chose publique, donc affaire d'Etat, les appréciations sont d'ordre politique et les priorités se meuvent au gré de nouvelles conjonctures et de fréquents arbitrages. Il en est ainsi pour la tutelle de l'architecture : il en est donc ainsi pour la recherche architecturale et l'enseignement de l'architecture. Car c'est l'actualité en France, et il peut paraître incongru, ici, à Delft, où la stabilité institutionnelle de l'architecture n'est pas à remettre en question à tout instant, que d'affirmer que l'ambition tant attendue pour une politique architecturale française est, depuis l'été dernier, sous la responsabilité du ministère de la Culture.

Aujourd'hui en effet, le transfert des attributions relatives à l'architecture, du ministère de l'Equipement vers celui de la Culture, c'est l'autre actualité de cette absence de formation à la recherche architecturale. La question se pose en ces termes : quelle est la nature des nouvelles orientations qui ont récemment modifié en France les relations, déjà précaires, entre les trois départements ministériels concernés par la recherche architecturale et l'éventualité de doctorats en architecture, l'Equipement, l'Education Nationale, et la Culture ?

Certes, il existe des formations doctorales basées dans les écoles d'architecture. Mais elles sont co-habilitées avec l'Université. Les diplômes sont délivrés par l'Université. Les allocations de recherche sont distribuées au compte-gouttes, et en priorité aux étudiants universitaires. Enfin, malgré la qualité des enseignements, la maturité relative de ces formations n'a pas encore permis de juger de leur performance et de leur probité.

Certes, les disciplines qui concourent (ou devraient concourir) aux différents processus de conception, se fédèrent de manière instinctive. L'histoire par exemple est un de ces terrains riches et mouvants : l'histoire de l'architecture, l'histoire des techniques de construction, l'histoire des villes ou l'histoire des formes urbaines. Malgré les revendications catégorielles et corporatistes, de timides passerelles se sont formées entre l'enseignement de l'architecture et l'enseignement universitaire : elles font partie de ces initiatives ponctuelles qui petit à petit force le destin de l'inertie technocratique. C'est d'ailleurs sur la base de telles initiatives transversales, qui mobilisent avec opiniâtreté la collaboration d'un "milieu" et d'un "monde", le milieu de l'enseignement de l'architecture et le monde universitaire, que forcément émergera l'évidence d'une production doctorale incontournable.

Car chacun sait que les arbitrages politiques en matière de recherche scientifique se fondent, pour tel ou tel investissement, sur le poids et la répartition du nombre de thèses soutenues, pour telle ou telle ligne budgétaire, sur la rationalité des rapports entre l'offre et la demande, entre la production scientifique et l'application même de cette production scientifique.

Mais, sous identité culturelle, et dans le concert des forces de production du construit, que pèse par exemple la recherche historique, même centrée sur la nature des modifications du visible, même centrée sur la réalité du patrimoine matériel de nos sociétés urbaines ? C'est la deuxième question de cette actualité. C'est aussi la question que, de manière sous-jacente, le rapport Lichnerowicz devait poser il y a 25 ans. C'est enfin la question qui, malgré la qualité et la pertinence de nombreux travaux de recherche fondamentale en architecture, nous interroge sur l'identité de cette recherche architecturale globale, à l'heure où les pouvoirs, les décisions, l'initiative de transformation du cadre de vie, se sont éloignés de l'Etat centralisateur.

La Recherche en Architecture: *Ni satellites, ni narcisses*

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La création du 3ème cycle et des études doctorales en architecture, a rencontré et rencontre, partout en Europe, en France comme ailleurs, des difficultés de plusieurs ordres qui sont le fait de plusieurs facteurs: la place de l'architecture dans chaque pays, la spécificité de l'architecture en tant que savoir et savoir-faire et, par conséquent, l'architecture en tant que champ disciplinaire etc.
Pour commencer, j'aimerais m'appuyer sur une problématique spécifiquement française avant de traiter des difficultés qui sont communes à plusieurs pays. C'est-à-dire les difficultés qui dépassent les particularités nationales et l'histoire de chaque formation, et touchent des questions en rapport avec la constitution du champ architectural, avec la construction des objets de recherche du champ architectural, les questions du savoir architectural et non seulement de la discipline "architecture" inscrite dans les institutions d'enseignement, universitaires ou autres, qui existent avec leurs différences et leur propre histoire.
Il est évident par ailleurs que tout au long de cette intervention je ne séparerais pas l'architecture comme objet de l'architecture-ville. Les programmes de toutes les écoles ou facultés d'architecture montrent que la ville est présente partout et que les problématiques de la ville, du projet urbain et du paysage sont intimement liées entre elles et, pour certaines écoles, avec l'enseignement de l'urbanisme.

L'architecture : une entreprise intellectuelle

Prenons donc l'exemple de la France. Très souvent, on dit que la tradition de l'École des Beaux Arts, à laquelle appartenait l'architecture, et la formation des architectes fut une tradition académique et anti-intellectuelle. C'est vrai en partie, et surtout à compter du moment où, en général au 20e siècle, on va poser autrement la question des savoirs scientifiques ou artistiques mais aussi des savoirs architecturaux avec une complexité qui dépasse largement la manière réductionniste figurée par les quatre fonctions de la Charte d'Athènes. Il suffit de songer à la quête de nouvelles relations à nouer avec les sciences sociales ou exactes et aux débats du 2e et du 3e CIAM du début des années '30, (Francfort et Bruxelles), pour saisir la complexité.
Il faut rappeler aussi, que l'enseignement de l'architecture du 18e et 19e siècles ne fut pas anti-intellectuel à l'origine, ni hermétique aux autres savoirs. Les débats de l'Académie Royale le prouvent et les architectes de l'époque sont loin d'être "des imbéciles voyageurs".
Le fait est que cette tradition intellectuelle se perd ou s'amenuise lorsque les architectes se confinent dans leur rôle de "professionnels", c'est-à-dire de corporation qui défend ses intérêts de marché en évacuant toute autre fonction de l'architecture sauf celle de

"bâtir dans les règles de l'art". Et curieusement, du même coup, ils perdent aussi cette capacité de pouvoir bâtir effectivement dans les règles de l'art.
Car pour obtenir une architecture "ordinaire" et de qualité - et l'un ne s'oppose pas à l'autre comme en témoigne le Paris hausmanien - il faut avoir comme objectif l'art et non pas se limiter au respect des règles qui assurent le bon fonctionnement d'une profession et garantissent au tiers des services compétents sans plus.
Autrement dit, toute vision qui rend étanches les rapports entre *savoir et savoir-faire*, empêche de voir l'étendue du champ architectural et du coup rend le fossé infranchissable entre les acquis d'une part et l'innovation et le renouvellement des compétences de l'autre. D'où la sclérose des dits acquis et enfin la mort de la profession.
Quand on parle de "savoir" en architecture, on songe en fait à Beaudelaire qui écrivait en 1852 que "*toute littérature qui se refuse à marcher fraternellement entre la science et la philosophie est une littérature homicide et suicide*". Ce serait aussi l'avis de Stravinsky, de Bartok ou de Boulez si on pensait musique ou, encore, de Klee, de Magritte, de Matisse et certainement de Léger si on traitait de la peinture...
Mais en fait la question que pose l'art, en général, et encore plus l'architecture concernant leur "formation", se situe à deux niveaux : d'une part celui de la *reproduction* à partir des acquis, et d'autre part celui de la *production*, c'est à dire le renouvellement et la capacité d'adaptation aux innovations.
Mais, concernant toute innovation, depuis le mythe de Promethée tel que Eschyle le raconte, on sait que toute innovation est perçue comme une trahison des acquis et que ceci est le propre de toute activité humaine. En ce sens rien d'inquiétant!...

Les Écoles d'architecture lieux de production de savoir.
C'est en ces termes, je le crois tout au moins, qu'on doit se poser la question des études en architecture - et *a fortiori* celles qui concernent les troisièmes cycles. Poser les questions pas seulement en termes institutionnels d'équivalences européennes ou d'uniformisation des études mais en terme de production et de reproduction de savoir et savoir-faire sans enlever la spécificité et par conséquent la richesse apportée par chaque pays ou chaque tendance d'école. Car il faut bien s'en rendre compte : les systèmes diffèrent et c'est vital et c'est tant mieux pour l'architecture.
Il faut alors qu'on songe à l'université européenne et ce qu'elle nous a apporté d'incontournable depuis sa formation. *L'Université est le lieu par excellence de la production du savoir et pas seulement le lieu de la reproduction des savoirs.* Mais qui dit production du savoir dit recherche et lieux - institutionnels ou pas - d'accueil de la recherche.
En France, pour des raisons plus ou moins connues, la recherche architecturale née, dans ses formes nouvelles, dans les années '70 est le fruit du travail de quelques groupes ou personnes isolées dans les écoles d'architecture sans appui et véritable reconnaissance institutionnelle, avec peu de lieux d'accueil et, relativement, peu de moyens.
C'est pourtant grâce à ces groupes et personnes que le paysage aussi bien intellectuel qu'architectural, a changé depuis ces années : une production intellectuelle intense que nous connaissons en Europe et au-delà de l'Europe, des recherches, des publications, des contacts, bref un tissage de "réseaux" comme on dit dans un langage télévisuel et "moderne"...Le fait est que nous ne pouvons pas comprendre la renaissance de l'architecture française des vingt dernières années si on ne l'associe pas à la renais-

sance de la recherche architecturale dans ce pays. Et cela au-delà des phénomènes médiatiques à travers les revues et des conjonctures politiques qui ont rendu l'architecture un faire valoir de prince.
La création, avec beaucoup d'efforts, de quelques formations doctorales, en France est due aussi à cette histoire récente de production et de recherche architecturales qui ne me revient pas d'écrire mais que je dois affirmer ici sa présence.
Grâce à des alliances avec les universités; grâce à l'intelligence d'universitaires qui aiment l'architecture et qui la considèrent et la comprennent comme entreprise intellectuelle; grâce aussi à la mise en place de procédures d'habilitation par les universités, (procédures qui pour des non français doivent apparaître comme une chose exotique digne d'études ethnologiques); grâce aussi à l'habilitation de quelques enseignants-chercheurs à diriger des thèses, nous sommes depuis cinq ans à l'amorce d'une reconnaissance institutionnelle de reproduction et de production de savoir architecturale reconnu aussi institutionnelement à travers de formations doctorales...
Ce qui peut paraître comme une banalité pour l'Italie, l'Allemagne, la Grèce, l'Espagne, c'est à dire partout où les facultés ou instituts d'architecture sont intégrés au système universitaire, devient en France une conquête de sommets vertigineux.
Il faut préciser qu'en France l'unique dépositaire du doctorat et du droit de délivrer le titre de docteur est l'Université et que l'autorité de tutelle des écoles d'architecture n'est pas l'Éducation nationale mais le Ministère de l'Équipement et, depuis peu, de nouveau, le Ministère de la Culture.

L'ambiguïté externe et l'ambiguité interne

Ainsi, nous nous trouvons en présence d'une double ambiguïté et difficulté.
La première est une *ambiguïté "externe"*. Jusqu'ici les diplômés en architecture qui voulaient poursuivre leurs études en thèse s'inscrivaient, en fonction de leurs orientations et sensibilités, en géographie, histoire, histoire de l'art...
Il est évident que l'anti-intellectualisme d'une bonne partie des écoles et l'absence de formation à la recherche en second cycle, ont créé une attitude de méfiance chez les universitaires : les architectes sont-ils capables de mener une recherche et de produire une thèse?
D'autre part, cette méfiance s'est accentuée pour des raisons bassement matérielles qu'il serait long d'énumérer ici. Indépendamment de leur qualité scientifique les formations doctorales sont jugées sur le nombre des étudiants inscrits, sur le nombre de Diplômes d'Études Approfondies (1ère année de thèse) obtenus, sur le nombre d'inscrits en thèses et de thèses soutenues.
Il est clair que la création des doctorats en architecture va provoquer une baisse de la clientèle pour les autres DEA de l'Université. Si la méfiance d'un nombre d'universitaires est donc probablement et relativement justifiée, d'un autre côté la même méfiance est loin d'être désintéressée.
Jusqu'à maintenant, il est vrai, que les diplômés en architecture ne pouvaient poursuivre des études doctorales qu'à l'université, en géographie, en urbanisme, en histoire ou histoire de l'art, en sociologie urbaine...
Mais à côté de cette ambiguïté "externe" vis-à-vis de la recherche architecturale et des doctorats en architecture, ambiguïté aussi bien sur le fond qu'ambiguité institutionnelle, il y a *l'ambiguïté "interne"* qui, à mes yeux, est aussi grave. Il s'agit en fait de cette vision frileuse, restrictive et réactionnaire qui hésite encore sur des questions

aussi galvaudées que l'interdisciplinarité, comme aussi sur la nécessité de la recherche à l'intérieur des écoles d'architecture et bien sûr sur celle des doctorats.
À cette vision qui réduit l'enseignement du projet architectural et urbain à un simple apprentissage de clichés, on devrait ajouter une tendance qui considère que faire du projet et commenter son propre projet revient à faire de la recherche.

Un débat de fond

Pour l'enseignement du troisième cycle, pour les études doctorales en architecture, il s'agit par conséquent de dépasser ses deux types de difficultés, interne et externe, sans pour autant écarter un débat et les questions de fond: à savoir que, effectivement, concernant la recherche architecturale des problèmes épistémologiques, méthodologiques et de conceptualisation se posent.
En ce sens, les remises en cause des découpages et des disciplines universitaires dans les sciences (je pense à la biologie ou à la physique), le tournant des années '60 et '70, l'abandon progressif des courants positivistes, la mise en perspective historique des sciences (T.Kuhn) et la situation de "crise" qui s'est créée à propos des savoirs en général, montrent que ces derniers ne correspondent pas forcement ni au nombre des facultés, ni aux intitulés des formations et des doctorats existants.
Pour cela, il suffit de rappeler les exemples que l'histoire des universités européennes, nous offrent : c'est à dire qu'il a fallu des batailles institutionnelles pour vaincre les réticences et instaurer des nouvelles disciplines à partir des champs inédits que la recherche mettait en valeur dans tous les domaines, aussi bien scientifiques qu'artistiques. (Les raisons "sociologiques" de ses phénomènes d'inertie, suite aux travaux de Pierre Bourdieu, sont suffisamment connus par tous, pour y insister plus).

Toutes ces questions ne sont pas spécifiquement françaises et ne sont pas de la même importance. Mais certaines parmi elles posent malgré tout des questions plus vastes sur la recherche et les doctorats en architecture. Je ne peux les présenter ici que de manière superficielle et axiomatique et répéter aussi des vérités premières :

1. L'architecture est une entreprise intellectuelle c'est à dire une affaire qui concerne l'entendement sans pour autant s'opposer, comme on l'a trop souvent dit, au sensible et au sensitif. *A fortiori* alors, la formation en architecture est une entreprise intellectuelle, dont la complexité se dessine au gré des influences, des interrogations, des remises en cause de tous les savoirs qui la concernent. Qu'on me permette de répéter que l'architecture comme entreprise intellectuelle est entendue dans le sens où Beaudelaire parlait de la littérature dans ses rapports avec la science et la philosophie.
2. Les Écoles d'architecture doivent être des lieux de production de savoirs et pas seulement de savoir-faire. En ce sens nous ne préparons pas seulement aux métiers de l'architecture - qui sont pluriels - mais nous travaillons aussi aux savoirs préalables à ces métiers.
   C'est évident que ces savoirs sont en partie similaires et en partie différents de ceux dispensés aux universités. Mais c'est aussi évident que même quand il s'agit de disciplines comme la sociologie ou l'économie, une différence existe quand elles sont enseignées, au sein d'une école ou faculté d'architecture, par des enseignants qui sont sensibles aux métiers de l'architecture et à l'architecture tout simplement. Je sais que les traditions diffèrent énormément à ce niveau dans les différents pays

mais cela n'empêche pas d'attirer l'attention sur la manière de parler du *socius* aux architectes qui ne sont pas des sociologues ou économistes, et qui ne doivent pas le devenir.

3. Puisqu'il s'agit de savoir et de savoir-faire, les écoles d'architecture doivent être dotées des moyens pour mener sur ces deux niveaux la recherche. Des moyens matériels bien entendu mais aussi une reconnaissance du statut d'enseignant-chercheur avec des laboratoires de recherche, liés ou pas à l'université, en fonction des contenus et des programmes de recherche.

   Un besoin de clarté est nécessaire concernant les différences qui existent entre les types d'enseignants, pour éviter les confusions, les faux statuts et les faux investissements qui, avouons-le, sont souvent présents dans toutes les écoles de tous les pays.

   Une différenciation est à établir entre les enseignants qui ne pratiquent pas la recherche et les enseignants-chercheurs. Comme aussi il faut distinguer les enseignants-chercheurs architectes qui exercent leur profession et les architectes enseignants qui exercent professionnellement sans faire de la recherche. La complexité des situations et des profils ne doit pas empêcher la clarté.
4. Les doctorats en architecture impliquent la recherche. Ils impliquent aussi des doctorants qui sont préparés à la recherche au niveau méthodologique et au niveau des démarches. L'existence des doctorats en architecture signifient par conséquent l'introduction très tôt, dans l'enseignement de l'architecture, dès le 1er et 2e cycle, des cours d'initiation aux problématiques de la recherche. Il ne s'agit pas de calquer l'enseignement à celui de l'université mais il s'agit, au contraire, d'établir l'architecture dans sa spécificité en tant qu'entreprise intellectuelle. En ce sens l'enseignement de l'histoire de l'architecture peut être le noyau à partir duquel peuvent se développer les problématiques méthodologiques. Chaque école, en fonction de ses traditions, peut évidemment affronter ce type d'initiation différemment.
5. Chaque science, chaque art, chaque champ scientifique construit son objet. L'objet scientifique et artistique ne sont pas des données immuables - même en théologie! - mais des constructions renouvelées. Le fait que l'architecture n'est pas une science ne l'empêche pas de réfléchir sur la construction de ses objets d'investigation.

S'il est vrai que les historiens de l'art ne font pas de l'art, il est aussi vrai que tous les artistes font de l'art *dans* l'histoire. En ce sens, les projets dans l'enseignement de l'architecture, les multiples projets, sont des "créations raisonnées", pour rappeler Aristote. Apprendre à concevoir un projet architectural ou urbain ne permet pas à apprendre à faire de la recherche. Par contre, si on admet que construire son objet d'investigation, son objet de recherche, revient à *une mise à distance du faire*, à ce moment-là, et à cette condition, on peut prétendre à une recherche architecturale qui aurait alors son autonomie relative ou sa spécificité par rapport aux autres entreprises de la connaissance, et s'apparenterait en ce cas à une entreprise logo théorique, à l'image des autres entreprises de la connaissance. Il est évident qu'un débat est nécessaire à ce niveau pour affiner les multiples points de vues et positions par rapport au projet et le troisième cycle. Des instituts de recherche concernant la musique tels qu'ils existent en Allemagne ou en France (l'IRCAM par exemple), pourraient servir d'exemples pour débattre sur les frontières, parfois fragiles entre expérimentation et recherche conceptuelle.

Quand on observe la naissance des doctorats en architecture et l'enseignement en général dans les différents pays, on se rend compte que les configurations sont multiples et contradictoires. Les écoles d'architecture qui font partie, pour la majorité d'entre elles, de l'Université au sens institutionnel strict, sont structurées soit à l'image des sciences sociales, soit à celles des écoles d'ingénieurs (les Technische Hochschüle ou les Polytechnicum) ou encore à l'image des écoles d'art et d'artisanat comme le Bauhaus (c'est le cas pour certaines écoles en Amérique Latine).

On se rend compte aussi que, institutionnellement, les doctorats diffèrent... Dans certains pays, il suffit de s'inscrire auprès d'un directeur, ailleurs, c'est un cursus entier, une formation post-diplôme avec des cours, des séminaires etc.. Ailleurs un travail "théorique" solitaire présenté à un jury donne le titre du docteur. Et ailleurs encore, en France par exemple, les études doctorales en architecture, n'existent qu'à condition d'être reconnues, par cohabilitation, par l'université. Ajouterai-je que cette situation est aussi une garantie pour profiter des acquis de la recherche telle qu'elle se mène à l'université avec sa longue tradition? Ajouterai-je encore qu'il n'est pas nécessaire d'envisager que dans toutes les écoles d'architecture on mène des études doctorales?
Toutes ces différences montrent qu'il est difficile de "normaliser" une situation par décret, et établir partout un système unique. Et tant mieux. Mais il est tout aussi évident que le débat sur les doctorats en architecture, (et les thématiques traitées à Delft sur le sujet le prouvent amplement), ne peut pas être séparé du débat qui traite des problématiques sur le contenu de la recherche en architecture. Inutile de parler de diplômes et d'équivalences si on ne parle pas des contenus, des compétences et des spécificités des savoirs et des savoir-faire par rapport à d'autres savoirs et savoir-faire.

Mais au delà donc de toutes les différences, rapidement et partiellement développées plus haut, je crois que la question fondamentale reste celle des contenus de la recherche architecturale, de la construction de notre objet de recherche qui sera toujours un travail entre *l'autonomie et l'hétéronomie* de l'architecture. Pour éviter d'une part de rentrer dans un débat sur la spécificité de nos écoles à partir du projet. Ce débat est un faux débat puisqu'il traite d'une évidence: dans les écoles d'architecture on enseigne l'architecture comme dans une faculté de médecine on enseigne la médecine, comme ailleurs l'histoire, et ailleurs, encore, l'archéologie...
L'architecture dans son autonomie et dans son hétéronomie signifie tout simplement qu'on ne se contente pas de rendre nos formations des simples lieux d'apprentissage de "tics" professionnels, plus ou moins efficaces.
Comprendre l'architecture dans son autonomie et hétéronomie, pour l'enseigner à tous les niveaux, signifie aussi qu'on ne fait pas semblant, au nom des dimensions multiples et des répercussions sociales visibles de l'acte architectural, de rendre des enseignements "encyclopédiques" superposés et juxtaposés sans articulation avec notre propre objet de création et de savoir : l'architecture et la ville.
Alors on ne risquera pas de devenir ni satellites, ni narcisses.

The British Doctorate in Design and Architecture

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Abstract

Until recently the British doctorate in Design and Architecture has been the conventional Doctor of Philosophy - Ph.D or. D.Phil. Under pressures from industry and government a new British doctoral programme has been developed, similar in nature to the D.Ing., and known as an Eng.D. or Doctor of Engineering. This has led some British universities to begin the preparation of taught doctoral programmes in the American style. To our knowledge no such doctorates presently operate in the UK. Funding for full time doctorate studies in Design and Architecture is mainly from the Research Councils, and by a few grant in aid trusts, such as Wolfson and Leverhulme The extremely popular part time mode of study is normally funded from the postgraduates' companies and by the students themselves. Most doctoral candidates have to have a British honours degree at the 2.1 level to be funded to undertake research with the onus normally on the student to find a supervisor and funding. Supervision is extremely patchy in the UK with students typically receiving less help than they would like, particularly in broadening studies and is aspects of creativity. Exchanges between overseas universities are becoming common, as are shared responsibility between British universities for joint supervision. At present there are no specific professional career possibilities for those holding a "Doctorate in Design and Architecture", except within academia, where career progress and salary are often accelerated for members of academic staff holding a doctorate. The authors believe the development of a Design Doctorate, based on the successful structure implemented for engineers by the EPSRC, would be a valuable extension to the portfolio of doctoral qualifications.

The Traditional British Doctorate

The higher doctoral degree for those in Design and Architecture in the United Kingdom has always been the degree of Doctor of Philosophy. Most universities use Ph.D. as the shortened title/nomenclature for this qualification, although a few British universities, including Sussex, Oxford and Durham, use the term D.Phil. They mean the same thing and are normally the result of three years of full time, or 5 years part-time, supervised research education. Candidates typically undertake novel studies leading to the writing of a written thesis which should show them to have: clarity of thought; originality of idea, findings and conclusions; capable of undertaking quality observation, analysis, interpretation (normally backed up with sound statistics); and capable of providing a sustained and logical argument. The candidates for such doctorates would initially try to pair themselves with a suitable supervisor - someone capable of opening up the research world to the student so they might become innovative yet capable of undertaking the sustained processes of doctoral research and its promulgation. A correct matching of student and supervisor is critical to the British doctoral process since

the doctoral journey in the UK is mainly a personal relationship between tutor and student rather than group or team exercise. Research by Powell (1993) shows that until 1993 the quality of this supervision was extremely patchy with some students being under supported (receiving less than 4 supervisions per year) and other being over-supervised. Table 1 shows the percentage of engineering doctoral students interviewed in a wide ranging survey who failed to receive training on a number of key research related issues.

Table 1:
Skills & Competencies Doctoral Engineers *"Hoped to learn, but did not!"*

Skill or Competence	*Percentage of Total Interviewed*
Commercial Understanding	50%
Resources Management	48%
Project Management	45%
Leadership Skills	38%
Team Working	34%
Integration Methodologies	32%
Communication Skills	29%
Time Management	29%

As a result of the above and other studies the two major funders of design and architecture doctoral students - ESRC and EPSRC - now lay down stringent guidelines for research student training. The ESRC, the Economic and Social Research Council, now only offer funding to those universities conforming to a recognised programme of research methods training for their postgraduates and the EPSRC, Engineering and Physical Sciences Research Council, are implementing their own programme of methods based activities, which include one week methods seminars, guidance books and a suggested quality assurance procedure to which they expect universities to conform. The Higher Education Quality Council and the Higher Education Funding Councils of England are also taking this aspect of quality of supervisory support extremely seriously and will be issuing directives in the near future indicating the portfolio of support doctoral students can expect.

The above desire for improvement in supervision must be seen within the context of an extremely successful mode of British education. British doctorates are given only to the most creative and innovative leaders in research, the apparently ad hoc mode of supervision and support does seem to have the desired effect on most successful candidates and this is recognised internationally. However, in time of marked global comparison Britain, has recognised the need to monitor, improve and validate its doctoral training. Furthermore, although for many centuries the Ph.D. has been seen to give sufficient scope for anyone wanting to undertake the highest form of research based academic study, pressures from industry and government has recently led to the development of a new form of industrial based doctorate. They seem to want, not only creative leaders, but those who can project manage and communicate well in an industrial setting.

Doctorates in Art, Design and Architecture

A review into design research activities undertaken by Cooper (1995) indicates that relatively few research projects are presently exploring or developing new methods or research design applicable to the discipline itself. Livingstone (1988) has long since advocated that 'without a healthy and developing critical perspective, design education will be seriously undermined'; he also argues that if practitioners continue to reject an ongoing responsibility for understanding and explaining what they do and why they do it, others will gladly take over. This prophecy has become self-fulfilling, reflected in many of the design related research papers published, which represent a lack of design based authors and in particular design based practitioners.

Most design academics have traditionally perceived their role as teaching knowledge, understanding and above all skills to enable students to practice as designers. In many situations the designer relies on activities which are heuristic in nature, utilising previous experience, and general 'rules of thumb', based on anticipating the right decision. However, this is at odds with the professional world which wants evidence in order to trust and value the process (Cooper, 1994). A new way of working or new doctorate programmes has been something academics in schools of architecture, art and design have been looking for, for over twenty years. Traditionally artists and those designers whose fields tended to be practice based such as architecture, fashion, graphics and product design, did not see the relevance of doctorates. Indeed, there are still relatively few Ph.D.'s in Design, Allison (1993), in his database of Research in Art and Design in the UK listed 272 degrees in Doctor of Philosophy up to 1991.However, Allison also points out the increase in popularity and number of doctorates in this area, this increase must be seen in the context of changing Higher Educational landscape within the UK, with old Polytechnics becoming new Universities, and greater institutional pressure to generate income through research income.

This has recently led to many more in-depth studies in all design based disciplines, which in turn has placed a career pressure onto existing and future academics to study for their own doctorates in 'art, architecture and design'. Furthermore, this pressure has also engendered an ongoing debate about what a doctorate in art, architecture and design should entail and what the examinable outcomes should be. Much of the discussion centres around whether by practising art, architecture or design, one is undertaking research. Press (1995) supports the notion that in an art and design culture research is 'the systematic investigation towards increasing the sum of knowledge which is reported in a form which renders both methods and outcomes accessible to others'. He uses the example of Diane Hobson, who produced delicate pate de verre glass, behind which was a great deal of research into forgotten glass making technique and unusually, she carefully documented both the research and the design.

It is important that we address a number of issues in design based doctorates. Greater emphasis must be placed on encouraging a broader range of participants to undertake doctoral degrees in design, specifically encouraging designers to undertake practice based research programmes (creative/expressive/productive) focusing on experimentation (pre-post testing, use of controls, etc.); encouraging professional practitioners to re-enter education in order to explore issues and experiences gained through profes-

sional practice; and encouraging the design based professions to value and adopt design research and its findings. These issues could be facilitated by adopting and developing innovations present in other types of doctoral training, such as engineering (previously outlined), which is based upon achieving greater integration between education and industry in order to develop novel and innovative vocationally orientated programmes of study.

In order to facilitate these issues it is important that we achieve a more interactive design research community. This will help to encourage inter-disciplinary working and help the development of research and advances in new programmes at the interface between disciplines. It will also be important to explore the development of European accredited programmes and Ph.D. qualifications in Design and Architecture in order to maximise the students learning experiences and expertise available to them. This is an avenue which Salford University is itself extremely interested in pursuing.

Some schools have developed an approach to degree of Doctor of Philosophy, which enables a programme of work to be undertaken by practice. Manchester Metropolitan University for instance encourages artists to research by practising. Currently Tim Dunbar of Salford University is researching Painting as Narrative by undertaking a programme of painting himself.

With this in mind, one could see craft based designers following a route to degree of doctor of design by undertaking experimental work or using a case study approach, as could fashion, graphics, architecture or product design. However, evidence of the benefits to the researcher and industry will need to be identified, so too will the maintenance of standards by the awarding universities. As yet this approach has not yet been followed by the design practice disciplines, however, with the trend towards taught doctorates and industry based doctorates, there is an ideal opportunity to follow the example of the industry based Engineering Doctorates

The Engineering Doctorate

In the late eighties Dr. John Parnaby of Lucas Industries recommended to the Engineering and Physical Sciences Research Council's Engineering Board the setting up of a new form of doctoral training for British engineers. This should be similar in nature to the higher European doctorate known a the D.Ing. or Docteur Ingineur. The Powell Committee (1992) endorsed Parnaby's findings and set into motion the UK's first doctoral experiment in over twenty years - it had successfully introduced a smaller programme in total technology doctorate at two universities during the seventies. The Royal Academy of Engineers strongly backed this new development which aimed to produce the "creme de la creme" of engineering doctoral students which they hoped would develop the creative and innovative research leaders of tomorrow. The Powell Committee was clear that the introduction of this new programme of doctoral working would be properly founded, fully evaluated and reported on, to ensure validity of this new approach. Presently the universities of UMIST (including Salford), Cranfield, Swansea, Surrey, Brunel, and ICST are taking part in this experiment. Early evaluations indicate the potential of this new qualification to engender the kind of research leadership, creativity and innovation desired by the Royal Academy of Engineers.

Such a doctoral degree would clearly lend itself to higher level studies in design and architecture, but at present there is not an Eng.D. programme tailored to the needs of such aspiring doctoral students. The Eng.D.would seem to be of interest in design and architecture because of its industry based, and creativity driven, nature. Eng. D. post-graduates are industry based with an industrial mentor for three out of their four years of study, but also have an academic supervisor who, not only undertakes traditional supervision, but who works closely with the host university to produce a series of support seminars. During their studies the students produce a portfolio of work based on the doctoral level projects they undertake in industry and on their seminar work. They prepare regular presentations for their peer group and their industrial colleagues and so become well versed in project/time management, presentation/communication skills and in team working and leadership skills. The examinations will also be an open one like many higher European doctorates, with several examiners from industry and academia, their peer group and other interested parties.

The first Eng.D. students are still to graduate, but the quality of the existing students work mid-way through their programmes of study and the demands from industry for this new breed of researcher gives much hope for this new way of working. This structure for this form of doctoral education would suit itself for those who wished to read for this higher academic degree but with an emphasis on design and design practice.

Other Novel Doctorates

As a result of the above, and the complete shake up that has occurred recently in British Higher Education, many Schools of Architecture and Design are now actively exploring the possibility of new forms of doctorate. Some are taking the traditional doctoral route and incorporating in the education a period of research training for which the candidate can obtain the extra qualification of M.Res., or Master of Research. Others, like our own, are developing Design based doctorates around the notions mentioned above for an Eng.D. in Design and/or Architecture. There is also a strong move towards developing a more taught style of modular doctoral programme, building on the massive developments which have already started during the modularising of the British Master's Degrees in Design and Architecture.

In preparation for this paper we also wrote to every Head of School of Architecture and Design in the UK to determine whether any such novel doctoral approaches had become formally accepted by their university or if they were presently running such programmes. At the time of going to press we have been told of no such programmes, but it is envisaged that change is imminent, perhaps spurred on by this meeting.

The Role of Informing Technologies

Technology will also have a role to play in achieving the advances we have mentioned and it is especially important that we explore the use of information technology with European partners in order to facilitate the exchange and transfer of ideas, maximise resources, and provide access to a broader range of facilities and expertise. If this is combined with a high level of electronic information exchange it will encourage and

create a strong vibrant research community and provide evidence of its value and worth to the professional community.

Funding of British Doctorates

Funding for doctoral is mainly by the two previously mentioned Research Councils, the ESRC and EPSRC, depending on the thrust of the study. Those taking a more social view are funded by ESRC, those a more technological view by the EPSRC. Those taking a designerly view often fall between Councils and may need to get funding from other sources such as the Royal Academy's 1892 fund or from one of the few grant in aid trusts, such as Wolfson and Leverhulme.

The extremely popular part time mode of study is normally funded from the postgraduates' companies and by the students themselves. Many universities allow their own young staff to enrol for doctorates, at no cost, as part of staff development.

Increasingly, students are turning to Europe for funding. Such funding is then mainly as a result of British students undertaking their studies in another member state and other European postgraduates coming to the UK as in the "student mobility" programme. The early part of a doctoral training can be funded those presently out of work through the European Social Fund or through government TEC money. The routes here are often difficult to find.

Many universities in Britain now fund some of their doctoral students from accumulated funds. For instance, our own university uses funds generated by our industrial partners to sponsor two full time doctoral students and to give twenty £1,000 bursaries.

Candidate Selection

Those universities with a high reputation in Design and Architecture tend to attract the best candidates automatically and are often over subscribed with high quality candidates. Those new to research have to advertise through the national press. Most students looking for independent postgraduate study will not normally be funded unless they have an honours degree at the 2.1 level or above, in a relevant discipline. Those with design/ architectural experience and an alternative qualifications are also acceptable. Candidates are mostly interviewed by the prospective supervisor and, as long as their qualifications are acceptable to the university, it is the supervisor who make the final selection.

Again the Research Councils give guidance as to the kind of candidate who might prove acceptable, but most universities have no formal criteria of selection for postgraduates at present. However, under pressure from HEFCE this may well change in the near future because the Council is concerned about the poor pass rates of existing doctoral students.

The main check against incorrect choice of doctoral candidate, for most universities, is by making all postgraduates enrol initially for the M.Phil. degree with the possibility of transfer to doctoral status after one year. At the end of the first year a significant interim report is produced which is normally vetted by two or more staff and the decision

to transfer made at this stage, to be later ratified by the university. Those felt unable to undertake original and innovative work are 'weeded out' at this stage.

Supervision Arrangements

Until recently the supervisor has been the sole determinant of the supervision arrangements. As mentioned earlier these can be extremely good, or rather problematic. Normally, the initial supervisions are fairly regular - while the student gains confidence, become less in the middle of the work - as the data/observations/analysis develops and becomes intense again during the writing up period. Until recently supervisors were rarely trained for this task and as a result the research training can be rather idiosyncratic. However, spurred on by the National Committee for Postgraduate Students and the HEFCE/RCs, most universities are setting up formal training for their staff and are thinking about team supervision.

Our own university is going one step further and developing a structure to enable the monitoring and support of postgraduate students. This will be based around a "learning agreement" between student and tutor - a document which lays down formally in chronological form the activities/facilities/support each side can expect from the other. Our hope is that this agreement, re-negotiated each year during the research, will improve the quality of supervisory support without destroying the unique bond which must develop between supervisor and student.

Exchange Arrangement

Exchanges of doctoral students and joint supervisions are all possible within the British system. They depend on the university, the faculties, the schools and their mode of relationship with other universities and industry. The more progressive universities, like our own, work with other faculties, universities and industries to provide the best support possible to support the postgraduates studies. The only determinant for collaboration and exchange is comparability of the partner with respect to quality and availability of support. Most universities are looking to give the postgraduate the highest quality of support and guidance and are therefore looking for the highest quality of partner.

Our own university, for instance, offers the industrial doctorate mentioned earlier; joint supervisions within the university across faculty supported by interdisciplinary Research Institutes; and exchanges with students from overseas normally for one year out of the three years of study. We, and many other British universities, are looking to develop richer relationships with other universities particularly in Europe.

Conclusions and the Future

Now is an extremely exciting time for those involved in developing new forms of doctoral education and training in the UK, and indeed in the world. Industry is beginning to recognise that those with the right form of doctorate - such as the engineering doctorate - have a real role to play in their future.

With the 3rd age of our society becoming larger and those in it looking for a constructive alternative to life advanced postgraduate activity may take on a new meaning.

Furthermore with the advances in telecommunications geographical and locational boundaries no longer seem to be a problem. We must plan creatively and innovatively, with hope.

Unfortunately, except within academia itself, the degree of "Doctor in Design and Architecture" still has very little influence on a holders career prospects. Perhaps, through a strong European Union on this issue we can create a useful and necessary change in this respect. The creation of a Design Doctorate, based on EPSRC's Engineering Doctoral structure but with a focus towards design practice, would offer something useful to those wanting to pursue design at a higher academic level. It would also represent a valuable higher level qualification for those designers entering academe. Finally it might be the sort of higher academic qualification that the very best designers would wish to avail themselves of as a measure of their design capability.

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Doctorates at Faculties of Architecture in Germany
Some Quantitative and Qualitative Data for the Period 1986-1995

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Introduction

An attempt was made to produce an overview of the Doctorates at the faculties of Architecture in Germany. Through the help of prof dr - ing Habil Günther Harder, 'Vorsitzender deutscher Dekane - und Abteilungsleiterkonferenz für Architetektur, Raumplannung und Landschaftsarchitektur', we could address the deans of the twenty faculties of Architecture with the request to provide us with the titles and authors of dissertations produced in the last ten years. By June 1996 twelve of them had responded. Two of them, being recently founded faculties, had no doctorates sofar. Although some of the larger faculties are lacking in this overview the ten faculties discussed in this paper are fairly representative of faculties in both the eastern and western parts of Germany. Interestingly the political unification of both parts took place in 1989, within the studied period of 1986-1995.

Some remarks on the doctorate procedure

- Precondition for a doctoral candidate is that he/she has finished her university study with a diploma.
- The thesis has to mirror the scientific independence of the candidate.
- A committee of (usually 3) university professors judges the dissertation.
- Every member gives a written comment not later than three months after the delivery of the thesis.
- The oral examination of one hour consists of a thirty minute lecture on the contents of the thesis and half an hour of questions not only dealing with the thesis but covering a broader field. If the candidates fail with the oral examination they have the chance for repetition after one year. The thesis has to be published within a year after the oral examination.

Funds, scholarships, duration

Funds and scholarships are offered on state and federal levels: 'Studienstiftung des deutsches Volkes', an education foundation; 'Graduierten Förderung'; 'Alexander-Humboldt-Stiftung', which provides grant scholarships to foreigners. Private enterprises, like Volkswagen and Daimler Benz, and political parties, also provide grants.

A lot of candidates are attached as assistants to university chairs. In the German system, the teachting period covers two terms of altogether 6/7 months, the rest of the year can be spent on research. Both for teaching assistants as for individually working candidates, the period needed to finish their thesis is on average five years.

Table 1: number of doctorates

	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	
TH Aachen	6	4	13	5	5	6	7	5	6	2	59
TU Berlin	10	2	4	3	4	3	5	9	3	4	47
TU Braunschweig [1]											12
U Dortmund	-	1	1	4	1	2	-	1	2	2	14
TU Dresden	13	12	7	17	15	4	9	4	1	1	83
HBK Hamburg	1	2	1	2	1	-	2	-	1	2	12
U Hannover	4	6	9	4	7	11	4	11	6	9	71
U Kaiserslautern	-	-	1	-	-	1	-	3	-	1	6
U Kassel [2]	-	-	1	-	-	2	-	-	-	2	5
U Weimar	9	2	6	17	14	8	2	5	3	3	69
	43	29	43	52	47	37	29	38	22	26	378
former DDR:											
U Dresden + Weimar	22	14	13	34	29	12	11	9	4	4	152
W German U	21	15	30	18	18	25	18	29	18	22	226

[1] Dates were not provided

[2] only doctorates in building physics were provided

Results

In table 1 the yearly production of Doctorates at ten faculties of Architecture is given. Given a grand average of 3.8 doctorates per year / per faculty, there is a clear distinction between universities which generate 5 or more and universities which generate 1 or less doctorates per year.

The former DDR universities of Dresden and Weimar, which were before 1989 the most productive, show a sharp decrease in production since then. The eight 'West' German faculties maintain with small variations an average of 22 doctorates per year. The political and organisational background of these changes in Dresden and Weimar are too complex to be dealt with by us, but should be reason for serious concern in our opinion.

More interesting even than these quantative aspects is the kind of themes and topics dealt with in this large number of dissertations. The authors had only the titles to judge by the topic, theme, field of study or approach of the dissertation.

Based on these judgements seven 'disciplinary' categories could be discerned, to which each dissertation 'gravitated' as it were.

In table 2 the results of our attribution attempts are presented. The eighth category denoted as 3°, counts the number of dissertations dealing with non-european and/or Third World cultures, very often produced by students coming themselves from these cultures. From this last count it appears that Dresden and Weimar in the former DDR and Hannover were the most internationally oriented universities. Dresden and Weimar drawing students from Vietnam, Cuba and arab countries and Hannover more from Turkey, south-american and african countries.

Table 2: doctorates per subject/theme (period '86 - '95)

	T	*H*	*A*	*U*	*S*	*B*	*C*	*3°*
TH Aachen	5	28	11	10	4	1	-	9
TU Berlin	9	18	12	6	-	2	-	9
TU Braunschweig	4	5	3					
U Dortmund	7	-	2	3	1	-	1	1
TU Dresden	25	16	15	21	-	5	1	20
HBK Hamburg	1	8	1	4	2			2
U Hannover	9	28	11	11	5	3	3	28
U Kaiserslautern	-	4			3			1
U Kassel [1)]	5							
U Weimar	18	9	32	7	3	-	1	24
	83	116	87	62	18	11	6	85

[1)] only building physics dissertations provided

T= Technical: statics, building physics, construction, materials, solar heating, installations, climate etc.

H= Historical: History of Architecture, urban planning history of art, restoration of monuments, evolution of building types or parts of buildings; biographies of architects.

A= Design of (parts of) buildings, functional analysis + programming, architectural theory, design theory, design process.

U= Urban planning + design incl. landscaping, urban faculties, traffic, pedestrianisation.

S= Social sciences (psychology, sociology, political science, education)

B= Building management, process, economy, law.

C= CAD + informatics.

3°= Subject area in non-European / 3° world cultures.

Now turning to the other categories, not surprisingly by far the most popular approach in doctoral research is the historical, ranging from the analysis of the work of one particular historical architect, an architectural movement to the historical description and analysis of urban planning policy during a particular period. It looks as if this type of research was not that popular in Dresden and Weimar, where technical and architectural (often building typology) were the dominant fields of research, whereas again social-scientific approaches are relatively more frequent in 'western' faculties. The fields of building (process) management and CAD/informatica are, probably due to their newness, the least attended to in german dissertations.

Concluding remarks

Although we do not possess the figures about the number of doctorates in other, than architectural, faculties, we are quite confident in estimating that the number of dissertations in the fields of architecture, urban and landscape planning, is among the lowest.

From (our own) experience we know that other faculties provide a much better methodological and theoretical basis for (doctoral) research than the design and practice oriented faculties of Architecture and Planning. If we want more doctoral research in our faculties, this basis should be reinforced.

Architecture: A Profession and / or a Discipline

On the Doctoral Program of the Oslo School of Architecture

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Abstract

In this paper the author discusses the concept of research education at the doctoral program in the Oslo School of Architecture and considers its theoretical, pedagogical and practical grounds. General thoughts on the meaning and role of doctoral studies in architecture are introduced in conclusion.

The "Univeritas"

The Norwegian University Council, consisting of four universities and six university colleges, adopted a National Doctoral Code on the 10th of March 1992. This code builds on four main principles: i) setting 3 years as the standard limit for full-time doctoral studies (6 years for part-time study); ii) obligatory, organized research training; iii) that each candidate must have at least one appointed supervisor; and iv) admission to a doctoral program is formalized by a written agreement (A Description of Doctoral Degrees in Norway, 1994: 4, 5.).

The rules of the national code state that the program should consist of three phases which may overlap in time: training; in-depth studies and a preparation of the doctoral dissertation. The research training period has a duration of one full year.

In discussions leading to the establishment of the national code, there were several different opinions with regard to the principle objectives of doctoral studies. They arose from a wide range of disciplinary backgrounds distinguished by different epistemological characteristics. In the end, these objectives were defined as follows:

> "The program of studies leading to the doctoral degree is intended to qualify students for research and other kinds of work which demand a high level of scientific or scholarly insight. The specific goal of the studies is the production of a thesis of a high academic standard, based on research in a particular area of specialization". (A Description of Doctoral Degrees in Norway, 1994: 11.).

The role and character of research education has been extensively discussed in the Norwegian university milieu (Sagstuen, 1993). The conclusions drawn appear similar to those the British have reached on the subject. In Britain there have been attempts to formulate strategies and guidelines for research training. They specify the research skills common to various disciplines and the basic principles of research design. The following approaches to the development of structure and syllabus for a research education have been discussed: i) providing a structured transition from lower to higher

grades of research work; ii) broadening students' understanding of their own discipline; and iii) developing a common disciplinary identity (Becher, Henkel, Kogan, 1994: 52, 53.).

The background of the Oslo school

There are three schools of architecture in Norway a country with a population of 4,2 million: one in Oslo, one in Trondheim and a semi-private school in Bergen. The Oslo School of Architecture, originally called The State School of Architecture, was established in 1945 as an "emergency support" for the students of architecture whose studies were curtailed by the war. The course of studies lasted two years and followed three years study at the well-established State School of Arts and Crafts. In 1969 the institution was awarded the status of School of Architecture with a governing board appointed by the Ministry of Education. In 1983, it was elevated to an autonomous institution with an internal Executive Board, appointed by the Ministry of Education and with the right to confer a doctoral degree (decreed in 1981). In 1995, a new University Legislation reconfirmed the academic status of the School as an autonomous university college. That same year it was merged with the Institute of Industrial Design. All together the number of students today is over 300 with a faculty consisting of 32 full-time and associate professors, as well as of a number of untenured part-time teachers.

The school has traditionally emphasized the value of practice as the main source of professional and pedagogical competence. Therefore research at the school, with few exceptions, is a relatively new phenomenon. At an institution without a strong research tradition, it has been a challenge to establish such training within the doctoral program along the lines defining research by the Doctoral Code. The problem of developing research education in architecture has been common to other Scandinavian schools. In all schools, including those in Sweden which do have long traditions in research, there has been insecurity concerning the object of architectural research, its methodology and theoretical base, as well as uncertainty about the required skills of the researcher and the criteria for evaluating the products of research.

The doctoral syllabus currently used by The Oslo School of Architecture was developed through a series of seminars and workshops attended by the University of Oslo and The Faculty of Architecture at the Norwegian Institute of Technology, the University of Trondheim. In addition, The Oslo School of Architecture hosted a research colloquium in January 1992 attended by the University of Liverpool, Department of Civic Design, the Oxford School of Architecture and the Oxford School of Planning. An ongoing series of research seminars and courses started by the Scandinavian Group for the Co-ordination of Doctoral Studies in Architecture (NKUFA) in March 1992, also provided an important incentive.

The profession

Since the middle of the 15th century architects have, on the basis of developed theory, defined their competence through their work in design. As the distance between architects and traditional builders increased, abetted by design, theoretical discourse and practical treatises, this competence became more readily discernible. Thus architecture evolved both as a profession and as a discipline, i.e a professional discipline. The lit-

erature on professions and on architecture as a profession is still growing. Barber has written about "a high degree of generalized and systematic knowledge; primarily oriented towards a community of interest rather than individual self-interest; a high degree of self-controlled behaviour through codes of ethics internalized in the process of work-socialization and through voluntary associations organised and operated by the work specialists themselves; a system of rewards (monetary and honorary) that is primarily a set of symbols of work achievement and thus ends in themselves, not means to some other end of self-interest" (Barber, 1963: 672). Small expands on Baber by emphasizing the "esoteric" nature of the profession´s services, and the professions´ claim that those services depend on "some branch of knowledge to which the professionals are privy by virtue of long study and by initiation and apprenticeship under masters already members of the profession" (Small, 1991: 25).

This being so: how does architecture present itself as a discipline within these general descriptions of professionalism ? Here I turn to Albertsen who proposes that architecture is not based on scientific knowledge, a kind of "architectural science" which could be applied in specific professional situations, but upon inter-disciplinary knowledge which architects believe allows them to realize an inter-disciplinary process, synthesis and resulting form. Architecture claims to be the only profession that includes art as a part of its identity. Another of its distinguishing features is tacit knowledge which appears to play a stronger role in the practice of architecture than in other professions (Albertsen 1994: 121).

Sarfatti Larson has further addressed the dual identity of architectural discipline and profession by combining Foucault´s definition of a discipline "a system of control in the production of a discourse" with her own understanding of social appropriation of such a discourse (Sarfatti Larson, 1995: 260). She thus proposes an interesting concept of architecture as a field of tension between «the autonomy of the architectural discourse and the heteronomy of the process of making architecture» (Sarfatti Larson, 1995: 5). She implies that «the autonomous discourse» is the knowledge and justifications it produces by and for itself on behalf of the general public; while «heteronomy» is the dependence on clients and other experts in the field of building. Thus according to Larson, the autonomous and the heteronomous aspects, by constraining each other, define architecture.

Landau has presented an illuminating canvas of the architectural profession seen from an Anglo-Saxon perspective. He analyses the architectural position as a result of various theoretical perspectives (psychology, philosophy of mind, epistemology, etc). In this manner knowledge and empiricism are the origins of programs for individual action; and in being programs constitute a position. Landau maintains that every designer must hold a position, even those who incorrectly claim to have no theory, such a statement being a strong theoretical position in itself (Landau 1984: 3,5).

Landau, as Sarfatti Larson does, focuses his discussion on discourse, the architectural discourse which encompasses both text and objects, but he goes a step further by recognizing the various actors which play a strong role in this discourse despite the fact that they are outsiders in the making of architecture per se. These actors include the

patrons of architecture; other professionals; cultural and educational institutions; the journals; the media; and of course the critics, historians and writers on architecture all of whom possess a special capacity for making and shaping the architectural discourse.

The power of this discourse involves two facets: the discourse itself and its socializing aspect. The makers of the discourse, promoting it through their contributions, by seeking acceptability gain credibility and in doing so, according to Landau, build up a community of interest. The socializing instruments in this process: rhetoric, polemic and persuasion, must be considered in the light of the values which underpin them (Landau, 1984: 7,8).

Landau stresses that his study is confined to the British context characterised by a tendency towards empiricism, a long and rich tradition of experimentation, novelty seeking and innovation. It thus contrasts with another powerful European cultural tradition, the rationalist, where thought precedes action. Theoretical prescription is demanded prior to action (Landau 1984: 8).

These two traditions have resulted in two approaches to the issue of a knowledge base in architecture.

The role of tradition in building a knowledge base in architecture

In the Anglo-Saxon world, the focus on knowledge derived from the tension between art and artifact leaves no place for theory [1]. This is the field of architectural criticism. Such criticism provides, through descriptions, interpretations and evaluations of architectural works, both a traditional source of reflection and, as discourse, has a socializing effect on the corps and its champions. As discourse transcends to a higher meta-level of abstraction, when critics criticize criticisms, it reaches a stage where buildings and places, being of lesser consequence, are supplanted by a profusion of discourses, formalism, post-formalism and deconstructuralism being only recent examples (Attoe, 1994: 524 - 527). Architectural criticism, as an appreciation of architecture as a work of art, accepts this tension between art and artifact. While such criticism deals with the former (art) the latter (artifact) is the object of rationalised and personalised reflection. This observation is expressed in recent concepts of design rationality, e.g. by Donald Schön.

Schön points out four approaches to the derivation of knowledge from practice: (i) the use of an analytical frame, a method of studying the way practitioners frame problems and roles and in so doing become aware of their own tacit frame; (ii) the use of a descriptive image analysis to ascertain category schemes, exemplars, etc. from which repertoires for use in unique situations can be built; (iii) the use of a combination of methods of inquiry and subsuming theories; and (iv) the study of reflection-in-action (Schön , 1995:309).

The rational approach to the production of a knowledge base in architecture is well illustrated in the work of Phillippe Boudon. He maintains that "L´architecturologie n´est pas l´architecture" (Boudon, 1991: 5). According to him «architecturology» is the theory of architecture, except that the term theory in his case lies closer to the term

doctrine. Further, he states that theory in architecture is generally more normative than in science where the term is applied to «a coherent body of knowledge» (Boudon,1994:9).

Another French theoretician discusses the role of architectural criticism in the production of knowledge saying that:"criticism is one of the main forms of relationship between architecture and society. Nevertheless, is it possible to elude the question of the nature of the contents being so socialized ? Such a quest is surely limited, but does not appear to be less important. It raises the difficulty of the construction of knowledge and of a language that can legitimize the subject of criticism and gives it its own tools for evaluation. This example of a research process has progressively established the difference between form and content. It allows for the separation of two types of architectural criticism: criticism of work and critical studies. The former deals with buildings, the latter with questions, methods, and concepts, isolated by an activity whose socialization is different: architectural research»" (Deshayes, 1991: 173).

A search for such a differentiation is also found in the writing of a non-French author (Habraken, 1993:). These concepts of criticism of work and critical studies have also been discussed at length in connection with the establishment of doctoral studies in art in Norway (Rebolledo, 1994: 10).

While in the Anglo-Saxon tradition the field of tension is more between art and artifact, between architecture as art - architecture as a profession; the field of tension in the European tradition is more between the discipline of architecture and other academic disciplines. Boudon introduces three approaches to an architectural knowledge base and to research: the axiomatic; the applicationistic; and the hermeneutic. The first is an internal study of the field from an architectural viewpoint. The second is an external study of architecture from a disciplinary view point. The third is a study which regards architecture as a subject for continuous revision ("a permanently revised object') (Boudon, 1994: 13, 14).

Boudon´s view on the architectural discourse presents a relevant point of departure for the constitution of a doctoral syllabus, especially his acknowledgement of four pertinent discourse categories: history, criticism, doctrine and theory. He sees «architecturology» as the third. Each has its own discursive role: history has the study of the past; criticism, the statement of values; doctrine, is directed towards practice; and theory aims at knowledge (Boudon, 1994: 15).

The development of the research education concept of the oslo school of architecture 1992 - 1995

At the Oslo School of Architecture, the concept of research education has, as mentioned before, been developed with reference to two worlds: that of *Universitas,* with the criteria defined by the Doctoral Code; and the profession, with the complex of approaches formulated in recent years by international discussion.

The traditional undergraduate training leading to the degree of Civil Architect in Scandinavia gives, as previously mentioned, few opportunities for theoretical research.

Traditional professional competence has therefore been directed towards practical skills related to the constructive aspect of architecture. Thus the recent transition from traditional undergraduate training to post-graduate architectural research education presents a challenge which almost implies the «re-education of an architect» (Dunin-Woyseth, Bruskeland- Amundsen, 1995:8). Students are now being trained to develop their ability for theoretical thinking, to combine the known with the new, and to withstand criticism for their efforts. With this type of professional education in mind, The Oslo School of Architecture, has attempted to develop a scholarly profile, a "research education concept" for architects.

This concept of teaching architectural research is implemented by a three part program, a series of courses which together constitute The Doctoral Programme of The Oslo School of Architecture.

Part 1 provides a general introduction to the «landscape of disciplines». Within this landscape a family of professional disciplines can be discerned where each one has an essence rooted in practice. Architecture finds itself in a sub-group of these so called "making disciplines». The intention behind such an introduction, is to establish a sense of identity among doctoral candidates within the broad research world.

The aim of Part 1 is to show the candidate: what research is, to show the basic methodological problems encountered in research in general, and those relevant to architecture in particular. The purpose of Part 1 is thus "to introduce the candidate to central problems in the philosophy of science as well as to the theory of humanities" (Haugom Olsen, 1995: 12). It is here that "the trichotomy: physical data, scientific phenomena and theory is introduced" (Kaiser, 1995 a :179). The candidate learns to appreciate how phenomena are made out of data, and how theories connect, not to data, but to phenomena. Put in epistemological terms: the «upward» movement from data to phenomena is met by the «downward» movement from theory to phenomena (Kaiser, 1995 b: 191).

Thus Part 1 of research training meets conceptual objectives stated by providing a structured transition from lower to higher grade research, and by broadening the candidates' understanding of the relationship between their own discipline and the wider context of the philosophy of science.

Part 2 is an introduction to the knowledge base of architecture where differences between architectural discourse and architectural practice are emphasized, and their variations in history and in concurring Western traditions.

Candidates are introduced to those Western traditions which constitute the knowledge base of architecture. The richness of such an approach is well expressed in a collection of course outlines for the study of history, theory and criticism at 18 Anglo-Saxon universities and schools (Bizios, 1991). A Norwegian author, Sinding-Larsen, points out that one can classify and categorize the subject in many ways, but indicates that the major point is to present an outline of possible perspectives (Sinding-Larsen, 1994:69).

Boudons´ concept seems to be the closest to the concept behind the courses offered in recent years, 1993 -1995, by the Oslo School of Architecture. These have presented a historical outline of the written and built canon of architecture, discussed the role of architectural criticism as a value bearer; and given an introduction to design theories, the theories of making. But the strongest emphasis has been laid on architectural theory.

It is impossible to present a single overarching theoretical concept in a course where the main content is theory in a broad spectrum of concepts and definitions ranging from the most «including» to the most «excluding». Kruft proposes that "a sum of what has been consciously formulated as such" as an including concept-definition (Kruft, 1994: 13). Further he adds that architectural theory is comprised «of any written system of architecture, whether comprehensive or partial, that is based on aesthetic categories" (Kruft, 1994: 15).

Choay divides architectural theories into two groups: «producers» and «commentators». The latter are oriented towards explanation or prediction of the object, while the former are directed towards prescribing what should be done with the object. Choay proposes an excluding concept definition for the category of producers-theories but adds that these can only be regarded as such if they comply with a set of restrictive criteria (Choay, 1980: 24) [2].

In this manner, Part 2 of the research training program abides to the conceptual criterion and develops a common disciplinary identity amongst doctoral candidates.

Part 3 is intended to provide a theoretical basis for individual dissertation topics. It is therefore tailored to both the topics' individual needs, and their broader disciplinary contexts. The objective is to support the candidates in defining the entire theoretical basis of their projects. This is the stage where the role of the candidate changes from one of «axiomatic» to one of «applicationistic» researcher (Boudon).

At this point between research training and the development of their dissertation, each candidate is obligated, in accordance with the Doctoral Code, to submit a revised, and from then on, binding outline of their research project.

The so called "Roskilde Model" has been applied as a model for the pedagogical structure of the Oslo research training programme. Roskilde University in Denmark pioneered doctoral studies based on a cross-university cooperation network. A *conditio sine qua non* for such co-operation is the organization of short concentrated periods of ex-cathedral teaching preceded by intense literature studies and followed by practical theoretical exercises such as writing essays supported by extensive tutorship. Each educational unit is concluded by a public mini-disputation of submitted papers.

"Architectural research is a field of professional practice" (Deshayes, 1991: 173). That is the way it is being taught at the Oslo school, i.e., as "an apprenticeship in the craft, emphasizing coaching and learning by doing" (Schön, 1995: XII). Thus by adopting

the "Roskilde Model" for architectural research training the program follows the same pedagogical principles used in the existing architectural design training model.

It is too early to evaluate the quality of the above described research concept and the program by which that concept is put into practice at the Oslo school. The first groups of doctoral students will defend their theses in the Spring of 1996.

A kind of conclusion: the contribution of doctoral research to the professional discipline of architecture

During recent years the professional disciplines have undergone much development and change. The discipline's epistemological bases are both still growing and undergoing re-evaluation. The various professions face strong competition and are subject to the laws of supply and demand in their respective fields of competence (Dunin-Woyseth, 1994: 184). The situation of the professional disciplines differs from that of the sciences in that, unlike the sciences, professional disciplines are caught in the tantalizing challenge of combining knowledge and action, and theory and practice; a combination which is crucial for their identity.

In order to survive, professional disciplines must continuously redefine their fields of competence according to, and in accordance with, society in general and the internal developments within its own ranks (Robinson 1990: 20). A broader perspective of architecture as a design discipline, encompassing scales from the spoon to the city has evolved in recent years. Professional practice can only survive through support from an ever expanding theoretical discipline.The activities of a discipline and a profession are necessarily inter-linked. While professional identity is based on a conveyance of traditional practice from generation to generation; the disciplines, whose task it is to continiuously update the knowledge base of the professions, provide a basis for evolutionary growth. Architectural quality is established on the basis both of professional practice and continuous disciplinary research.

In summary: Doctoral studies have a two-fold objective: to educate researchers and to enable them to conduct significant research; and to contribute to the development of a more comprehensive understanding of the knowledge base of architecture[3] . Both contribute to the advancement of disciplinary knowledge and the maintenance of epistemological tradition and its practice. Doctoral research is regarded as the key contribution to the output and culture of research (Becher, Henkel, Kogan, 1994: 65).

In light of the above, there is need for the continuing discussion on improving and implementing programs for doctoral studies in architecture.

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Notes

1. Valery Bacon maintained that: "In the architectural literature the word «theory» is used, but often what are being put forward are untested hypotheses. Therefore, in teaching PhD students, one aim is to test hypotheses, and build up knowledge, which in time may contribute to some theories in architecture of the type found in other disciplines". (Unpublished manuscript to the lecture "Doctoral Studies in Architecture. Oxford Polytechnic, Postgraduate Research School" presented at the Anglo-Norwegian Research Colloquium, held at the Oslo School of Architecture on the 31 January 1992).

2. "Le traité d'architecture ...sera provisoirement défini par cinq traits (1) C'est un livre, présenté comme une totlité organisée (2) Ce livre est signé par un auteur qui en revendique la paternité et écrit à la première totalité personne (3) Sa démarche est autonome. Il ne se veut subordonné à aucune discipline ou tradition. (4) Il s'assigne pour objet une méthode de conception, l'élaboration de principes universels et de règles génératives permettant la création, non la transmission de préceptes ou de recettes. (5) Ces principes et ces règles sont destinés à engendrer et à couvrir le champ total du bâtir, de la maison à la ville, de la construction á l'architecture» (F.Choay, 1980:24).

3. Two examples of the purposes of doctoral programs:
   "The Ph.D. program exists to develop future scholars/researchers/professionals, and to encourage current research that will make architecture and the arts more coherent and contributive modes of work" (The History, Theory and Criticism of Art, Architecture and Urban Form, Ph.D. and Masters Programs, MIT, Cambridge, Massacusetts, 1995).
   "A major objective of the degree is to train researchers who will make original contributions to the development of an improved theoretical basis for the discipline of architecture" (Doctoral Program in Architecture, Program & Course Descriptions, The University of Michigan, College of Architecture & Urban Planning, 1995-1996).

Above: Plenary session on the State of the Art, with Piet Lombaerde, Niels Ole Lund, Pierre von Meiss, Jerker Lundequist and Richard Schneider
Below: Round table discussion with Murray Milne, F. Pousin, J. Mabardi, Alexander Tzonis, Stanford Anderson, Necdet Teymur, Phillipe Boudon and M. Malecha

Research in Architecture and The Idea of a Social Science

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Abstract
Sweden has three schools of architecture, each linked to a faculty of technology, in Stockholm, Gothenburg and Lund. Each school has an extensive research and research education program, divided into one academic year devoted to courses, and three years devoted to the thesis work.

The architectural research education system in Sweden now has been practiced for nearly 30 years, and the results have not been very satisfactory. The architecture schools of Sweden therefore have begun to redefine and rethink the aims, goals and methods of their research education system. Especially at the Stockholm school of architecture we have been heavily influnced both by the philosophical tradition after Wittgenstein, e g the ideas about practice-oriented science which have been proposed by the philosophers Peter Winch and Donald Schön. Therefore a discussion of their ideas is presented in this paper, as a new concept of architectural research that refers to a science that aims at articulating a social practice by clarifying the concepts that are crucial to this practice.

First, as a general background I have to present some facts and figures about the architectural research education system in Sweden: Sweden has three schools of architecture, each linked to a faculty of technology, in Stockholm, Gothenburg and Lund. Each school has an extensive research and research education program, divided into one academic year devoted to courses (Research Methodology, Theory of Science, Theory of Architecture, Design Methods and others), and three years devoted to the thesis work. Each research student is assigned one or more tutors. About 50 research students participate in the research education programs at each of the three schools. A research student who is studying fulltime thus is supposed to finish his studies within 4 years, a goal that very seldom is achieved.

Royal Institute of Technology, Stockholm: The department of Architecture and Urban Design is divided into 9 divisions, one for each research education subject: History of Architecture, Building Design, Building Function Analysis, Design Methodology, Theory of Form, Architecture, Building Engineering, Lightning, Urban Design. The department has a staff of about 90 people, including 9 full professors, 9 lecturers, and about 40 researchers/teachers. Most of the external funding comes from the Swedish Council for Building Research and similar state or private owned sources. The school has about 450 undergraduate students and about 50 postgraduate (research) students.

The annual output of the research education program is about 4 to 5 doctors of technology, and 4 to 5 licentiates.

Chalmers University of Technology, Gothenburg: The School of Architecture is divided into 8 divisions, one for each research education subject: History of Architecture, Building Design, Housing Design, Industrial Building Design, Design Methodology, Theory of Form, Architecture, Building Engineering, and Urban Design. The school has about the same size and organization as the school in Stockholm.

Lund University of Technology, Lund: The School of Architecture is divided into 8 divisions, one for each subject: History of Architecture, Building and Design in Third world countries, Building Function Analysis, Building Design, Theory of Form, Architecture, Building Engineering, and Urban Design. The school has about the same size and organization as the school in Stockholm.

The architectural research education system in Sweden now has been practiced for nearly 30 years, and the results have not been very satisfactory. The system is expensive, inefficient, and is troubled by several problems of quality both when it comes to the methods used and the results presented. The main reason for this, I think, is that the architectural research education organization already from the start did the mistake of taking over methods and other intellectual tools from the established sciences and of applying these tools in the field of architecture, without any reflection on the specific conditions of architectural research, which, it might be argued, is a specific kind of research that by necessity has to be pragmatic, e g practice oriented, and closely linked to the needs of the architectural profession.

The architecture schools of Sweden therefore have begun to redefine and rethink the aims, goals and methods of their research education system. Especially at the Stockholm School of Architecture we have been heavily influnced by the philosophical tradition after Wittgenstein, e g the ideas about an action and practice-oriented science which have been proposed by the philosophers Peter Winch and Donald Schön. Therefore a discussion of their ideas is presented in this paper, as a new concept of architectural research that refers to a science that aims at *articulating a social practice* by clarifying the *concepts* that are crucial to this practice.

Who is a theorist and who is a practitioner?

The architectural profession differentiates between theorists (which means architects who research, teach or investigate) and practitioners (who design buildings and urban structures). But the word *practitioner* actually refers to someone who applies, or practices, a theory. So, who is actually the practitioner and who is actually the theorist? One clue lies in looking at the labor market of the architectural profession in Sweden of today: one third work with physical planning and urban design, one half with architectural design, and the rest with administration, investigations, research and teaching. Consequently, the profession includes both theorists and practitioners. An architect also often shifts between the role of practitioner and the role of theorist during his or her professional career. The labor market, however, is not reflected in the undergraduate education, which is mainly focused on providing basic skills in design.

The difference between one who possesses practical knowledge and one who works with theoretical issues is sometimes described as follows (Ferré 1988): The important thing for the practitioner is *that* X functions. The theorist wants to know *why* X functions. The practitioner uses available knowledge, theoretical of practical, as a means to an end, and usually does not differentiate between facts and values (since to him it is a fact that the person N has expressed the value V) in order to arrive at the answers which are *useful for the users and the clients. Instead, the theorist is interrested in why* these answers are useful. Why this is so, and what it should mean for research and research education at an architecture school, is the main subject of this paper.

According to the Stockholm Architecture School's catalogue, the school offers a basic training for future professional practitioners of architecture, comprising a technical, social and artistic education - e g a generalist education - in the design of buildings and built environment. In reality, the education concentrates on issues of architectural design, something which until now has not been reflected within the school's research and research education, which mostly has been directed toward the social and behavioural sciences. Accordingly, the distinction between the theorist and practitioner has become apparent, where the school's research and education did not cooperate according to the prescribed model, in which it is presumed that research produces that which later is taught to the students. This refers to the (according to Schön 1983) fundamental opposition between the kind of knowledge that is offered to most of the students at the universities by the research society and the kind demanded by their future professional practice.

The architectural profession is, as has been said, a generalist profession, which means that the profession has some difficulties in asserting itself in competition whith other, related but more specialized fields. This leads to the question of what the main subject matter of architecture actually is: In what areas of knowledge are architects undeniably more capable than others? The answer is of course, architecture, but that only leads to the next, a lot more difficult question: What does this subject actually include, how should it be taught, and how should the content of the knowledge be renewed? And, where does architectural research come in?

We can let the discussion take a detour by considering the motto of the Royal Institute of Technology, to which the School of Architecture belongs. The motto says: *Science and Art.* Here the concept of art is the old one, that stands for skill and experience, and it thus differs from our modern concept of art, which first came about during the nineteenth century. We can also find the dichotomy *Science and Art* in the formula for professional knowledge - *science and proven experience* - which means that the professional practitioner's knowledge shall be based both on scientific, theoretical knowledge, and on proven, practical experience.

The problem is that the academic system seems to ascribe to students an inability to use the accumulated experience of professional practice, which, of course, is what they actually need. With the formula of *Education Grounded in Science,* it is all too often considered that the schools shall attempt to teach an effective resolution of architec-

tural problems by applying scientifically grounded theories and methods. It is presumed that in their teaching the theorists at the architecture schools shall equip future practitioners with theory and method, which is later, in professional practice, applied to the client's problems (Schön 1983). But the schools do not operate this way, and practitioners do not work in this way, which leads to the question: What do practitioners do in practice?

It is often stated that architects are people who resolve problems for their clients. In reality, I think, their work is more about managing problems, i e identifying, clarifying, visualizing, and adapting the client's problem, something which involves uncertainty and clashes of values (see also Schön 1983). From this it follows that a practitioner's difficulties in managing his client's problem is usually not a result of a lack of factual knowledge, but rather from a learned inability to manage conflicts of values. The fundamental questions for architects are about ethics and aesthetics, and what are the scientific grounds for how such problems should be handled?

In practice the architect sketches possible solutions for the design problem which has arisen out of the situation where the client finds himself, and which motivated him to seek an architect in the first place. The work involves a systematic reflection over this situation, where the architect uses all the knowledge which is available, scientific or otherwise. Scientific knowledge certainly is of use, but only as one part of the systematic reflection needed (Molander 1993, Rolf 1991). And this leads us to the next question: What kind of theory does the practitioner need and how does such a theory arise?

It is often presumed that a researcher is somebody who has mastered the theories and concepts which constitute his scientific discipline. When approaching his object of research, he selects a theory from the set of theories his discipline supplies, and then applies the theory to some part of practical reality, with the goal of making that part of reality understandable. In this way, an academic discipline consists of the theories, concepts and methods which a *practitioner* of the subject should be able to apply. With the support of these tools, he attempts to affect development within his field by developing and deepening the apparatus of concepts which is used when people act in *practice* (Winch 1988).

The goal of architectural research therefore should be to *clarify* the fundamental concepts of architecture in order to *articulate architectural practice,* i e the rules which governs man's behaviour in those situations where architecture is of significance. This is done by identifying and describing the rules which constitute its *deep grammar,* to use the Wittgensteinian metaphor. However, it is not enough to identify the rules - they must be demonstrated through example to show how they are to be applied.

Knowledge about the rules and concepts that constitute practice arises out of comparisons between different real life cases, where the rules and concepts have been put into use. We increase our knowledge about architecture by comparing different works of architecture. And we not only seek similarities in our comparison, but also the differences - we look for the *family resemblance* at hand.

The Idea of a Social Science

This part of the paper presents the ideas of the philosopher Peter Winch about the interpretation and understanding of the forms of life that constitute society, as expressed in his book *The Idea of a Social Science.* Winch outlines a general research programme for the social sciences, using *form of life* as a key concept. Other concepts like *rule, practice, language game* are given their meaning by the key concept of form of life. I argue that Winch's ideas have important implications for architectural research: how it ought to be organized, and how its aims and goals ought to be defined. I also argue that the fundamental questions of architectural research are conceptual. The fundamental concepts of architecture must be analyzed *a priori.* Before the researcher starts his empirical research, he must define *what* the research project is about. Every architectural research project aims, I think, at providing a unique and circumstantially determined answer to the question of what architecture really *is.* The different aspects of architecture - *form, function* and *structure* - merges into just one perspective that views the building as a *limited but meaningful whole.* This understanding of the whole presupposes a discussion of questions that are conceptual, not empirical. This perspective has important theoretical and practical implications for architectural research. The *clarification* of architectural concepts should, I think, be considered the kernel of architectural research, and the overall aim of architectural research must be defined as *the articulation of the practice* of architecture.

My point of departure is the interpretation by Kjell S Johannessen of the philosophical ideas of Wittgenstein, especially the concept *sub specie aeternitatis* (which means to see something from the viewpoint of eternity). Johannessen starts his philosophical investigation with two paragraphs from *Tractatus:*

> "It is clear that ethics cannot be put into words.
> Ethics is transcendental.
> (Ethics and aesthetics are one and the same.)"
> "To view the world *sub specie aeterni* is to view it as a whole - a limited whole.
> Feeling the world as a limited whole - it is this that is mystical".

Wittgenstein wants us to see that ethics and aesthetics are united by the same goal, or rather, that ethical and aesthetical considerations are based on an infinitely long perspective of time. He creates no theories, but a lot of examples of *philosophical investigations* about the events, ideas and concepts that have made him interested. The case studies are different in some aspects, similar in others, but not so that it is possible to find properties that are common to all the cases. The relations that exist between the different cases are characterized by a *family resemblance* - certain cases have certain properties in common, other cases other properties in common, and the total set of properties constitutes a family resemblance for all the cases. A philosophical investigation of a certain case is a *language game,* a short description of a case, a real or invented situation where the concept which is investigated has been put to a meaningful use (Johannessen 1990).

Wittgenstein gives no advice about how we ought to treat the problems of ethics and aesthetics. He shows us the structure of these problems but proposes no solutions. He also shows us that the concepts through which we see the world are historically and

socially determined, and he points out to us that the way to avoid becoming a prisoner of the present is to see the world *sub specie aeternitatis.*

Winch formulates a *critique* of the social sciences, using ideas from the late Wittgenstein. By *social science* Winch means the sciences about human relations. He does *not* write about the social sciences that are at hand, but about a new social science that ought to be at hand. I think that Winch's critique is valid and that architectural research ought to be a social science of the kind that he describes.

Winch's new concept of social science refers to a science that aims at creating an impact on society *by clarifying the concepts* that are used by people when they think and communicate. This has always been an important task for science, but the difference is that Winch puts this task at the very center of social science. He talks about a set of scientific disciplines with the common purpose of *articulating a social practice* by clarifying the *concepts* that are crucial to this practice.

The basic problems of social science are *conceptual,* he says, not empirical. The social sciences ought to be centered around a kernel of concepts: *form of life, praxis, rule, action, meaning and interpretation.* The analysis of concepts is thus given a crucial role. In fact, he says, all research projects must begin with the question of what the object of the investigation *is.* That is, questions like: What *is* architecture? What makes us *see* buildings *as* architecture? We interpret physical objects *as* architecture, but we avoid the question of how the relations between physical objects and human experience are established. We search the answers to questions for which the conceptual foundation is too weak.

According to Winch the task of social science is to clarify the meaning of the actions and concepts that constitute human practice. By *practice* he means a rule governed, social pattern of behaviour. The task is to understand the object of the study by using the concepts which have emerged from the existing social realities - *the forms of life.*

Winch gives language an important role in our forms of life (1988, p 15): "The concepts we have, settle for us the form of the experience we have of the world. .. The world *is* for us what is represented through those concepts. That is not to say that our concepts may not change; but when they do, that means that our concept of the world has changed too". We *see* the world *through* our concepts. We interpret the world we live in by *seeing* something *as* something (we *see* a specific building *as* a church, we *see* a specific individual *as* a friend, we *see* a square meter of coloured canvas *as* a painting). But concepts are not stable, they change as society changes and as our relations to one another changes, and as our ways of seeing changes. One example might be our way of *seeing* certain artefacts *as* works of art - but since the modern concept of art was not created until the 18th century the modern individual sees a work of art from the renaissance in a way that is different from how renaissance man experienced the same artifact (ibid, p 15): "The world *is* for us what is represented through those concepts".

Theories of architecture also have to deal with questions about concepts like space, time, matter, place, form, function and structure - but much to often the researchers involved take these concepts for granted, as if they had a once for all decided meaning, and begin their research without any kind of conceptual reflection.

Roger Scruton writes that the most important part of the architect's work is to judge and evaluate the design proposal - is this good, is this bad, must improvements be made? This is done by using concepts which much too often are unsufficiently clarified. Therefore the main object for the theorists of architecture ought to be the development of the *conceptual tools* that are being used by the practitionners.

Then, what does it mean to clarify a concept? Nordenstam (1989) has developed, not a method, but a strategy for this: The first step is to propose some definitions of the concept. Then follows the work of writing the story about the genesis of the concept and how it has developed through history. The third step is to do the *case studies* that are needed to show how the concept can be used in a meaningful way in different situations - and to describe the *rules* which govern the way people act within these situations. The fourth step is to *compare* the case studies, looking for the family likenesses at hand. And, you have to *train and train again* to use this concept in different circumstances, lecture about it, hold seminars about it, and write about it. This is why research students must be trained, over and over again, in *the art of writing.*

The ambiguity of concepts and human relations do not entail that social formations, events and occasions are circumstantial. The stability that after all caracterizes the use of language, social institutions and human relations, is caused by the fact that human beings always are involved in a *practice,* in *a rule governed pattern of behavior.*

The important question then is: What does it mean to follow a rule? According to Winch the decisive factor is when an individual follows a rule in such a way that other people are able to identify the rule that is being followed - and are able to decide that the rule is being followed in a correct manner. The point is that rules have a social context. To follow a rule is not something private. To follow a rule is something social. It is the crowd, the referee, the players and the media who identify the rules that are being followed by the players on the football field, and who know if the rules are being followed. The rules are, in the last instance, generated by the form of life within which we live (Wittgenstein 1953 II, p 226): "What has to be accepted, the given, is - so one could say - forms of life".

To follow a rule is, says Winch, not to just repeat a certain behaviour, but to do something that has the same meaning as that which was done before. You can follow a rule, once you have learnt it, in a totally diffent situation, if the meaning of the rule is possible to transfer into the new situation. To drive a car in deep snow is almost the same as to drive in deep sand. Drivers in the Sahara desert and in northern Sweden have problems that belong to the same family. But in order to accomplish the transfer of the rule you need to reflect on the rule (ibid, p 65). The task of the scientist is to articulate the practice he is investigating, by making explicit *the tacit knowledge* to be found. He

participates in *the constitution* of the concepts that are needed for the development of his practice.

New concepts force us to change (Winch 1988, p 123): "To give an account of the meaning of a word is to describe how it is used; and to describe how it is used is to describe the social intercourse into which it enters". Concepts are so to say impregnated by theory - we *do not* see the phenomenons and events in reality as isolated, but look for the relation between the object in focus and its background. Our concepts tend to create systems of concepts - that is, theories (ibid, p 124).

Some concluding comments

By way of introduction it was stated that it is the aesthetic and ethical questions of *judgment* which are at the center of the theory and practice of architecture, and the way to correctly manage such questions must be based on a deep familiarity with the knowledge of experience which accumulates over a long time through the practice of architecture. If architecture loses its historical dimension, we also lose the ability to assess it - and our ability to develop it. And it is just this historical dimension, that the built environment *is* the history which we live in, which gives the theory and practice of architecture its specific conditions. Architecture is a profession which can manage historically determined cultural values, ie, which has the ability to promote and defend these values. Only this way is it possible for architects to assert that there is a field in which they are more skilled than others. The practitioner's work must be based on knowledge from architectural practice. To articulate architectural practice is the main task of architectural research.

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Doctorats en marge des conventions

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Constat

° Les architectes-doctorants gagnent considérablemt en passant au moins une fois par l'exercice scientifique de :
  - l'établissement de l'état des connaissances
  - la formulation d'une hypothèse
  - sa vérification et le retour à la littérature

° Les écoles d'architecture enrichissent leur potentiel de recherche grâce aux doctorants.

Ces évidences ne devraient pas masquer un certain nombre de problèmes:

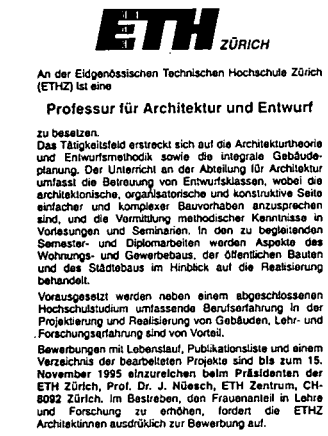
° Une majorité des doctorats en architecture aurait tout aussi bien pu être effectuée dans certaines facultés voisines: histoire de l'art, anthropologie, ethnologie, sociologie, géographie, informatique, etc.

° Les architectes les plus doués ne sont guère motivés pour faire un doctorat dans le sens traditionnel. Par analogie les meilleurs professeurs d'architecture sont rarement motivés pour diriger des thèses.

° Le doctorat n'est pas valorisant pour obtenir une place de travail dans une agence d'architecture. Au contraire les praticiens se méfient, à tort ou à raison, des jeunes théoriciens qui se sont gardés de "se salir les mains" dans la pratique après l'obtention de leur diplôme.

° Cela implique que le doctorat tendrait à conduire vers l'enseignement et la recherche en architecture. Pourtant les étudiants demandent avant tout de recevoir l'enseignement de grands praticiens, capables de théoriser et de communiquer leur démarche.

  A l'exception des pays méditerranéens, ceux du Proche et du Moyen Orient et de la Belgique, le doctorat n'est même pas indispensable pour obtenir une position académique comme professeur du projet d'architecture, l'objet central de notre enseignement! Pour être nommé dans ce domaine des principales convergences, il est plus important d'avoir réalisé des projets exemplaires et radicaux que de faire valoir des titres ou des résultats de recherches académiques.



ETH ZÜRICH

An der Eidgenössischen Technischen Hochschule Zürich (ETHZ) ist eine

Professur für Architektur und Entwurf

zu besetzen.
Das Tätigkeitsfeld erstreckt sich auf die Architekturtheorie und Entwurfsmethodik sowie die integrale Gebäudeplanung. Der Unterricht an der Abteilung für Architektur umfasst die Betreuung von Entwurfsklassen, wobei die architektonische, organisatorische und konstruktive Seite einfacher und komplexer Bauvorhaben anzusprechen sind, und die Vermittlung methodischer Kenntnisse in Vorlesungen und Seminarien. In den zu begleitenden Semester- und Diplomarbeiten werden Aspekte des Wohnungs- und Gewerbebaus, der öffentlichen Bauten und des Städtebaus im Hinblick auf die Realisierung behandelt.

Vorausgesetzt werden neben einem abgeschlossenen Hochschulstudium umfassende Berufserfahrung in der Projektierung und Realisierung von Gebäuden. Lehr- und Forschungserfahrung sind von Vorteil.

Bewerbungen mit Lebenslauf, Publikationsliste und einem Verzeichnis der bearbeiteten Projekte sind bis zum 15. November 1995 einzureichen beim Präsidenten der ETH Zürich, Prof. Dr. J. Nüesch, ETH Zentrum, CH-8092 Zürich. Im Bestreben, den Frauenanteil in Lehre und Forschung zu erhöhen, fordert die ETHZ Architektinnen ausdrücklich zur Bewerbung auf.

Voici une annonce de l'EPF Zurich du 20 septembre 1995 pour solliciter des candidatures afin d'occuper le poste de professeur d'architectuure. Elle précise entre autres:

"... A côté d'études universitaires accomplies nous demandons une expérience professionelle étendue dan le domaine du projet et de la réalisation; une expérience didactique et de recherche est un avantage..."
Je traduis: "... peut-êtra un avantage, mais ne sera en aucun cas déterminant"...

La plus grande ambiguïté du doctorat en architecture par rapport à celui de la plupart des autres disciplines universitaires se situe dans la carence d'avantages pour un plan de carrière.

De là à conclure qu'il faudrait œuvrer par le politique et l'administratif afin d'exiger le doctorat pour pouvoir enseigner, signifierait nourrir l'inceste et le narcissisme du clan universitaire. L'architecte-dessinateur sans diplôme, qui a fait ses preuves comme autodidacte par une pratique et une recherche exemplaires reste un sérieux candidat à prendre en considération dans une université moderne.

En matière de doctorats, les facultés d'architecture cherchent à imiter les pratiques et les formes parfois sclérosés d'autres facultés pour s'assurer un minimum de respectabilité et quelques crédits financiers.

Ce qui manque c'est la vision de ce que devrait être la spécificité d'un doctorat en architecture

Deux questions

1) Est-ce que nous dirigeons vraiment des sujets de thèse qui n'auraient pas trouvé un accompagnement plus compétent dans d'autres facultés?
2) Est-ce que la défense et la présentation conventionnelle d'un long texte argumenté est réellement la forme la plus adéquate pour une thèse qui contribue fondamentalement à la théorie du projet d'architecture?
   En d'autres mots:
   - Est-ce que les moyens de recherche et de présentation pourraient être autres que le texte, comme p.ex. des représentations graphiques, des formules, des vidéos, des constructions, etc.?
   - Est-ce que la Robie house de Frank Lloyd Wright, la villa Savoye de Le Corbusier ou les dessins pour les maisons A, B et C de John Hejduk, méritent-ils le doctorat en architecture?

   Durant 15 années de doctorats d'architectes à l'EPFL il n'y a eu qu'une seule thèse qui ait échappé aux conventions universitaires. Pietro *Fontana* présentait en 1981

une interprétation critique d'œuvres et de valeurs de la scène architecturale italienne des années 60 sous forme de 24 peintures de 1x1 m accompagnées de légendes et d'un texte introductif de neuf pages. La thèse fut acceptée avec l'approbation appuyée du Président de l'Ecole Polytechnique Fédérale (un physicien).

Doctorats en architecture en Suisse

Doctorats achevés:	total 150	
ETHZ depuis 1921 (!):	111	
EPFL depuis 1974:	39	
Doctorats en cours:	total 65	
ETHZ:	45	
EPFL:	20	dont env. la moitié avec bourse ou assistanat partiel; l'autre moitié s'autofinance
Nationalités EPFL doct. achevés (39):	49 % suisses (19)	
	15 % Proche Orient et Afrique du Nord (6)	
	13 % italiens (5)	
	10 % grecs (4)	
	13 % divers (5)	
Nationalités EPFL doct. en cours (20):	50 % suisses (10)	
	10 % italiens (2)	
	10 % allemands (2)	
	10 % français (2)	
	20 % divers (4)	

Doctorats en cours par domaine	ETHZ	EPFL
Histoire de l'architecture	17	8
Didactique de l'architecture	4	-
Théorie de l'architecture	3	4
Urbanisme et amén. du territoire	3	3
Énergie, développem. durable	3	5
Projet d'arch. et informatique	2	-
Histoire et informatique	1	-
encore sans titres *)	12	-

*) Vu les compétences des directeurs de thèse choisis, il s'agit surtout d'histoire de l'architecture
En gras: centres de compétence (instituts de recherche).

Directeurs de thèse

ETHZ — Sur 45 doctorats en cours 15 (33 %) sont dirigés par des professeurs qui enseignent également le projet d'architecture.

EPFL	Sur 20 doctorats en cours 4 (20 %) sont dirigés par des professeurs qui enseignent également le projet d'architecture.
Durée max.	3 ans (depuis 1994) - prolongeable d'une année
Titre décerné	Dr ès sciences ou Dr ès sciences techniques.

Doctorates in Design and Architecture
The situation in Italy

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The following information about doctorates in design and architecture in Italy are based on the last organic law on research and education in university environment and on my personal experience as student, voluntary assistant and researcher. Other valuable sources of information have been: Umberto Barbieri from the Delft University of Technology, prof. Piero Ostilio Rossi from the Faculty of Architecture at the University of Rome *La Sapienza*, and several outputs of the doctorate school of architectural composition at the same University. However, the responsability for the following statements remains to me alone.
The first two parts are devoted to the description of the architectural education system in Italy, with special reference to the Faculty of Architecture at the University of Rome *La Sapienza*; the last part gives information on the doctorate schools in architectural design.

In Italy, the actual situation has been determined by the reorganization of the whole university education and research sector. A new law was published in 1980 to re-regulate the university education environment, including the discretional power of the Universities, the mechanisms by which professors and researchers have to be designated, the quantity, type and functions of professors and researchers, the possibility of having exchanges with the foreign universities or professors, the figure of the `research doctor', and other items again. This law has been adjusted several times, especially for what concerns education itself. In the actual situation, faculties councils have got a large independence concerning the organization of the curricula of their faculty. This means that each faculty may propose an own curriculum based on its own interpretation of the Ministry indications. In fact all curricula must be in line with the general framework indicated by the Ministry of University and of Scientific and Technologic Research (MURST). Here an effort is made to comply with the indication of the European Community n. 85/384.
The following information is based on the interpretation given by the Faculty of Architecture of the University of Rome *La Sapienza*, around which the curriculum of the study course of *via Flaminia*[1] is organized. However, I shall give this information in a quite simplified way, to avoid the risk of making these pages dull reading by unusefully entirely reporting the complexity of the situation.

Architectural education curriculum

The study course in Architecture takes at least five years, while no maximum deadline exists. During this time students hardly receive any kind of bursary from the government. Four kinds of courses are introduced:

- year courses around single disciplines: 120 hours each;
- half year courses around single disciplines: 60 hours each. These courses may be integrated by another half year course belonging to the same disciplinary area to reach one full examination, or they may just be used as a half examination;
- year integrated courses: 120 hours each. These ones are courses in which different teachings of different disciplinary areas are integrated with each other till the reaching of the necessary amount of hours that shape one full examination;
- laboratory courses: 180 hours each. The laboratories are very important parts of the curriculum. They are built around a main matter (e.g. architectural composition or urban planning) with the contribution of other matters. For instance, the laboratory of Architectural Design 1 is formed by 120 hours of Architectural Composition plus 30 hours of Building Technology plus 30 hours of Architectural Drawing Technics. There are five kinds of laboratories which takes place in different years: Architectural Design (4 years); Architectural Construction (2 years); Urban Planning; Monument Restoration; Synthesis laboratory (the final one before the degree thesis). Since the laboratory idea is based on the direct exchange between teacher and the single student, each laboratory is allowed to contain a maximum of 50 students.

The 4500 hours of the entire architectural education curriculum are divided into 32 full examinations plus the final synthesis laboratory. These examinations are divided in three cycles.

The first cycle covers the first two years for a total of 1800 hours of teaching. It is formed by 13,5 full examinations to be passed after 15 courses - the typology of courses is described above.

The second cycle covers the third and fourth year for a total of 1800 hours of lessons. It is formed by 12,5 full examinations to be passed after 15 courses.

The third cycle coincide in the fifth year, when 6 full examination must be passed after 6 courses plus the final laboratory.

Courses belong to 11 different disciplinary areas, from architectural planning to mathematics, from urban planning to construction sciences, from history to building economics, and so on. Some examinations and some cycles are propaedeutical with respect to other ones. For example, regarding the cycles, a student cannot be registered at the third cycle if (s)he has not yet concluded the first one, and if (s)he has not yet passed at least 18 full examinations. Again, to be registered at the second cycle a student must prove its knowledge of the english language.

All the courses pertaining the first two cycles are decided by the faculty council, while in the third cycle each student may choose five courses out of one group of `oriented study paths' proposed by the faculty council. The oriented study path should be chosen by the student according to its future degree thesis, while the choice of the final laboratory is free. The Final Synthesis Laboratory should check the ability of the future architect in dealing with the design items of the profession. The main matters herewith are Architectural design or Urban Planning.

The choice of the promotor (*relatore*) for the degree thesis should be taken at the beginning of the third cycle. The degree thesis is formed by two different parts:
the discussion of the activity carried out within the Final Synthesis Laboratory; and
the discussion of the thesis that has been elaborated under the guidance of a promotor. This thesis may be a design as well as a more theoretical output.

After having passed 32 full examinations plus the final laboratory and the degree examination, the student obtains the title of `doctor' (*dottore*). This title has nothing to do with the title of Ph.D. or `research doctor' (*dottore di ricerca*). In Italy, everybody who holds a degree is called `*dottore*' (*dottore in architettura*; *dottore in ingegneria*; *dottore in economia* ...). For scientific disciplines, this can be the same of the dutch term `ir.'. To be allowed to practise the profession of architect, the *dottore* must pass an additional examination that takes place two times a year. This examination is quite difficult, and is divided in two days and in two parts: the first part takes place on the first day and deals with a design project. Who passes this first part is allowed to take part to the second one, that usually deals with the discussion of what designed during the first part. In general this happens within one month.

University education staff

Two kinds of professors can be distinguished: '*ordinario*' (the highest level) and '*associato*'. Another role that can be recognized is the 'researcher' (*ricercatore*). This last figure works for the university on a permanent basis like the professor, and is obliged to devote a certain number of hours to education. Researchers are not independent, in the sense that they are attached to a Department and to a course; the responsability for the education activity within the course remaines to the professor. In the Faculties of Architecture the most researchers are concentrated in the technology area, but also where one can find professors having a greater academic status. Another university role is the so called laboratory' technician' (*tecnico laureato*). This one is a *dottore* who takes care of the laboratory of the University Department to which (s)he belongs, with officially no educational duty. The number of researchers and technicians within the faculties of Architecture is actually very small, especially if compared with the quantity of work that has to be made. The result is that a great deal of architectural university education is sustained by (unpaid) volunteers, who take care of the students and lead them till the examination. Professors give lessons, make general supervision, examine students. The role of volunteers is especially important for what concerns experimental matters like architectural design, that are matters where the traditional *ex cathedra* lessons are insufficient, and where a continuous face to face exchange is needed between each single student and who has the duty to teach them. Without the contribution of volunteers, architectural education in the mentioned matters shall be hardly possible. By helping a professor in the educational activity, the volunteer improves its knowledge of the discipline and this is important for a possible academic career. Furthermore there is not much to do for a young architect in Italy! However the number of volunteers that succeeds in an University career is very small. In relation to this last point, one important pre-condition is to be able to get the title of research doctor.

Both professors, researchers and technicians are designed after a national competititon. The lower levels -like researcher- have the most difficult examination: two days of examination are devoted to design and the writing of articles; one other day is devoted to the oral discussion. The highest level, *professore ordinario*, has the most easy one: only titles evaluation, without discussion. At this level, however, much depend on the status of the candidate in relation to the commission.

Doctorates

The actual doctorate schools have been introduced in Italy with the law of 1980. Differently from other countries, in Italy the doctorate schools in architecture are divided by matter. There are doctorate schools in architectural composition, in architectural theory, in technology, in history, in restoration, in urban planning, in technical design, and so on. However, the council of professors of a doctorate school is often multidisciplinary. The school takes three years during which the student (called *dottorando*) receives a bursary (approx. the equivalent of 1200 florins). In no case the bursary can be prolonged. At the end of this period the student has the opportunity to submit his thesis within some months during which he is not paid. After this deadline an examination commission of three university professors is designed by the minister. These professors all belong to the specific disciplinary area of the doctorate school: they are professors in technology for a doctorate in technology, professors in architectural composition for a doctorate in this matter, and so on. The commission establishes a date for the thesis defense, that usually takes place within six months. All the candidates belonging to the same doctorate school will defend their thesis with the same commission and on the same day. The thesis must be defended on this date: only in very exceptional circumstances -e.g. serious illness or important family problems, or if the thesis may reach an exceptional importance- the candidate may obtain one and only one unpaid extra year. After this deadline it is not possible to defend a thesis anymore. The number of candidates is quite small: per year, it usually ranges from 2 to 5 per doctorate school. If the thesis is succesfully defended, the candidate becomeS 'research doctor' (*dottore di ricerca*).

Universities and Faculty departments are the place of the doctorate schools. In this way one can have for instance the "Doctorate school in Architectural Composition at the Faculty of Architecture of the University of Rome" (or Naples, or Venice, etc.), or the "Doctorate school in Urban Recovery Technology at the Faculty of Architecture of the University of Genoa, Naples, Palermo and Turin"; and so on. In fact more Universities can decide to join together to set up a Doctorate school: in this case the professor council is formed by professors coming from the different universities, while one University is entitled to be the administrative place of the school.

How to access the school

The selection of participants does not take place on the basis of a specific research programme. The only way to enter the school is to participate in a competition. According to the kind of doctorate school the participation in the competition is more or less large. For most popular doctorate scools (architectural planning, architectural composition, urban planning etc.) the ratio can be of about hundred participants for 2 to 5 places a year! It understandable how strong can be the fight to win the competition. A number of additional places are reserved to foreigners, about 1/3 of the places for

Italian students. However, foreigners do not receive any grant. The selection is made by a commission of three professors designated by the Ministry, two of which belong to the school. Each component of the commission proposes one theme (thus totally three themes) related to a more or less general issue of the matter, and on which the competitors must elaborate by writing an article. One of the competitors draws by random one of the three themes out. Then the competitors have several hours to write down their articles. These articles must be anonimous and the name of the competitor must be closed in a sealed envelop. After this first part, the commission makes out a restricted list of competitors (generally 10 to 12) who are admitted to the second oral part of the examination. This often takes place within one month.

Attendance and education

In principle the school requires some attendance; in practice this is left to the school itself. The research programme is prepared within the first year of the doctorate school, together with the subject and the title of the project. The first year is therefore devoted to the preparation of the research work by means of literature investigation, discussions with the professor council of the doctorate school, design of the research programme. Also the education activity of the school takes place during the first year of work. This activity mainly deals with the reading and commenting of literature and on the organization of seminars and workshops. For instance the Doctorate School in Architectural Composition of the University of Rome *La Sapienza* organizes four workshops every first year of the school. Very often this organization is left to the student. The second and third year are devoted to the specific research activity and to the writing of the thesis. At the beginning of the second year the candidate will get two promotors within the council of the school. One promotor is chosen by the student, the second one is decided by the council. There is also a possibility to carry out part of the research activity in a foreign institution when its effective utility justifies it. But a few persons use this possibility.

Contents

Once entered the school, the student is free to choose its own subject, method, and content of research. The only restriction is to comply with the matter the school deals with and to agree and discuss its choices with the council of professors. This means that there is no preconceived research programme or theme at the basis of the doctorate school. However, a thesis must be an original contribution to the advancement of the knowledge in the matter. Here the definition of Eco is quite widely accepted. According, a doctoral thesis must:

- deal with a recognizable item;
- say things not yet said, or re-investigate already known items but under a new point of view;
- be useful to the others;
- give enough elements to verify or deny its starting hypothesis.

A thesis may overlap other knowledge domains. In this case, the point of view of the school matter has to be as much preserved as possible. In some cases students may have an additional promotor. However, students tend to remain within the borders of the school matter. For doctorates in architectural composition or planning, these borders coincide in the peculiarities of the design matter.

Research doctor: theory or practice?

This point deserves some attention. The Italian educational system knows two different types of post-graduate training having two different tasks: the doctorate school and the specialization school.

The task of the doctorate school is mainly directed towards the academic career: to train researchers that will later become professors. Therefore the kind of study is mostly theoretical, dealing with different theoretical aspects of the design project.

The task of the specialization school is directed towards the training of good professionals. Here the kind of study is mostly a practical one, in the sense that students produce a number of design projects during the study course.

Therefore it can be said that who holds a doctorate will generally try to enter the university career, while specialized architects should have a better market in the professional world. But this clear-cut distinction is only a theoretical one: in the practice students tend to prolongue their education for as long as possible, waiting for one possible future. Maybe this has something to do with the shortage of work for young architects.

This difference is complicated by the particular nature of the architectural discipline. The architect claims that the project is a research in itself, being practice and theory at the same time. Therefore the question is: can a design project become a doctoral thesis? The answer is left to the professor council of the various doctorate schools, and is one of the themes of the actual debate on the meaning of doctorates in architectural education. The general idea is that a design can be a doctorate thesis when it goes hand in hand with a written contribution that shows the relevance of the design in relation to a research theme.

Therefore the doctoral thesis is firstly a theoretical output that can incidentally contain the development of new tools for the profession.

Number of doctorates per year

The total number of doctorates per year in Italy sums up to 3000. This number is related to the whole university system with no distinction regarding disciplines. For what concerns architectural design matters, thus not the entire architectural discipline, doctorates are about 40 every year. Since doctorate schools are 9 years old, a calculation can be made on the total number of research doctors in Italy. However this calculation must take into account that not each school started at the same time. The oldest doctorate school in architectural design matters in Italy is the doctorate school of Architectural Composition at the Venice University Institute. The reader can get an idea on how old these schools are and how many theses have been defended by consulting the reported list of theses and schools in the Appendix.

How to set up a doctorate school

Universities and Faculties must present a demand to the CUN, National University Council, in which the curriculum of the proposed school is described and the professors council is pointed out. On these basis the CUN takes a decision, in which also geographical criteria (position and number of faculty students) play an important role. In some cases the CUN can suggest the integration of the proposed school with an already existing one, when differences between the matters aren't very strong.

Financing
The doctorate schools are financed by the Ministry of Scientific Research and Education. The available budget is divided according to the number of doctorate students having the right to receive the bursary, that is the number of students in the three functioning years. Each doctorate school receives some money to cope with the ordinary expenses related to its working. An external sponsor can eventually pay additional students (to be selected with the same procedures within the same competition) to let them working on subjects of their interest. But this happens very few times, especially in architectural design matters.

Withdrawal
Withdrawal from the doctorate schools happens very seldom in the Italian system. From the one side entering the school costs too much effort to withdraw, on the other side there are few possibilities to get a permanent or better paid job. Also an unsuccessful final defence of the thesis is a very rare event in Italy. But this doesn't mean that the scientific quality of the thesis is always very high.

Other information over doctorates in architectural design matters can be found in the recently published catalogue of an exhibition hold at the *Triennale* of Milan and in other publications as listed in literature.

Note

[1] The Faculty of Architecture of the University of Rome *La Sapienza* is divided into three different study courses, and each one has its own professors and students. The study course of *via Flaminia* is one of these three courses.

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Appendix: ***Titles of doctoral thesis around architectural design matters***

What follows is just a sample of schools and theses. Not every school is reported below but only the schools concerning architectural design on which I was able to gather information (translation of the list annexed to: Coppola Pignatelli, ed.). However, this can be an indication of the variety of interests covered by doctorates in Italy. It must be remarked that some titles were difficult to be translated since it is not possible to know the wanted specific meaning of certain terms without having read the thesis.
Years refer to the already completed doctorate courses in 1995 (last completed course: begun in 1992 - thesis defended in 1995), while number concerns the amount of defended thesis. Each completed course takes three years.

University: Chieti
Doctorate: Architectural Composition
Years: 3
Number: 3
Titles:
- The design in the glance.
- The chaotic city.
- Architecture of station buildings.

University: Genua
Doctorate: Questions of Method in Architectural Planning
Years: 6 (one of which not activated)
Number: 11
Titles:
- An experiment around the role of the architecture of goods for the construction of the urbanized limit.
- Architectural design and the city of underdevelopment.
- Architecture and machine.
- Questions of method in the reading of the urban territory. A note on the use of photography.
- Architecture and architectural culture in Liguria during the 30's. The interpretation of Rationalism in Daneri, Vietti and the Ligurian group.
- Natural environment, the place of continuity: a constant theme of the design. The Liguria of the 30's.
- The '30's and the design of the Modern. The elaboration of architectural language in the "ephemeral" works and in the works of "régime" in Genua.
- The architecture of the hollow space.
- Knowledge and invention at the beginning of the architectural design.
- History and design. A central question in the architectural debate in the post-war Italy.
- High Tech: machines and clouds. Architecture of the industrial production and the search for lightness.

University: Milan Polytechnic
Doctorate: Technic Innovation and Architectural Design
Years: 5
Number: 5
Titles:
- The evolution of the figure of the designer. The transformation of profession between innovation control and context changes.
- Design culture and new instrumentality.
- Strategy and policy of building industrialization in Egypt.
- Ideation, design, realization in architecture: Italian case studies from the 50's until nowadays.
- Scientific and technological poles: methodologies and design criteria of the places of the technological innovation.

University: Naples *Federico II*
Doctorate: Architectural Composition
Years: 5
Number: 19
Titles:
- Simulation processes and city transformation.
- The design of the suburbs. Trends in urban design.
- The study of the composition teaching in the Ecole des Beaux-Arts, in relation to the teachings of Julien Guadet with special reference to the research over a number of designs that show the relevance of this kind of culture within a design path.
- Artifice - nature. A design for the redescovery of the river vocation of Benevento.
- The design of the design.
- Reuse and preservation of disused mining areas: proposals for the Sicilian sulphur mines.
- The design of port areas in the transformation of the contemporary city.
- The character of regulation and ordinances in the urban design.
- From the enclosed city to the contemporary city. The structure of the limit.
- Materials of contemporary architecture. External surfaces.
- Design and archaeology: the example of Soane.
- The city as architecture (foundation and re-foundation of small and medium dimensions). The case of Bari.
- The weight of the line. From linear city to metropolitan linear structure.
- Suburbs and architectural design.
- Suburbs and urban identity. Palermo and its northern suburbs.
- The poetics of transparency in the contemporary design. New phenomena of identity and representation in the relation between architecture and city.
- Archetypes and materials for a topology of the Modern.
- Architectural design in the arabic-islamic city. History - language - methodology: two intervention on the Akrad street of Salt.

- The street. Place of living.

University: Naples *Federico II*
Doctorate: Urban Design
Years: 3
Number: 9
Titles:
- The relation between plan and design in the upgrading of the hystorical centre: the case of Brindisi.
- For a recovery of the holy spaces in the ancient centre of Naples.
- Geography, archeology, architecture. The street as founding structure.
- The ancient centre of Naples: continuity and transformation.
- The construction of the territory in the relation between architecture and geography: farms in Apulia.
- The conventual citadel and the city.
- The water square.
- Napoli. The space among the parts: a parameter for the re-reading of the urban structure.
- Elements for the reading of the newly founded areas: the western area of Naples.

University: Rome *La Sapienza*
Doctorate: Architectural Composition
Years: 8
Number: 33
Titles:
- The construction of the identity of the city by means of the architectural design. Convention and metaphor.
- The abacus of the rules semplified by the reality of architecture. The theoretical writings and the unpublished works of Adalberto Libera.
- The linguistic acquisitions of contemporary architecture between contents and expression.
- From the settlement to the rooms, conceptual categories and topic for the interpretation of the residential design.
- Multimediality. Molteplicity of design relations.
- To design the dwelling.
- Iconology of the facade in the Italian architecture. The architectural-compositive research from Vitruvius to rationalist handbooks.
- Idea, Imagine, Architecture.Architectural invention technics and composition.
- Modern architecture and the stairs.
- Architectural elements and "iconic signs" of the modern design.
- The long duration.
- Tendency to abstraction and progressive denaturalization of the building. Tendency to abstraction, growing separation from the nature and its laws, and the expulsion of naturalistic elements in the definition of the architectural form.
- Architecture and environmental challenge. The construction of architecture as "ecologic model" of spatial organization.

- Type and character. Typicity and and individuality in architecture.
- Architectural polycromy.
- Place and place culture in the contemporary architecture. The place as design legitimation principle.
- The architecture of german industrial buildings from 1971 to 1991. Reconnaissances and design considerations.
- Configurations of the office building. Materials for the design.
- Contemporary imagines.
- The urban scale of the architectural design.
- The possible order. Complexity of the design and design of the complexity.
- The contemporary architectural design and the visual arts.
- The concept of prefabrication: the architectural prefiguration in the dialectics between perfection and temporality.
- The object of the contending. Problems of sense in architecture.
- Remake the new. Themes and technic of contemporary intervention on buildings of modern architecture.
- Over the telematic city.
- Railway spaces railway times urban spaces urban times.
- City and nature in the urban contemporary design: models of dispersion, landscape, ecology.
- Towards an architecture of synthesis. Notes on the relations between the creative process and computer use.
- Mathematic structures of architectural composition.
- Light-space. The unmaterial of architectural design.
- The inner border: spaces and conditions for the urban and contemporary design.
- Within the design. An example of interpretation of the urban place through the design of architecture.

University: Venice University Institute
Doctorate: Architectural composition
Years: 9
Number: 44
Titles:

- Consolidated architecture. The design of architecture in the city, composition and transformation, public space and civil quality of architecture; the value of urban empty spaces and the figuration in the built city.
- Type, style, quotation. Paradigms of architectural composition.
- Verona and its river.
- The vertical city. The skyscraper: urban role and composition.
- The lived quality. Objectivity and subjectivity in the design of architecture. Elaboration of the tools for the analysis and the design of the elements which determine the subjective experience of the environment.
- The paradigm of the capital city.
- The architectural composition and the memory.

- The architectural project for the Straits of Messina and the design for the "future metropolis" by Giuseppe Samoná.
- Past and design.
- Diffusion and functionalization of architecture. The hystorical experience and the verification of figurative and methodological principles in the construction of the territory. The design of architecture and the Esperidi bridge in Brenta.
- Regionalism and urban specificity. Notes on the "characters" of the city of Naples.
- The design and the ancient in the area of the high-Adriatic. The case of the Venice Arsenale.
- Over the difficulty of judging Venice and consequently of ri-designing it. Indications for an architectural design in a virtually central but hystorical marginal area of the city of Venice: Santa Croce island.
- The monument: study on the synthetical facts of architecture.
- Fragment and architectural composition questions in urban collective spaces.
- Tools and technics for the transformation of the city. The case of Naples.
- The design of the square and the architecture of the city. Piazza del Duomo in Milan: in the construction field of the city, the museum of its architecture.
- "The open rhythm": object and space. The abstract figuration in the Polish architectural culture.
- Designs for the exchanging city: Milan, Barcelona, Frankfurt, Lion.
- The "museum-city". Museums and urban architecture in the contemporary city.
- The im/measurable spaces. Tools of compositive control for the great dimension.
- The role of composition in the Italian rationalism experience. Rules and compositive procedures in the greatest architectures of Terragni.
- The typology of the theatre and the architectural composition.
- The "figure-limit" in the "architecture of stratification". A capital city: Beyrouth.
- The role of industrial architecture in the shaping of the formal language of the modern architecture.
- Two essays on modernity in the contemporary composition.
- The architecture of the inner limits of the city. The urban facts in the figure of the "places-limit".
- For a definition of the paradigms of the architecture of the limit (of the city): designs and models of the construction of the open space in the "ville classique".
- Joze Plecnick and the castle of Prague.
- The design of empty urban spaces. Composition criteria and modality of construction in the great dimension.
- Over the symbolic forms of architecture.
- Characters and construction of the sea cities.

- The city as text. Autonomy of the architectural language and figuration of the city.
- The construction of the void in the city. Compositive themes in the urban design.
- Essay over the construction. A research on the role of construction in the design of architecture in relation to typology and decoration.
- The notion of collective space in the design of the dwelling.
- Shape and measure of the unlimited city.
- Between ancient and modern. The relation between architecture and city in the german classicism. The cases of Berlin and Dresden.
- Urban materials.
- Plans of civil architecture in the city.
- The dwelling and the architecture of the dwelling in the construction of the contemporary city.
- The transfigured city.

Qualifying and Doctoral Theses in Architecture at Istanbul Technical University

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Introduction

The qualifying theses which are submitted to the Faculty of Architecture during the period between 1948-1956 total up to 24. The first doctoral thesis was submitted to the Faculty in 1961, and since then 212 doctoral theses have been completed.

Qualifying theses

Their subjects include building design, history of Architecture building science, statics and urban planning. Most of these (10 of them) fall into the subject area of building design. In these theses, building typology has been examined, a different one in each. Out of the 7 qualifying theses submitted to building science; main topics have been the building elements, such as door, chimney and hearth; and buildings invarious locations in Anatolia representing vernacular Architecture. In 4 of the theses submitted in the area of History of Architecture; Anatolian towns, Turkish Graves and Turkish Baroque Architecture have been researched. In Urban Planning, one thesis has been written and it is on parking. Two theses written in the field of building statcs have focused on the structural columns and frames.

Doctoral Theses

Classification of doctoral theses submitted to the Faculty of Architecture during the last 35 years is as follows:

Building Design	60	Construction Management and Economics	27
History of Architecture	30	Control of Physical Environment	28
Urban Planning	40	Building Statics and Concrete Structures	10
Building Science	8		
Building Materials	8		

Building Design

In the first decade during which doctoral theses have been submitted the subject matter varied: the economic and educational dimensions of Architecture, the fire problem in buildings, the planning problems related to hospitals and industrial buildings, and the subject of housing equipment.

During the early 70's, Ergonomics in Architecture gained significance as manifested in the thesis written in the era. By the mid-70's, perception and creativity were the subjects mainly selected for doctoral theses. Towards the end of 70's, the theses subjects shifted towards the appraisal of visual and social dimensions of the man-made envi-

ronment. Throughout the decade, the topic of building typology has sustained its popularity as it did in the previous decade.

In the 1980's, duch building typologies as healthe facilities, offices, hot spring resorts, housing (including squatter housing) have become popular theses topics. Besides, theses investigating design education and creativity have increased in number. towards the end of 80's and the begining of 90's, new building typologies have been evaluated in the doctoral theses.

After the 1990's, the general inclination towards the housing problem of the low-income and the expert systems have been reflected on the dissertations because of their influence on the social and technologically aspects of the Turkish society. During the last few years, Instanbul's transformation has become another popular topic.

History of Architecture
Theses in this field came quite late, when compared to those in Building Design. During the 60's and the 90's, major topics have been the religious complexes, dervish lodges and houses of Roman, Turkish, Ottoman and Turkish Republican Periods. Contemporaty Turkish Architecture and its transformation during the 1st Turkish Republic Era have been among the appealing research topics, as reflected in the Ph.D. theses submitted to the History of Architecture.

Since 1980's, the topological studies have continued on one side and the theses on presentation of the civic architecture, the spatial analysis of Anatolian towns have been written on the other.

During the 1990's, the topic of 'preservation' has remained as important as before. Moreover, the historical tecture of the unique cities and their transformation have been examined and research has been made on the use and properties of the building materials in various centuries.

Building science
Theses in this field fall into the topics of building component and their standardisation. Since 70's, theses which integrate the architectural components have been written.

Building material
In this field, doctoral theses have been written since late 60's. Most topics include plaster, concrete and terra cota and the rationalisation of these materials in Turkey's conditions. After the 90's, these which examine the redbrich have been written.

Construction management and economics
During the period between 1965-1980, person-area-cost relations and employer-worker-architect relations and modular coordination in building components have been examined in several doctoral theses. After 80's, there has been a considerable increase in the number of doctoral theses written. Their topics are mainly on comparative analysis and management. After 1990, the selected topics have become appraisal of production by computer and development of financial models.

Control of physical environment
The major topics since 1966's have comfort conditions such as acoustics, lightening and heating in buildings and their impact on building design. After 1980's, the use of solar energy in heating the buildings have become focus of many doctoral theses written in the field of control of physical environment.

Building statics
Since 1961, low-story and multi-story load-bearing systems, their statical problems have been studied in the theses.

Urban plannings
Starting with 1962, during the 1st decade of the theses written in urban planning, the topics ranged from settlements to the Development Plans in Istanbul and Turkey. During 1970-80, the relationship between home and workplace, green space in the city and the settlement problems as well as the urban facilities have become theses topics. Towards the end of 70's and the beginning of 80's, various cities and their special functions have been examined. Places outside of Istanbul, such as Izmir and Kapadokya have been investigated to constitute doctoral research. During the decade of 1980-1990, the undesirable impact of urbanisation on the administration and transportation of the cities as well as on its settlements were studied in parallel to the topics involving the critique of the planned approaches. Tourism Planning have shown up as a new research topic taken up in doctoral theses in this era.

Conclusion
This paper has been based on published and unpublished documents at I.T.U. One can conclude from it that at the Faculty of Architecture, doctoral theses have been written in such capacity and tradition that it forms a strongbase for further research in future and it constitutes a rich accumulation of knowledge in this field. For about half a century, the doctoral theses / qualifying theses submitted to I.T.U., the concentration has been on Buiilding Design, History of Architecture, Building Components, Building Materials and Physics, Control of Physical Environment, and Urban Planning. The variety of undergraduate and graduate courses based on the research made by the faculty staff through doctoral theses is a major indicator of the contribution of the I.T.U., Faculty of Architecture toward higher learning.

Doctorates in Design in the United States: Status and Analysis

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Abstract
This paper details the development and status of doctorates in design in the United States, with a particular emphasis on doctorates granted by those programs which also confer professional architecture degrees. Currently there are 18 such programs, although doctorates which focus on architecture and related topics are granted by many more universities that do not have professional degree programs. The paper reports areas of research, student composition, graduation rates, and challenges faced by faculty and administrators. It draws upon the author's experience as a director of a major doctoral program at the University of Florida, as well as upon a recent study completed at Georgia Tech University.

Introduction

I am pleased and honored to be with you today and to be able to take part in this important meeting .I am here, not only to deliver a presentation on the status of Architectural Doctoral Programs in the United States, but also as a representative of the Architectural Research Centers Consortium, Inc. (ARCC). I am President of ARCC which is a co-sponsor of this meeting. ARCC is a private, international organization of about 45 of the largest and most active architectural research universities, Centers, and firms in the United States and Canada. ARCC's primary mission is to facilitate the development of the research culture in the discipline and profession of architecture and related fields.

The majority of the 18 universities in the US which have both professional and doctoral program in architectures are active members of ARCC. And my purpose today is to briefly speak about the status of those programs. The data which supports this talk is derived from my own experience as director of a major doctoral program in a large US architecture school, from a nation-wide study of doctoral programs that several of my graduate assistants and I conducted in 1991, and from a national study recently completed by Professor Jean Wineman, at Georgia Tech University.

Background and Context of Architectural Doctoral Studies in the US

Doctoral studies in architecture in the United States are a relatively new phenomenon, especially compared with other technical/professional fields, such as engineering or medicine. That is because architecture and allied design disciplines, generally have created "intuitive" professionals, to whom knowledge has been handed down by great masters/teachers or transmitted by practical field experience. And that knowledge was in small, individualized clusters, rather than in large, generalizable "batches." Thus,

architecture, at least as it has been taught in the US studios has been more intuition and experience based and less "knowledge-based," than many other professional disciplines.

Architecture has not had the same epistemological and pedagogic tradition as have engineering and medicine, or the social and physical sciences. That has had a bearing on the relatively late development, and slow spread (until recently) of US doctoral program in architecture and related design professions.

According to Moore (1984), while Harvard and other universities awarded doctoral degrees in architecture since the beginning of this century, the first *non-* architectural history Ph.D was awarded by Harvard in 1956. Harvard subsequently disbanded their doctoral program only to reestablish it relatively recently in two forms -- one as a Ph.D associated with the college of liberal arts, and the other as a "Doctor of Design"(the only one offered in the US) which provides specializations in architecture, landscape architecture and urban design.

The oldest *continually* operating architectural doctoral program in the US (which is not focused on architectural history) is found at the University of Pennsylvania, which has specializations in theory, technology, and representation. That program was established in 1964.

Since then the number of doctoral programs in architecture schools has grown relatively slowly, with a marked jump in growth in the early 1970's (with the energy-crisis in the US and a perceived need at that time for more researchers in building physics/energy) and recently (late 1980's-early 1990's) as architectural research has gained momentum and gained more appreciation among *college* and *university-level* administrators in the US.

A Ph.D in architecture is seen now, by many US architectural college administrators and by some faculty, as a *desirable* credential to have for a new faculty member: This was not always the case (the reverse was true!).

Architecture and Non-Architecture Schools

The distinction between "architecture" and "non-architecture" schools in the US is important since there are many colleges and universities in the United States which do not have professional programs (either 5-year B ARCH, or 6-Year M ARCH) programs but which nevertheless award students Ph.D, degrees for research done which focuses on architecture or design.

Many universities -- 53 by our count in 1991 -- have awarded doctoral degrees for dissertations in architecture (or a very closely allied field), whereas only a minority of these have professional programs in architecture (Table 1). The so-called "non-architecture" Ph.D programs may award their students the doctoral degree through a variety of other fields, eg. *art*, *art history*, *history*, *liberal arts and sciences*, *psychology*, *humanities*, or *engineering*, to name a few.

Table 1: Doctoral dissertations in architecture awarded by non-architecture Ph.D. programs/Universities 1974-1988

Boston University	University of Missouri
Brown University	University of Nebraska, Lincoln
Bryn Mawr University	University of New Mexico
California School of Professional Psychology	New York University
University of California, Santa Barbara	State U. of New York at Binghampton
University of California, Los Angeles	University of North Carolina at Chapel Hill
Case Western Reserve University	University of North Carolina at Greensborough
University of Chicago	Northwestern University
University of Deleware	University of Northern Colorado
Eastern Baptist Theological Seminary	Ohio State University
Emory University	Ohio University
Florida State University	Oregon State University
Florida Atlantic University	Pennsylvania State University
University of Florida	Ressselaer Polytechnic Institute
Georgia State University	Rutgers University
George Washinton University	University of Southern California
University of Georgia	Southern Illinois University at Carbondale
University of Illinois, Urbana-Champaign	Stanford University
Indiana University	University of Tennessee
University of Iowa	University of Texas, Austin
Loyola University	Union of Experimenting Coll./Univ.
University of Maryland	Virginia Polytechnic Institute
Massachusetts Institute of Technology	University of Virginia
Miami University	Washington University
Michigan State University	University of Wisconsin, Madison
University of Minnesota	Yale University
Total: 52	

Table 2: Doctoral programs in the united states located within schools/colleges of Architecture offering professional degrees (1996)

Arizona State University**	Massachusetts Institue of Technology**
University of California-Berkeley	University of Michigan**
University of California-Los Angeles	University of Pennsylvania
Carnegie-Mellon University**	Princeton University
Cornell University	Rice University
Columbia University	Texas A&M University**
University of Florida**	Texas Tech University**
Georgia Institute of Technology**	Virginia Polytechnic Institute**
Harvard University	University of Wisconsin-Milwaukee**

** ARCC Member Institution

Our research, and that of Prof. Wineman's at Georgia Tech., has focused primarily on those colleges and universities in the US which *award the doctoral degree and also have professional programs in architecture.* What and where are they?

Status of Present Architecture Doctoral Programs in the US

Presently, we count 18 universities (Table 2) in the United States which have professional architecture programs and which also have approved and/or ongoing doctoral programs as well. This is a small percentage (15%) of the 118 architectural programs/schools accredited by the National Architectural Accrediting Board (NAAB) and recognized by American Collegiate School of Architecture (ACSA). These 18 schools are almost evenly split between public and private institutions but represent, on the whole, established and mature, graduate-research institutions with world class faculty, students, and facilities.

These 18 schools includes several not surveyed in the Georgia Tech study, by Dr. Wineman, mentioned above. Her data concentrates on 14 schools, which we also identified. However, we also include *Harvard University* (the Doctorate of Design--DOD), *Rice University* (which has a very individualized course of study for the degree), and *Texas Tech University* (whose program in Land Use Planning and Management was administered by the Architecture School). In addition, we include *Arizona State University*, whose doctoral program has just been formally approved and which will accept its first students this coming fall.

Our original study omitted *Columbia University* (which has a very small program -- 4 students -- focused on History, Theory and Criticism). But we now include Columbia in the 18 architecture Ph.D, programs. This does not, of course include the two Canadian Ph.D programs, one new program at McGill University (set up by Derrick Drummond) and a long- established program at the University of Montreal.

Also, this number does not count the many Urban and Regional or City Planning PH.D, programs across the US (upwards of 50 at least) which may or may not be associated with architecture and design schools. Many planning schools are affiliated with schools of government, politics, political science, or other social sciences.

Finally, the 18 schools do not include several programs still in the approval process or formative stages. These include programs at the *University of Arizona* (which is developing a multi-disciplinary, international design-oriented Ph.D, program with 5 schools in Mexico), *North Carolina State University* (which is working on a doctoral program in design concentrating on visualization and human-technology interaction), and the *University of Illinois*, Champaign-Urbana (which has been developing a doctoral program for years).

The fact that some of these programs have been in the development process for quite some time illustrates the costs, the "degree-conservatism" and the many bureaucratic hurdles that most universities -- especially state universities face when trying to establish a new doctoral degree program. This is especially true in those fields where a *strong demand from the profession* cannot be clearly demonstrated, in the *absence of*

other, pressing problems (eg. in Florida we have hurricanes, growth pressures, energy problems from sun loads, which in the mid-late 1980's helped make the case for a new doctoral degree in design, planning and construction. Other places have not been able to demonstrate, as clearly I believe, these type of crises which propel state legislators and bureaucrats to act).

Areas of Research/Work Concentration

Table 3 shows, according to our data, the general areas of research concentration offered by the 18 schools of architecture for the doctoral degree. Recurrent focal areas (themes) include *history, theory and criticism, urban and regional planning, environmental studies of a variety of types,* including *technological studies* and *design of a variety of types, including urban design.*

This general five-fold topology is mirrored in the concentration of doctoral degrees granted by the schools from the period 1974-1988, the time frame during which we analyzed architectural dissertation abstracts in the University of Michigan's *Dissertations in Architecture*, University Microfilms.

Our findings are summarized in Table 4. Out of a total of 346 dissertations abstracts reviewed for the above time period we categorized the following distribution of dissertations:

46% focused on Building Design Issues (158)
23% focused on History-related Topics (79)
9% focused on Urban Design/Planning (30)
7% focused on Environmental Systems (24)
3% focused on Construction/Building (12)
2% focused on Landscape Arch.Issues (7)

The remaining 10% couldn't be classified under any one area but belonged to several.

When we looked at the Ph.D's awarded from the *"non-architecture"* Ph.D programs in the US, we found that, of the 140 analyzed,the great majority (66% or 93) were granted for study in the area of *history*, followed, in distant second place , by *building design* (accounting for 25% or 35), with urban design/planning, landscape architecture, and *construction* falling far behind in third, forth and fifth places.

Students

The Wineman Study offers rich data as to the student composition of US architectural Ph.D-granting schools as well as to the number of degrees awarded through the years 1990-1994. According to that data, based on 1994 enrollment figures, there were a total of 380 doctoral students enrolled at the 14 universities she studied. The largest programs in the US are, in order, *University of Pennsylvania* (49 students), *University of California at Berkeley* and the *University of Michigan* (tied at 46 students each) followed by *Texas A&M University* (45 students).

Table 3: Academic/Area concentrations of architectural doctotal programs in the US at professional schools

Arizona State University: Environmental Studies, Energy, Architecture, Construction (Ph.D.).

University of California-Berkeley: History, Theory and Criticism, Environmental Bahavior, Social factors, Technology (Ph.D.).

University of California-Los Angeles: Policy Progrmming and Evaluation, Technology, History and Criticism, Design Theort and Methods (Ph.D.).

Carnegie-Mellon University: Computer-Aided Design, Building Performance (Ph.D.).

Cornell University: History, Theory Criticism, Urbanism (Ph.D.).

Columbia University: History, Theory, Criticism (Ph.D.).

University of Florida: Architectural Design, History, Urban Planning (GIS), Construction Science (Ph.D.).

Georgia Institute of Technology: History Theory Criticism, Environmental-Behavior, Technology (Ph.D.).

Harvard University: Architecture, Landscape Architecture, Urban Design (D.o D and affiliated Ph.D.).

Massachusetts Institute of Technology: Architecture, History and Theory, Arts and Media Technology, Design Methods (Ph.D.).

University of Michigan: Design Process/Methods, Environment-Behavior, History/Theory, Building and Environmental Technology (Ph.D.).

University of Pennsylvania: Theory, Technology, Representation (Ph.D.).

Princeton University: History Theory and Criticism, Technical Studies of Social and Behavioral Science (Ph.D.).

Rice University: Individualized Study (Ph.D.).

Texas A&M University: Energy, Health facilities, Environmental Control Systems, History and Theory, Visualization (Ph.D.).

Texas Tech University: Land use Planning, Management, Design (Ph.D.).

Virginia Polytechnic Institute: Environmental Design and Planning, History, Theory Criticism, Environmental-Bahavior (Ph.D.).

University of Wisconsin - Milwaukee: Environmental Behavior (Ph.D.).

Table 4: Summary of dissertation topics by category 1974-1988

		Dissertations from Arch Ph.D. Programs				Non-arch	
		Current Programs	Inactive Programs	Total	%	Ph.D Programs	%
	BUILDING DESIGN	**153**	**5**	**158**	**46**	**35**	**25%**
BD(T)	Design Theory and Process	46	0	46	13	7	5
BD(A)	Analysis of Contem. Bldgs. or Bldg. Types	38	2	40	12	9	6
BD(B)	Behavioral & Perceptual Aspects of Design	37	1	38	11	9	6
BD(C)	Computer Aided Design	13	0	13	4	3	2
BD(E)	Architectural Design Education	11	1	12	3	4	3
BD(P)	Professional Practive: Admin. & Mgmt.	8	1	9	3	3	2
	HISTORY	**65**	**14**	**79**	**23**	**93**	**66%**
H(A)	Historic Architecture & Architects	45	8	53	15	80	57
H(T)	Theory of Architectural History	19	3	22	6	10	7
H(P)	Historic Preservation	1	3	4	1	3	2
	ENVIRONMENTAL SYS.	**23**	**1**	**24**	**7**	**0**	**0%**
ES(E)	Energy Use & Consservation in Buildings	10	1	11	3	0	
ES(T)	Systems Affecting the Thermal Environment	8	0	8	2	0	
ES(L)	Systems Affecting the Luminous Environment	3	0	3	1	0	
ES(S)	Life Safety Systems and Design	2	0	2	1	0	
	BUILDING CONST.	**11**	**1**	**12**	**3**	**2**	**1%**
BC(M)	Materials and Methods of Construction	6	1	7	2	1	1
BC(C)	Contracting: Mgmt, Scheduling, Costs etc.	4	0	4	1	1	1
BC(S)	Building Structural Systems	1	0	1	0	0	
	URBAN DESIGN/PLANNING	**25**	**5**	**30**	**9**	**5**	**4%**
	LANDSCAPE ARCH.	**7**	**0**	**7**	**2**	**3**	**2%**
	INTERIOR DESIGN	**1**	**0**	**1**	**0**	**2**	**1%**
	Unclassified	26	9	35	10	0	0
	TOTALS			346	71	140	29%

Source of Titles: American Doctoral Dissertations:
Dissertations in Architecture, 1974-1988; University Microfilms International-University of Michigan. Prepared by: Richard H. Schneider, Scott A. Johnston, and Casey P. Kirk. University of Florida College of Architecture, November 1991. For: Architecture Research Centers Consortium (ARCC)

Of the 380 total number of students, 62% (236) were males and 38% (144) were females. While males still predominate by a wide margin, the substantial proportion of females speak to the inroads that have been made by women over the past twenty years into what was once an almost completely male-oriented field, at least within the professional architectural schools. At the University of Wisconsin and at UCLA women and men are found (at least in 1994) in equal proportions. Only at Cornell University do women actually outnumber men, 2 to one.

The general male-female make-up is almost mirrored in the proportion of non-US citizens to US citizens in the make-up of the national student body of architectural schools Wineman reviewed. Thus, Wineman found that 58%(220) of the students were US citizens, whereas 42%(160) were non-US citizens. In three schools she studied, the *University of Michigan*, *Texas A&M*, and the *University of Wisconsin*, foreign students made up a majority of the total student population.

While non-US citizens are a minority in the other 11 schools, they are a *sizeable* minority overall, far outdistancing the proportion of non-US citizens in the vast majority of *undergraduate* programs in the US, and at most universities generally. This high proportion of *non-US* students in architecture is echoed in other disciplines in the US with strong technical components, such as the physical and earth sciences, engineering, and medicine. Many of these students -- in all the disciplines noted above -- come from the Mid-East, Asia, and Latin America, often from "Third World" or developing countries.

This large non-US student enrollment may present problems to *existing* programs seeking increased funding from conservative ("America-First" state legislators and other officials) and make it more difficult for universities to establish new doctoral degree programs because of the same reason.

It should be noted that there are generally negligible percentages of minority students (never more than 12%) --Black, Hispanic, Asian, and Native American (Indian) students found at the institutions that Wineman surveyed. This is a significant ongoing problem in the US.

Graduates

Finally, any test of an educational program must ask how many graduates are being sent to the academic and professional job markets? As figures 1 and 2 from Wineman's study show, between 1990 and 1994 190 students were graduated from the 14 institutions she studied (an average of about 38 graduates/year), with the largest number --44-- coming through the University of Michigan's doctoral program (23% of the *total* number of graduates). Following behind Michigan is Berkeley with 29 students (15% of the total) and Cornell in third place with 19 graduates (10%) . A bare majority of graduates (98 or 51 percent) are distributed in varying numbers among the other 11 schools.

In comparison, during the same period of time in the United States there were more than 70,000 doctoral graduates in the engineering disciplines alone, a ratio of 179 to

one for the 5-year period. I have not done the research for the social sciences or the humanities, but I suspect the ratios to be nearly as great.

This disparity points to many things which deserve elaboration in subsequent papers. Among these are the *comparative state of the art of research in architecture vis a vis other professions/disciplines*, the *changing market for architectural doctoral degrees in academia and elsewhere (eg the demand)*, and the *growth of "knowledge-based" studios as part and parcel of the architectural curriculum.* Excellent reference points for those wishing to proceed further in these topics are papers by Jesson (1995) and conference papers edited by Spreckelmeyer (1993).

Some Conclusions

Since inception in the 1950"s, US doctoral programs in architecture have had a slow, and often lurching growth in terms of the number of programs and the output of graduates. Growth spurts, in the 1970's and the late 1980's have corresponded to both large scale societal pressures (eg. the energy crisis, environmental issues and concerns) as well at to more localized public issues (eg state-level population growth pressures, and local natural disasters). Another factor contributing to more recent growth is the maturation of some architectural/planning research programs at certain universities, especially in the west and south (eg. Arizona State University and the University of Florida). This research maturity permits these schools to support graduate research assistants for relatively long periods of time, or at least long enough to earn the doctorate.

However, as long as the profession of architecture, joined by a fair proportion of faculty members in architecture departments in the US, is generally resistant to the inclusion research methodology course work and "knowledge-based studios" into the curriculum and is skeptical of the conduct of research as applied to architecture, doctoral programs in the field will continue to grow slowly as will the number of graduates.

This growth pattern probably suits the academic market despite the fact that some university vice-presidents, deans, (and sometimes chairs) with institution-wide perspectives, have in recent years begun demanding that entry-level faculty candidates have the doctoral degree as the "terminal degree." These views, have acted to counterbalance the professional antipathy toward research and probably have provided the basis for the employment of the small numbers of architectural doctoral graduates produced each year in the United States.

However, a result of this seesaw between the profession and academia has been a form of schizophrenia that is evident, among other things, in the perennial instability of architecture's national research organization within the leading professional and academic societies. While there are suggestions presently on the table to stabilize this situation, there is not yet a long term solution to the greater problem, which is the role of research within the profession of architecture generally.

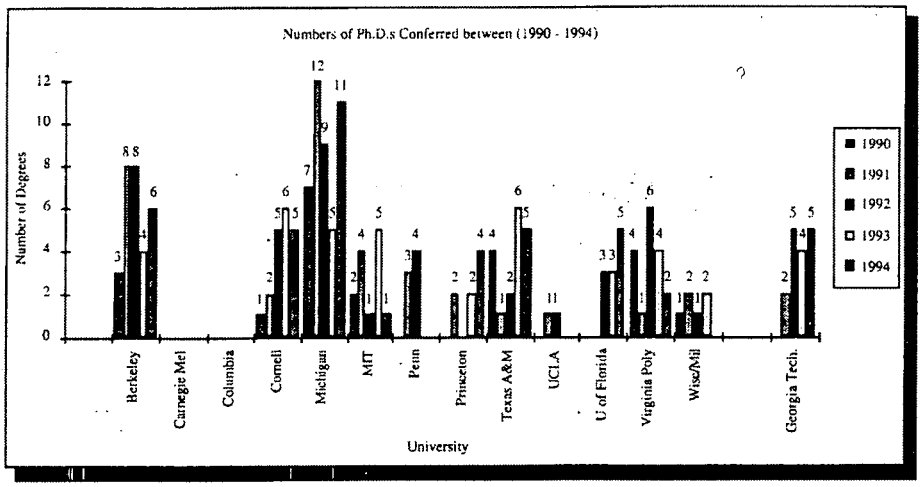

Figure 1: Number of Students awarded their Ph.D. each year per Institution (1990-1994)

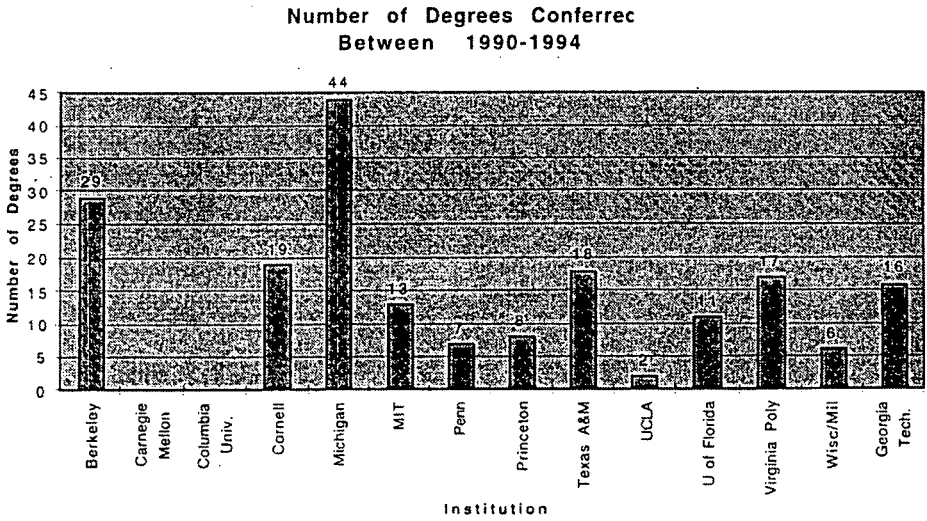

Figure 2: Total number of Students awarded their Ph.D. between 1990-1994 per Institution
(source: Wineman Study, Georgia Tech.)

Specific Problems and Concerns
Some relevant problems within US architectural doctoral programs include the following issues.

Funding While always a primary concern, this may manifest itself in many ways, not the least of which is the problem of the balance of state (public) support vs external grant support. This applies particularly to large-scale public universities. Of course, research funding is often a serious problem within many private universities as well.

Core Curriculum: what is it? This is a particular problem within those multi-disciplinary architecture schools where epistemology and politics are different among units -- eg planners, engineers, landscape architects, architects, interior designers, whose faculty have a different way of knowing and seeing the world. While this can sometimes be a benefit -- because of the diversity of approaches -- it is often a headache.

Core Curriculum: Who Teaches It? This can be a major problem for the diversity reasons stated above: it can also translate into a never-ending organizational shuffle which is disruptive to students and faculty.

Faculty: Where do they Come From? May be a problem where there are few Ph.D, faculty members on staff. But, the more serious problem is dividing up and allocating their time to the doctoral program, especially where Ph.D programs have been created "on the backs of other programs," that is where they have been carved out of the FTE's of existing departments. This is a breeding ground for faculty resentment and conflict.

Research Support: This is related to funding, of course, but also is linked to the continual pressure that US faculty are under to capture grant monies to support graduate assistants. Moreover, there are unequal sources of support insomuch as technological and scientific research (eg. building physics) and construction research areas (materials and methods) tend to be well-supported, whereas design (with the exception of some types of urban design), history, representation, and building poetics tend to be difficult to fund. The latter fall under the rubric of "scholarship" rather than research. This can be the source of great resentment among the faculty.

Organization and Linkage to Other Units: While this can and does impact single-discipline colleges, it is a particular problem to multi-disciplinary schools, which are common in the organization of US architectural colleges. The question is, "how should the doctoral program be organized (eg as an umbrella program under the Dean's Office or under an office of its own, or within each of the separate disciplines which may participate in it) and who should administer it and how?" Furthermore, there is the fundamental problem of the Ph.D program's linkage to individual departments, which may seek to enforce different standards relative to everything from the oral examination to the conduct of the field research. These differences may or may not be mediated and mitigated by university-wide graduate schools.

Credit for Dissertation Advisement: In some faculties, especially where there has been limited experience with doctoral study, there has been insufficient credit given to fac-

ulty for their time and effort expended in advising doctoral students. This can be and often is a source of significant injustice and resentment among the doctoral faculty.

Minority Representation: Minorities, especially native US minorities, are very under-represented. This can result in the lack of cultural diversity and sensitivity in the schools and fierce competition among the schools for those minority students who are available.

Non-US Representation Among Students: At the same time, the relatively large proportion of non-US students in architectural doctoral programs can be a detriment when seeking to "justify program existence/expansion" among conservative audiences or when seeking to establish a new program. This is so despite the significant benefits of cultural diversity.

Tracking of Graduates: This seems to be an issue throughout academia but is of particular concern to those programs, such as architecture doctoral programs, which have small or relatively uncertain markets. Most US schools do not do a very good job of tracking their graduates to ascertain where they are working and their relative success levels. National data here would greatly assist our understanding of the market for doctoral graduates in architecture and design. (In contrast, it is interesting how good a job Alumni offices do in tracking graduates!)

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Design PhDs in Architecture

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Abstract
If some design activities may be regarded as research then it ought to be possible to have design PhDs. The form that these might take is suggested here by considering the requirements of a PhD examination as well as the ways in which architectural knowledge might be extended through design research. It also suggests that for this purpose the practice of architecture as a craft needs to be distinguished for architecture as an art and considers the different kinds of exercise that this distinction implies.

Introduction

The amalgamation of British universities and polytechnics into a single system, with both subject to funding through the RAE, has made it necessary to think about how design might be regarded as a legitimate reseach activity. Departments which had not needed to define this activity in a way that might be acceptable to a wider academic community now need to do this. In a previous article (Yeomans, 1995) I considered whether architectural design might be considered as research and a natural extension of this is to consider whether there might be design based PhDs. The idea of a design PhD extends the definition of design as research, put forward previously, but in a particular context because a PhD is a restricted form of research from which it may be necessary to exclude some kinds of work which, although valid as research, are not appropriate to the constraints of a PhD examination. The task therefore is to define the form that a design PhD might take in terms of the aspects of the candidate's research that are examined.

The PhD examination

What we expect of someone who produces a successful PhD is firstly that they have identified the critical questions to be asked in a particular field. This means being familiar with work in that field and being able to identify where work should be directed in order to extend knowledge. This suggests that even a design PhD cannot simply be in drawn form. Any analysis of the present state of a subject which leads to identifying a particular problem must be done in words, even if those words are there to explain some graphic material. The analysis would need to describe a general class of problem to establish the context in which the research is to be set, and provide some analysis of the existing design solutions to draw out the issues they present, possibly showing how and why they fail or are in some way inadequate. This might be quite a simple statement. The design development sought through the research might be of a technical nature in which case the starting point could be a simple statement of the technical limitations of the existing design solutions.

Alternatively, the analysis of the current state of the art might call for a degree of architectural criticism leading to a more general kind of design. The candidate may in these circumstances develop one or more design forms but the issues so addressed must be general rather than particular, i.e they must consider a general class of problems and produce results which are applicable to a range of problems within that class. Just as a PhD may involve working within an existing theoretical framework or constructing a new framework for the purpose the designer may either produce something using existing methods or develop the design method itself.

The students must also plan and carry out a piece of work that extends the field of knowledge, gathering the necessary data and drawing conclusions from it within strict time limits so that it is important to select a task which may be completed within the period of study. This means that the design task need to ba at an appropriate scale, an issue that I shall return to.

In doing a PhD the student is demonstrating the development of certain skills and to examine this in design terms it is sensible to separate the craft of architectural design from the artistic aspects of the activity. Although there is obviously an overlap between art and craft, architecture has a number of the characteristics of a craft that were clearly identified by Collingwood (1938) when he drew a distinction between the two. For example, architecture is produced for a defined purpose and a purpose set by the client and not by the architect. At the same time architecture can also be regarded as an art because there are architects whose work satisfies Collingwood's requirements in this regard. One example alone is sufficient. Hildebrand(1991) recently examined Frank Lloyd Wright's houses showing clearly how the spaces may be read as expressions of the emotional need for shelter and security; an architecture transcending craft. Thus, asking what an architectural design PhD might look like resolves into two questions because the subject might be treated either as an art or as a craft and the examination process is clarified if they are distinguished.

Finally a written PhD must draw some conclusions and the candidate would normally be examined on the nature of the conclusions drawn from the body of the work presented. We should expect no less of a design PhD. One might draw an analogy between designing and the carrying out of a scientific experiment. In the latter, it is not sufficient to produce the results and let them speak for themselves, conclusions must be drawn from the results of the particular experiment to show how they answer the general problem identified at the beginning. Similarly a design thesis needs some demonstration that it is a solution to the general problem identified.

Architectural design as a craft

The design PhD must be different from the normal design process. Much design involves the application of known methods to problems which differ only in detail from other problems of a similar kind. The problem may gradually become more difficult and the form of the solutions more refined as the limitations of existing design forms and design methods is realised or as additional constraints are placed upon the nature of the solutions which are acceptable. As a result of this normalprocess (and I am deliberately borrowing the term from Kuhn, 1962), design solutions improve incremen-

tally, often including what Gilfillan (1935) has called 'perfecting inventions in a process that is often considered analogous to evolution. Any such process is implicitly limited by the starting point adopted by the designer or by the nature of the methods used to develop the design further. This implies that a design PhD should begin by breaking this mould, rejecting either the starting point of other designers or the methods which they use. In the former case it is the skill of the designer that is being tested with the proof in the form of a critical examination of the product. This is analogous to the skill of a scientist being tested in the devising and carrying out of an experiment.

If the design PhD was concerned with the development of a design method then it would be necessary to demonstrate that the method proposed gave improved results. In this case the design problems tackled might be less ambitious only serving as demonstration exercises. However, the difficulty here is paucity of work on design techniques.

If it is the craft activity that is being considered in the research then I have set out some of the characteristics it would have and considered the kinds of problem that it might tackle in my earlier paper. There are two that appear to be candidates for PhD work. The first is the incorporation of recent research findings into design where there may be useful collaborative work between designers and building scientists. An example is the development of design approaches to reduce energy consumption in buildings. It would not be necessary for this to involve the complete design of a building, but the work might either be at the level of overall design form, where gross energy consumption of a building is being considered, or at the detailed stage, perhaps considering individual rooms where reduction of consumption may involve the behaviour of occupants. A second possibility is the development of new approaches to design or new design forms based upon an improved understanding of the problem, or the alternatives available. Such work, described by Leyton (1961), was once carried out by development groups for housing, hospitals and schools.

The design problem might be just a part of the building procurement process and so would not always mean the designer-researcher being involved in the final form of the building. The researcher need not be the principal designer but may be part of a team which means that the design can be of a much larger scale than those that can be tackled by an individual. This accepts the complex collaborative nature of architectural design. It is possible to imagine a limited involvement in design at the sketch-design stage, developing the overall form of the building, with the researcher's involvement ceasing as soon as the design progressed to the development stage. The research aim might, for example, be the improvement of the brief. Although public participation in design and planning were ideals pursued in the 70s, users still have little voice in the buildings they inhabit although the concerns of 'users,' be they office employees, maintenance staff or visitor-users are issues that have more recently been explored by Kernohan (1992).

These kinds of research raise the question of group work being eligible for a PhD. Collaborative work is already accepted in some of the sciences but a possible difficulty in collaborative design is that others may not be PhD candidates. This is a difficulty that needs to be resolved because it is necessary in an examination to be sure of the

candidate's contribution. Research involved in detailed design where the researcher has some specialist knowledge also raises the question of distinguishing between research and consultancy. This is an issue that I intend to take up in another paper but the experience of the Teaching Company Scheme in Britain, where students registered for higher degrees may be working directly on problems generated by industry, suggests that this would not be a problem.

Examples making use of new scientific understanding or requiring some analysis to be applied during the design process and so calling for some kind of collaborative work are quite different from the development of what is more commonly regarded as a design skill. For examples of individual design tasks that demonstrate the kind of design that might be acceptable at PhD level it is necessary to draw upon historical examples. These are examples from practice which show an advance in the art of design that has led to the equivalent of a paradigm shift.

A recent development in timber-frame construction provides an example of work that has overcome technical limitations. The platform frame which has been commonly adopted for domestic construction in Britain has technical limitations that prevent its extension to larger or more complex building types. Fire protection is just one consideration that makes it unsuitable for extension to the construction of apartments for example. This has recently been solved by the development of a new and patented form of construction. Whether or not this design development would have merited a PhD, it provides an example of the rejection of an established design form (platform frame) and the development of a new one to extend the range of a construction type (timber frame) to a larger group of building types.

During the 60s and 70s the idea of providing a fixed infrastructure, or even a fixed structure on which could be developed flexible dwelling forms had a certain vogue but few of these developed beyond the basic idea. However Habraken, in collaboration with others, developed the basic idea outlined in his *Supports* (Habraken, 1972) and in *Variations* (Habraken et al. 1976) showed in some detail how it could be applied in practice.

Drawing on historical examples in this way is a slightly difficult exercise because it involves looking back over new design ideas that have been produced at different times and asking whether similar developments today might be regarded as candidates for PhDs. In each case we are looking for a general problem and a solution worked out in sufficient detail to clearly have general validity. Again it has been easier to start with technical rather than general design issues and we need also to find models for the latter. Consider, for example, the development of apartment design in the inter-war period. Within this category the ideas of Le Corbusier, as applied at Marseilles, Wells Coates's Lawn Road flats, which tackled the novel problem of the middle class bachelor apartment, or the prize winning entry by Lubetkin & Tecton for the 1935 Working Men's Flats Competition might all be considered developments in plan and form that represent a paradigm shift whatever their ultimate success in the market place.

Architectural design as art

So far architectural design has only been considered as a craft activity but this does not eliminate the possibility of an architectural design PhD which considers architectural design as an art, nor that it cannot be considered as an art for research purposes. The difficulty here is that if architecture is considered as an art how are results to be produced which are applicable to a general class of problems? Since art, to retain Collingwood's definition, must be expressive of emotion, it is impossible to predict emotions and provide general expressions - a point which Collingwood makes himself.

Emotional responses are singular, a work of art giving expression to the emotional responses of the artist. Artists are given public recognition because they produce works which communicate to others, pictures or poems valued as a work of art because they speaks to us in ways that we recognise. The same may be said of architecture when work communicates in a way that previous work has failed to do. This is not my field but it does not seem impossible to determine criteria by which this can be assessed. Brawne (1991) has already discussed the development of architectural ideas, using Kuhn's model of the development of science as a metaphor. In this model, as it becomes apparent that the forms used by architects are no longer appropriate, new forms must be sought. What is needed is a paradigm shift so that the architectural language of the buildings that people use and which forms their environment will again speak to them. Surely this is visible today as never before, particularly in a number of developing countries where increasing economic activity has led to rapid urban and suburban development. It would be difficult to claim that many of the architects responsible for this have found an appropriate language. In Malaysia, for example, there are examples of buildings which borrow the motifs of middle-eastern Islamic architecture or the roof forms of vernacular Malay houses. Meanwhile, there are suburban residential developments that are parodies of English mock-tudor. These are surely not appropriate responses to the changes occurring. What then are appropriate forms able to speak of both the inherited culture and the aspirations of the country? Is this not the kind of question that might be addressed in a design PhD?

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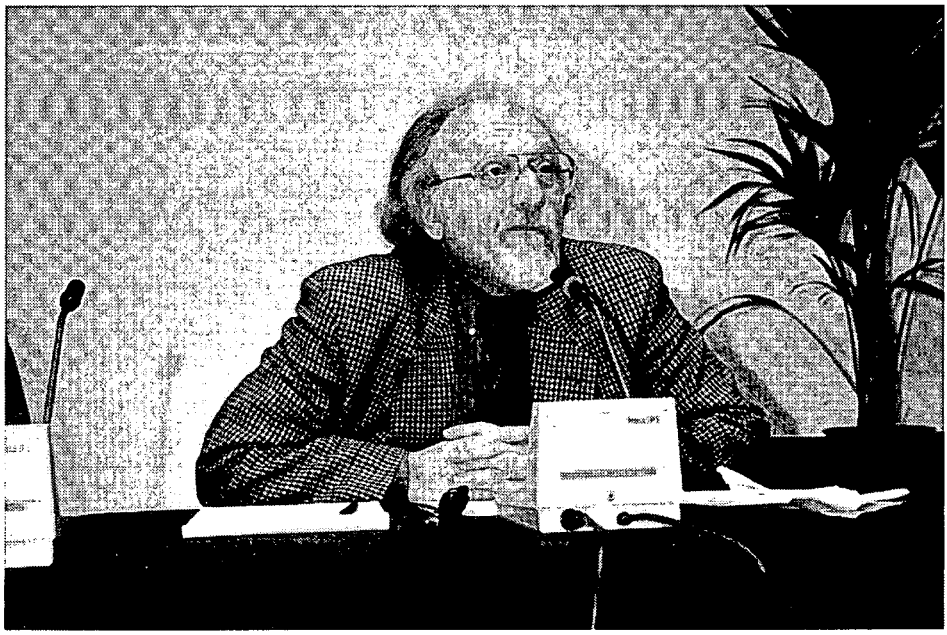

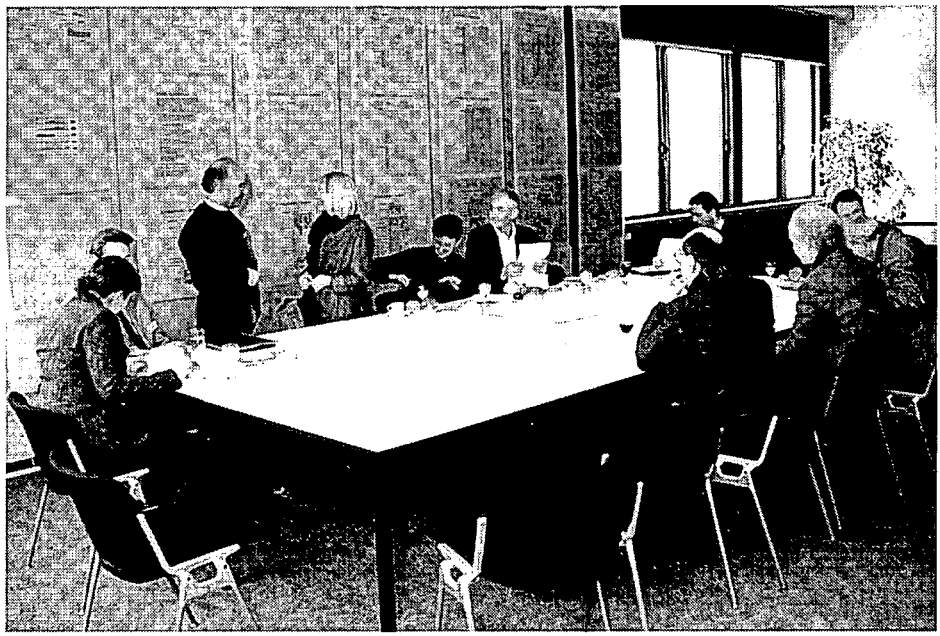

Above: Richard Foqué, conference chairman
Below: Meeting of the chairs of parallel sessions

Design Research : The Third Way

Richard Foqué

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In my introduction to the conference I posed the important question of the scientific status of design research as the underlying fundamental framework, within which every doctorate student has to work and should contribute to. In doing so he will offer some of the necessary knowledge for establishing a coherent design theory.
During the first conference on Doctorates in Design and Architecture we discovered a widespread, differentiated and often specialised field of research topics. We explored areas of interest, we looked upon results of utilisation of the results of design research in practice, its effects on design knowledge and debated on the possible opportunities for those who obtained a doctor degree in design.
In fact we tried to start to establish a tradition of doctorate studies in design research, being aware that there is little tradition at the different universities whatsoever and that the necessity of such a doctorate study is not always stimulated neither by the academic world nor by practice.

They both still look upon design in a very conventional way, preconceived as they are by the typical traditional division between science and art. Within this standard dualistic thinking science deals with measurable facts, rational and logical thinking, hypotheses which can be tested and proved false or true. Art is the opposite, it deals with unmeasurable parameters, decisions are made "intuitively", and by its own essence it can not be put to the true or false test.

It is not because art is not producing hypotheses, as in fact it is doing so all the time. But testing them in a traditional way is senseless. They never can be either true or false, as they have to keep their status of hypothesis for ever. It is the true meaning of art.

What is the position of the architectural design activity within this field of tension between science and art. For still a lot of architects design is an art and cannot be the subject of scientific investigation, for still quite a lot of scholars it is definitely not a science as it operates in a grey zone of indefinable variables and deals with wicked problems. It should be clear that conventional dualistic thinking is not offering us any perspective to establish a coherent framework for design research at all.

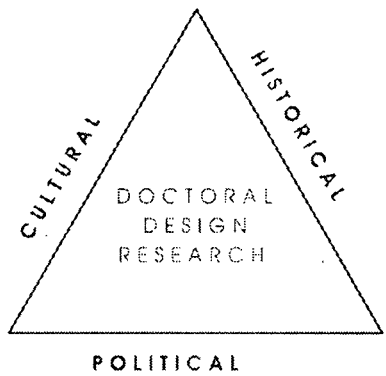
Recent discoveries in quantum physics have given us new insight in the fundamental composition of the prime matter. It enabled Prirogine to establish the chaos-theory, based on change - processes in dissipative systems. This new paradigma may offer us a key to understand the true essence of architectural design research, demolishing the conventional barriers between art and science and giving us the cornerstone for a true

scientific methodology in design research. It should indeed be possible to formulate design hypotheses and to test them. But the test will be contextually. The method of testing and the circumstances will influence the results. The hypothesis will be sometimes true and sometimes false, there will be no longer a linear relationship between cause and effect, time will be discontinuous and decisions will be submitted to the laws of change and chaos.

I will call this the third way : the designerly way, where the methods of traditional science and conventional art meet again and may offer us a framework in search of a new status of scientific design research.

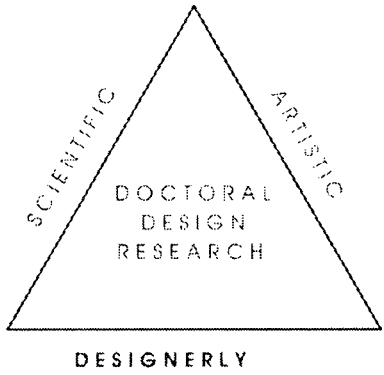
The study of the state of the art in the different countries offers us already several anchor-points and promising perspectives. In my conclusions of the conference I distinguished six areas of tension, I called them the six "eternal triangles" within which doctoral design research is caught up.

1. The contextual triangle



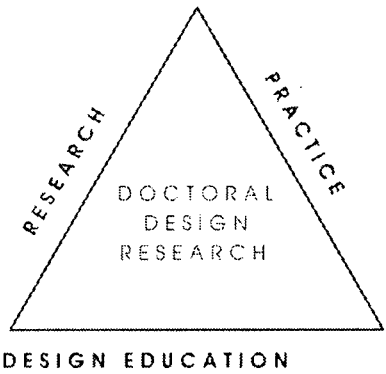
Doctoral design research will always be determined by its underlying value systems. A lot of questions remain to be answered : What is important ? What is morally acceptable ? What do we understand by beauty ? How do we deal with our environment?
The answers of the individual scholar will to a great extent set the context of his research work, defining the boundaries of the research areas and determining the methods used. The outcome of the doctoral study will no doubt be "biased" and can only be denoted within this contextual framework, which is defined by the scholar's historical, cultural and political background.

2. The methodological triangle



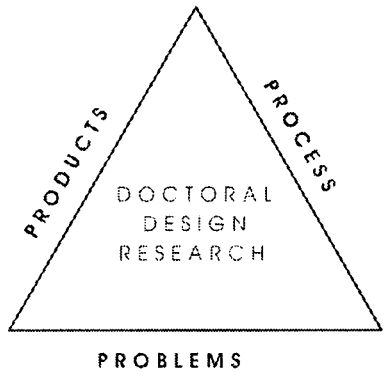
The traditional paradox between art and science is already discussed in the previous paragraph. It is clear that every design researcher will be confronted with the traps of both : The pure rational approach and the artistic negation of the existence of a systematic and coherent scientific method. The designerly way as a synthesis of both may serve as a handle for the development of an appropriate research methodology.

3. The professional triangle



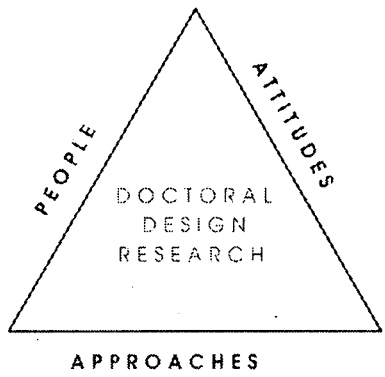
Design is always client orientated. The client really matters and designers in practice are mostly under tremendous commercial pressure. Therefore, design research will always have a very practical dimension. Design tests the research and the research tests the design as Duffy put it in his opening lecture at the conference.
This area of tension that exists between fundamental research, practical design and design education is very typical for doctoral design research. It gives each design project some open ending and the possibility of accumulating design-knowledge.
Building up and sharing this knowledge is not only essential to gradually enforce design education, but will be crucial for the professional practice to survive in the future.

4. The triangle of subjects



Analysis of the several research papers, presented at the conference indicates not only a wide range of subjects but clearly reveals three levels on which design research takes place.
The process level where researchers look into the mechanisms of the design activity itself : How do designers think ? How do they make their decisions ? Do general design patterns exist ? etc..
The level of the design product itself : comparative building studies, typology research, analysis of the work of particular designers are examples of this. Others are doing research on the problem-level : how can we resolve fundamental design issues ? Social housing , ecological sound environments, public transport, the application of new materials etc.. are examples of this level.

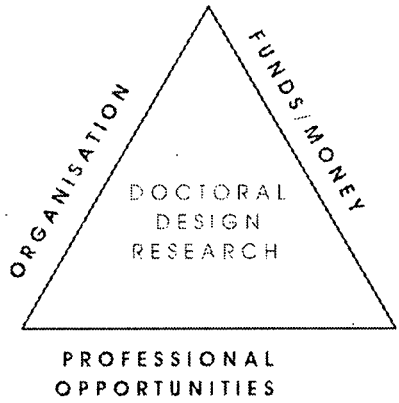
5. The triangle of the researcher's personality



The hypothesis that the personality of the researcher is considerably influencing both the research process and the research results is no doubt controversial.
However there are indications that individual attitudes lead to different approaches in tackling a design problem. Personal likes and dislikes may be determining triggers.

This contextual characteristic of design research is maybe one of the most typical on the basis of which it distinguishes itself from the more traditional sciences.

6. The organisational triangle



As all research doctoral design research also needs funds and money. What are the possibilities of grants and scholarships ?
The state of the art in the different countries show us enormous diversity in organising design research, even within one country, differences between the different institutes and universities are great. We should aim at international co-operation and exchange of scholars and at the time explore the possibilities for professional opportunities, putting the results of doctorate design research to work.

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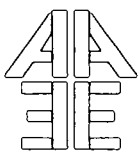

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