Fractured Pedagogy:
The design and implementation fault line in architectural knowledge -
a conceptual and historical analysis

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I am an artist, a technician, and a diplomat

Jacques Herzog, 2007

Declaration

This work has not been previously submitted in whole, or in part, for any award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work or works of others has been attributed, and has been cited and referenced.

Francis Carter, Cape Town, September 2007

To

Students of the 'UCT architectural students revolution of 1997', who I had previously taught at the Peninsula Technikon, and who asked me "how do we transform the curriculum?" I didn't know but said that I would find out, and registered for the UCT post-graduate diploma in higher education studies to try to understand what a curriculum is, and what the architectural curriculum is. I thought that transformation of the curriculum would have something to do with a shift from Euro-centric content, but started to see that there may be more fundamental issues to consider first. However I was in practice at the time and could not sustain these studies. When I took up a fulltime teaching post at UCT in 2003, the opportunity came to resume the task. In this period, this initial work on curriculum theory has gone hand in hand with work on tensioning up undergraduate architectural studies and shifting the intake demographics. But this report back to the students is incomplete: their question has not yet been answered....

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Acronyms

AA	Architectural Association
RIBA	Royal Institute of British Architects
UK	United Kingdom

ABSTRACT

There appears to be a gap in architectural knowledge between design theory and implementation practice which is difficult to bridge in teaching, learning and work. As evidence of the existence of this gap two sources of data are contrasted: exhibition catalogues which convey what individual architects say to each other about their work, and official reports which convey what institutional representatives of the organised profession say about failures in the work of architects. These data sets are contradictory, reinforcing the possibility of a fault-line between design knowledge and implementation.

The question then arises as to whether this tension in professional knowledge in the field of production is reflected in the pedagogisation of the knowledge, reinforced through its transmission. As the architectural curriculum in Commonwealth countries has a generic format, this generic curriculum is analysed next, in terms of Bernstein's concepts of classification / framing, and integration / collection. The analysis is ambiguous, as both strong and weak criteria co-exist with dual coding, complicated by the horizontality and tacit nature of spatial design knowledge on the one hand, and the extent of regionalised knowledge on the other which recontextualises contradictory knowledge systems from sources in arts and sciences. Tacit implementation knowledge sits uncomfortably in this mix as a largely segmental horizontal discourse.

To understand the default pattern in this pedagogy more clearly, the research then tracks back to the initial definition of the knowledge system at the time of the formation of the modern profession. In this analysis Bernstein's pedagogic device is used as the framework for locating and unraveling the historic data in terms of the production and recontextualisation of knowledge, distributive rules and power relations between agents. The history maps neatly onto this theoretical model, confirming in-built tensions in the knowledge system which marginalise knowledge of implementation and which construct a professional consciousness centered around spatial imagination primarily and technical innovation secondarily.

The research is thus an initial attempt at a historical analysis of a region of professional knowledge[1].

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[1] The scope of this work has been limited to the UK, as the South African model for architectural education derives from this source; it seemed necessary to understand these origins before examining export of the pedagogy to the colonies. No new data on the specifics of classroom transmission has been collected, and the sources used are secondary. The modeling exercise emphasises 'macro' elements of Bernsteinian theory.

CONTENTS

i Declaration
ii Dedication
iii Acknowledgments
iv Acronyms
v Abstract
vi Table of contents
vii List of diagrams

1.0 Chapter 1: Introduction.....1

1.1 Introduction to the region of architectural knowledge.....1
1.2 The research question.....8
1.3 Methodology and data sources.....9
1.4 Outline of the dissertation.....13

2.0 Chapter 2: Design and Implementation.....14

2.1 Design data.....14
2.2 Implementation data.....22
2.3 Horizontal and vertical discourse.....30

3.0 Chapter 3: The Architectural Design Curriculum.....36

3.1 The RIBA outline syllabus.....36
3.2 Classification and framing.....39
3.3 The pedagogic device.....45

4.0 Chapter 4: Historical Analysis of the Creation, Transmission and OfficialRecontextualisation of Architectural Knowledge.....50

4.1 Field of production of discourse.....51
4.2 Transmission of knowledge.....72
4.3 Official recontextualising field.....80
4.4 Summary of the historical development and recontextualisation of disciplinary knowledge.....93

5.0 Chapter 5: Conclusion.....96
5.1 Findings of the dissertation.....96
5.2 Postscript.....102

6.0 Bibliography.....105

7.0 Appendices.....109
7.1 Appendix One: Design data.....109
7.2 Appendix Two: Implementation data.....124
7.3 Appendix Three: Historical data.....129

DIAGRAMS

Diagram 1 Vertical and horizontal discourses of knowledge, with differentiation of horizontal knowledge structures.....32

Diagram 2 Architectural knowledge as a region.....35

Diagram 3 Outline syllabus requirements for RIBA validation of architectural Programmes.....38

Diagram 4 Classification, framing and codes.....41

Diagram 5 Dual code modalities in the architectural region.....42

Diagram 6 Weakening of classification in architectural recontextualisation and pedagogy.....43

Diagram 7 The pedagogic device and its structurings (Bernstein, 2000, 37).....46

Diagram 8 Structurings of the pedagogic device.....47

Diagram 9 Professional division of labour Stage 1 (17^{th} + 18^{th} centuries): Separation of aestheticians from craft production.....57

Diagram 10 Professional division of labour Stage 2 (turn of the 19^{th} century): Separation of architecture from engineering.....58

Diagram 11 Professional division of labour Stage 3 (beginning of 19^{th} century): Separation of architects from business relationships with builders.....61

Diagram 12 Professional division of labour Stage 4 (mid-19^{th} century): Inclusion of detailing and contract documentation.....64

Diagram 13 Professional division of labour Stage 5 (late 19th century): Stylistic autonomy or business compromise.....68

Diagram 14 Professional division of labour Stage 6 (early 20^{th} century): Hierarchy of knowledge in the region.....70

Diagram 15 History of transmission of architectural knowledge.....71

Diagram 16 Tabulation of examination arguments and agents.....81

Diagram 17 Timeline of 17^{th} and 18^{th} century architects.....133

Diagram 18 Agents of the official recontextualising field.....134

1.0 Chapter 1: INTRODUCTION

This introductory chapter gives a brief outline of the broad scope of architectural knowledge and its apparent tensions. These frame the research question, which probes the apparent tension between architectural design knowledge and architectural implementation knowledge. As the methods developed to research this question are straightforward, they are dealt with in this introduction, together with the selection of texts used in the analysis.

1.1 INTRODUCTION TO THE REGION OF ARCHITECTURAL KNOWLEDGE

Bernstein describes architectural knowledge as a 'region' of knowledge (Bernstein, 2000, 52) which aggregates a variety of other knowledge systems into a loose composite field of professional knowledge. This aggregation of knowledge is evident in the work which architects do. In order to design buildings and get them built, architects need to understand a wide range of *applied* knowledge derived from other disciplines. For example, they need:

- a *creative understanding of spatial design*, which draws on a broad understanding of design principles in the fine arts, and which requires practice in the inventiveness and synthesis required to solve complex functional and aesthetic problems;
- *visual literacy* and visual communication skills, which are informed by generic knowledge of manual and digital drawing, and theories of communication and representation;
- knowledge of *histories and theories* of architecture, which are informed by broad debates in philosophy and sociology and a wide range of current thinking in cultural studies;
- knowledge of *African Studies*, post-colonial theory and development issues, which flavor knowledge of architectural history and project delivery here;
- *contextual design* ability, informed by knowledge of the history of human settlements, the political economy of cities, human impacts on natural systems, and the design of external landscaped spaces;

- *technical knowledge* of building materials and building construction, which draws on principles of materials science, knowledge of industrial production, awareness of renewable resources, and traditions of architectural detailing;
- *structural knowledge* of the stability of buildings, requiring a mathematical understanding of statics and awareness of principles of structural engineering;
- knowledge of the *environmental performance* of buildings and the integration of *building services*, drawing on physics and requiring an understanding of mechanical and electrical engineering, all informed by current issues of environmental sustainability;
- knowledge of the *regulatory context* of town planning legislation, impact studies, building regulations, health and safety requirements, and knowledge of *building contract administration*, all informed by principles of law;
- understanding of the *co-ordination* of a wide range of other built environment disciplines, of the roles of other professionals in building projects, and the *management* of consultant teams;
- knowledge of commercial, public, public-private and community based *project implementation cycles*, requiring a knowledge of sources of finance, mechanisms of financial control and the politics of decision making in these different sectors;
- and, the ability to run a *design consultancy*, requiring knowledge of business management.

This aggregation of pure and applied knowledge systems is so broad that the region of architectural knowledge spreads across the usual groupings of knowledge found in University Faculties, with the result that Departments of Architecture (usually called Architectural Schools) can be found in a variety of Faculties, including Engineering, Humanities, Natural Sciences, Economics and Fine Arts. For example, in South Africa Architectural Schools are located in:

- Faculties of *Engineering and the Built Environment*, e.g. at the Universities of Cape Town, Witwatersrand and Pretoria (where computer science is included in this grouping);
- a Faculty of *Humanities, Development and Social Sciences* at the University of Kwazulu Natal;
- a Faculty of *Natural and Agricultural Sciences* at the University of the Orange Free State;

- a Faculty of *Economic and Building Sciences* at the Nelson Mandela Metropolitan University;
- and, until recently, Architecture was located in a Faculty of *Fine Arts and Architecture* at the University of Cape Town.

While one would never expect to find other regions of professional knowledge such as medicine or law in any Faculty other than a Faculty of Medicine or a Faculty of Law, the region of architecture seems to be so broad and loosely linked that it can have a shifting locus which locks onto different groupings of knowledge.

Nevertheless architecture is a discipline in its own right which holds a particular knowledge centred on *spatial design*, and a particular and longstanding pedagogy centred on the *design studio*. Spatial design is the synthesising knowledge which cuts across the components of the region, and the design studio is the transmission device which facilitates the integration of different knowledge in coherent design work.

This particular form of knowledge and pedagogy is a rich terrain for the investigation of 'invisible' transmission, cross-disciplinarity and creative design thinking generally. However, before one can explore architectural pedagogy in any detail, it seems to me that it is necessary to understand broad tensions and divisions around which the whole region of architectural knowledge balances. There are at least five of these general tensions, all deriving from the breadth of the region:

- firstly a tension between design and implementation;
- secondly, a tension between the global and the local;
- thirdly a tension between arts and sciences;
- fourthly a tension between pure and applied disciplines;
- and fifthly a tension between architectural design and urban design.

A tension between design and implementation:

This tension arises from the breadth and complexity of architectural work. In the field of practice a 'good architect' is able to resolve the multiple and often conflicting requirements of a project (functional, contextual, financial, structural, social, material, intellectual, cultural, environmental, etc.) in a coherent formal and spatial synthesis. This 'concept' guides the development of the project, resolving the idea in detail. This design

knowledge is complex, fuses rigorous analysis with leaps of the imagination, is culturally and materially loaded, and takes a long time to learn.

A 'good architect' is also able to marshal and lead a large consulting team, maintaining the trust of clients and financiers, and is able to get the project built within time and budget constraints to good quality, managing the multiplicity of legal and contractual processes which are required to do this. This knowledge of practice requires a high level of technical, managerial and legal knowledge, and a lot of professional experience.

'Good architecture' is able to carry itself across these two areas of knowledge. Unless there is a clear architectural idea (i.e. a coherent concept which pulls all the parts into a spatial relationship which resolves the specific requirements), skill in making it happen will not add up to very much, architecturally. Unless the strong architectural idea can be taken through the process of implementation in a way which protects it from circumstantial and expedient erosion, or conversely in a way in which the idea informs successful decision making, what will be built will be a disappointing version of what could have been.

While it is clear that architects need knowledge in both of these areas, there are often tensions around the emphasis and pacing given to each in the curriculum. Stereotypical views at each end of this divide are, on the one hand, that in an increasingly complex world there needs to be more emphasis given in architectural education to *knowledge of principles* of implementation, and on the other that this is a *management skill* which should be learnt in practice rather than in the University.

A tension between the global and the local:

While the tension between global and local issues in architectural knowledge has particular nuance now under conditions of globalisation, it has probably always been there. The 'informational economy' and the 'network society' have economic and social impacts on architectural knowledge and conditions of practice (Castells, 2001). While some architects theorise and embrace the iconic opportunities which global capital presents (Koolhaas, 2004), others react against globalisation's delocation of culture and tradition and its valorisation of economic participation (Correa, 2000).

Previously, during Modernism, the 'International Style' swept across continents (Frampton, 1980), but the dehumanising effects of standardised and repetitious modernist cities (Blake, 1977) lead to a revival of localised place making (Norberg-Schulz, 1980), a rediscovery of the social thresholds in African vernacular architecture (van Eyck, 1976), the study of complexity and contradiction in architectural form (Venturi, 1977), and investigation of the idiosyncrasies of popular culture (Cook, 1972; Venturi et al, 1972).

Underlying these 20th century dichotomies, classicism asserted that there were universal and abstract design truths while romanticism celebrated sensual, ambiguous and site specific space - conflicting design ideas which go back to the roots of Greek philosophy (Summerson, 1980). Tensions between the global and the local are therefore deeply embedded and overlaid in architectural knowledge, and have a direct (though sometimes hidden) impact on design ideas and strategies, and presumably on curriculum formation.

A tension between arts and sciences:

The region of architectural knowledge tends to get 'silo-ised' into two streams:

- history and theory of architecture, cultural studies, critical thinking, social science etc, hereafter referred to as 'arts';
- and building technology, environmental studies, theory of structures, etc, hereafter referred to as 'sciences'.

These subject streams feed the design studio, which provides an environment for the two groupings of knowledge to be synthesised in coherent design work, i.e. work which demonstrates an ability to theorise, contextualise, spatialise and materialise.

While one would expect there to be a good balance between these arts and sciences in architectural education, and good interaction between specialist teachers in the design studio, the pedagogy can fragment into silo-ised camps of 'theorists' and 'technocrats', with little actual synthesis occurring in design learning. Technology is sometimes 'applied' to a well theorised design at the last moment to meet an assessment requirement, with little integration of making in the process of design thinking. On the

other hand fascination with technology can get out of control, and have very little meaning or usefulness[1].

A tension between pure and applied disciplines:

A range of applied architectural knowledge has been listed above, together with the pure disciplines which underpin this. This begs the question of how much of the pure knowledge of arts and sciences are required in the region, how much applied knowledge, and in what relationship?

Two opposing responses to this dilemma can be found in the US and the British Commonwealth:

- In the US undergraduate studies are usually based entirely on the study of pure disciplines, i.e. general humanities or environmental science degrees, and applied studies in architecture start at *graduate* level (Boyer and Mitgang, 1996);
- In the British Commonwealth sphere of influence, the *undergraduate* degree is usually professionalised, and applied design education starts from day one of the course. There tends to be less in-depth study of the pure underpinning knowledge systems, which are referred to from the study of architectural texts and methods (RIBA, 2003).

In the first tradition the student enters graduate studies with well formed theoretical knowledge of pure arts or sciences at honors level, and this pure knowledge forms a strong component of graduate studies in applied design. In the second tradition the student enters graduate studies with sophisticated applied spatial design knowledge, which dominates the further development of knowledge. Both of these are strong platforms for building architectural knowledge, but may have divergent effects on learning and practice. This tension is not only dichotomous – there are a range of in-between options, and sequencing can move from a mix with pure emphasis to a mix with applied emphasis.

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[1] Despite these pathologies, there is a viable difference in emphasis which can be given to arts and sciences in architectural education. For example in parts of the EU technology is emphasised as an informant of design, whereas in the USA liberal arts generally form a stronger component of the curriculum, particularly in undergraduate studies (Gutman, 2000, 236). In a recent comprehensive review of US architectural education Boyer and Mitgang (1996) argue for this liberal arts curriculum to be strengthened.

A tension between architectural design and urban design:

While the professions and disciplines of architecture and urban design are as closely related as you can get, varying only in the scale of design enquiry, there appears to be considerable boundary policing between them (in the local context, at least). This may have something to do with the professionalisation of urban design knowledge, which developed in the USA in reaction to the negative consequences which modernist and quantitative town planning had on the qualitative experience of old urban spaces (Jacobs, 1961). As a result urban design developed design theory and practice based on a revival of historicist tradition (which remains explicit in the current USA trend of 'new urbanism'), whereas architecture developed urban theory based on cultural studies, e.g. the study of the politics of space, identity and difference, popular culture, etc. These are ideologically opposed schools of thought, which can shift the focus of architectural and urban studies one way or the other, or split it into opposing camps.

All of these tensions in architectural knowledge emerge in the particularities of architectural education at the point where transmission of the knowledge occurs, muddying the waters of course development and delivery. Therefore, before being able to delve into the detailed practices of the pedagogy it is necessary to understand and identify the operation of these broad axes of division in the region of architectural knowledge. While they are all intricately entwined, and could each generate substantive investigation, in this study the focus will be only on the *first* of them, i.e. the broad relationship between architectural practice and architectural pedagogy in terms of the relationship between design knowledge and implementation knowledge. This appears to me to be the overarching tension in architectural pedagogy, most removed from the design studio, yet an ongoing source of serious disagreement between practitioners and academics - the outer layer of the onion which needs to be peeled away first. The lifting out of this one issue from the region of architectural knowledge frames the research question.

1.2 THE RESEARCH QUESTION

If the architect is faced with the binary challenge of design and implementation in practice, as has been indicated above, how are these knowledge requirements played out in the field of architectural education? It has been noted that the tradition of architectural education integrates domains of arts and sciences into design thinking through the device of the design studio[2], where the ultimate assessment is based on the ability to demonstrate integration of these arts and sciences in a portfolio of coherent design work.

The study of project implementation, management principles, and knowledge of the political economy in general and its impact on project definition and design development in particular tends to sit outside of the cycle of studio-based learning – as marginal (and sometimes maligned) courses in professional practice. Although there is no reason in principle that implementation questions could not be fed into the development of design thinking in the studio from an early stage in the same way that applied arts and sciences are, this seldom happens in architectural education.

The focus of this research will be to probe this separation which appears to exist between design knowledge and implementation knowledge – what evidence is there for this separation, and how did it come to exist in architectural pedagogy[3]. The central question is therefore:

How did architectural knowledge come to be pedagogised with an emphasis on knowledge of design and a de-emphasis on knowledge of implementation?

This question sends the research work into conceptual and historical analysis, where the need is to understand whether this issue of emphasis turns around an actual division in

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[2] Usually 'Studiowork' follows a cycle of theorising design propositions, developing them conceptually, spatially and functionally, and testing them technically. Sometimes this cycle is reversed to emphasise materiality as an informant of design ideas (e.g. 'design a building from a list of given materials'), or an entirely abstract and sculptural design problem could be set (e.g. 'how does light enter a space').

[3] This focus on the design and implementation question limits the enquiry, which does not attempt to be a comprehensive history and theory of architecture. General knowledge on architectural knowledge not cited here comes from my own 'segmental repertoire of horizontal discourse' as a professional insider.

the knowledge, or whether it arises from a skewing of the knowledge for some historical reason[4].

As there are various models of architectural education in different parts of the world which differ in scope and sequencing (some of which have been referred to above), historical investigation of all models would require a wide-ranging comparative study which is too broad for the purposes of this minor dissertation. The investigation of this question will therefore be limited to the curriculum model which developed in the United Kingdom, for the simple reason that this established the norm for architectural education in the British Commonwealth – including South Africa (Mace, 1986, 115)[5]. Central to the structure of this curriculum is the traditional role in architectural education of the design studio as a laboratory for learning design thinking under the tutelage of a 'studio master', a process which is well described in Schön's seminal work of the eighties, defined as 'reflection in action' (Schön, 1983). This element of studio-based learning is heavily weighted in the model curriculum, prescribed as requiring at least 50% of the evaluation and time, and is supported by a range of lecture based subjects.

1.3 METHODOLOGY + DATA SOURCES

The nature of this minor dissertation is that of modeling and theory building – modeling a knowledge structure and its curriculum formation in general terms, identifying the reasons for and likely consequences of its form, and attempting to find a coherent theoretical explanation for this. The method used tests the application of an existing theoretical framework to a body of knowledge, in this case one which operates in the contexts of both professional practice and higher education. The study is exploratory, and uses existing descriptive data (both contemporary and historical) in order to develop a model which may suggest a 'plausible explanation of *why* things are as they are [and] what the causes of events or the causal mechanisms behind change are' (Mouton, 1996, 102). The analysis is conceptual in that it attempts to clarify central issues in the professional knowledge, and attempts to explore the 'explanatory potential' that the

[4] The research does not seek to advocate for the strengthening or weakening of 'professionalism' or 'managerialism' in architectural education, but merely seeks to understand why the architectural curriculum is as it is in terms of the balance of design and implementation knowledge, and how it came to be like that.

[5] This curriculum model came to be defined by the Royal Institute of British Architects (the RIBA), and the driving force behind its pervasiveness is the accreditation of degrees by statutory professional bodies, which often use the RIBA curriculum as the benchmark for inspection and international accreditation.

theoretical framework has in examining evident relationships in the data to articulate the pedagogic structuring of this professional knowledge (op.cit., 110, 198).

The methods of this 'macro' analysis therefore do not involve detailed data capture and 'micro' analysis derived from classroom monitoring, interviews etc. Rather, the method will be one of documentary analysis - a reading of texts through the theoretical filter in order to reveal structures and dynamics within the pedagogy. Documents to be used in the analysis will be key texts which relate directly to the different segments of the investigation, as set out in the outline below. While selection of the documents to be analysed then becomes an important issue, the research method is straightforward and does not require the development of complex research instruments, specific data capturing techniques, or considered ethical protocols.

The theory used in the analysis is derived from the work of Basil Bernstein (Bernstein, 2000), which provides a number of precise theoretical tools relevant to the analysis, as will be described below.

DATA SOURCES

Design and Implementation Knowledge:

There will be two sources of data examined under this heading. Design knowledge will be examined in catalogues of the Venice Biennale International Architecture Exhibition; implementation knowledge will be examined in RIBA reports.

Design knowledge: This will be discussed as it appears to be *now*, and as it appears to be in the *built work.* While the texts to be used in this discussion could have been the buildings themselves and critical commentaries on the work, these are both vast collections of thousands of texts. In trying to find summative documents on the work itself, I have turned to the institution of the architectural exhibition. This has a long history as a showcase of 'the best work', and there are currently a number of international architectural exhibitions which are fairly representative. The largest, most established and best documented of these is the Venice Biennale International Architectural Exhibition, which alternates with the Art Exhibition. The catalogues of this exhibition are substantive documents which record the work, comment on its thematic

elements, and are accompanied by introductions or essays which critique the work. Recent exhibitions have been:

- The 2004 Biennale, curated by Kurt Forster (Forster 2004a,b,c), with work organised thematically on the basis of new formal strategies which 'metamorph' programme, site and material;
- The 2002 Biennale, curated by Deyan Sudjic (Sudjic, 2002), which is somewhat similar to the 2004 exhibition in that it catalogues buildings and places thematically - in this case programmatically[6] rather than spatially or formally (a further difference being that this 'next' work is all un-built work still undergoing design). As with the 2004 exhibition it has an emphasis on multiple new aesthetics and materialities;
- The 2000 Biennale, curated by Massimiliano Fuksas (Fuksas, 2000), which, while polemicising 'less aesthetics more ethics' in the context of current urban transformations, nevertheless emphasised the striking visual properties and shifting formal orders of new architecture.

Any (or all) of these catalogues would have provided rich data for the investigation of design knowledge, but I have selected the 2004 material only as this is the most recent, the most clearly organised, and the most fully annotated of the three publications (and in order to limit the scope of this section of analysis)[7].

This selection of documentary evidence does have its limits: the Venice Biennale mainly records work in the major economies of the northern hemisphere (North America, Europe and Asia). However some work from various countries in South America, Africa, the Middle East and Eastern Europe is included. It certainly represents the sharp edge of dominant trends in the application of architectural knowledge, with sufficient evidence of other global issues to qualify those trends. I have considered including, say, the Sao Paolo Biennale (where some South African work has been exhibited) as a way of

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[6] These themes were 'Housing', 'Museums', 'Communication', 'Education', 'Towers', 'City of Towers', 'Work', 'Shopping', 'Performance', 'Church and State', 'Masterplans', and 'Italy' (Sudjic, 2002)

[7] Although South African architecture was exhibited at the Biennale for the first time in 2006 (together with a display on Johannesburg), this exhibition, curated by Richard Burdett (Burdett, 2006), is primarily an investigation of the spatial and social conditions in rapidly growing globalised 'cities architecture and society', and while relevant to the current context of architectural design is not included in this data set as its primary purpose is to explore design issues beyond the scale of buildings - the limits to this research needing to be contained to core knowledge in architecture. It is accepted, though, that urban pressures and architectural responses are inherently linked.

balancing 'north' and 'south' interests, but this exhibition is not well documented, making it difficult to collect fully representative information on the work and issues exhibited there. Other architectural exhibitions in Amsterdam, London, etc. are smaller, less representative, and less well documented than the Venice Biennale. On balance therefore the Venice material provides sufficient and accessible information to develop a snapshot of the nature of architectural design knowledge now, for the purposes of this minor dissertation.

Implementation knowledge: In the selection of the second data set, the approach taken is to hone in on official reports by the organised profession which examine the nature of implementation work, for the reason that these point to apparent weaknesses in architects' implementation knowledge. There seems to have been a long-standing argument between representatives of the organised profession and academics about the extent to which architectural education should include more preparation for the complexities of practice, with less emphasis on an individualised form of design teaching which is unrelated to the constraints of social processes and economic systems. This debate is evident in a series of major investigations into the state of architectural education and practice in the UK which go back to the 1970s.

The first report on these investigations is titled 'Crisis in Architecture', the crisis being the extent to which graduates understand the social conditions of practice (MacEwan, 1974). The RIBA's report on its 'Strategic Study into the Future of the Architects' Profession' (RIBA, 1992, 1993, 1995) shifts the debate to the demands of increasingly complex conditions of project initiation, delivery and management. These two reports are used as the data for the section on implementation knowledge, as taken together they suggest that there are two sides to the weaknesses in this knowledge – a disconnection between design knowledge and social processes on the one hand and economic processes on the other.

The Architectural Syllabus:

The text used for discussion of the architectural syllabus is the current RIBA document used for international validation (accreditation) of the degrees - 'Tomorrow's Architect: RIBA outline syllabus for the validation of courses, programmes and examinations in architecture' (RIBA, 2003) - which is a sufficient record of the scope, structure and intention of the curriculum for the purpose of this research.

Historical Data:

The primary text used for the historical data is Barrington Kaye's 'The Development of the Architectural Profession in Britain – a Sociological Study' (Kaye, 1960), as this is a detailed record of the process of professionalisation from the 17th century to the mid-20th century, during which key features of the pedagogy which persist were set in place[8]. This reference has been supplemented by Saint (1983), Mace (1986) and Crinson and Lubbock (1994).

1.4 OUTLINE OF THE DISSERTATION

The investigation will be developed in three broad sections:

- firstly, a section on the nature of architectural knowledge, with evidence of the tension between design and implementation knowledge;
- secondly, a summary of the generic architectural syllabus, its classification, framing and code modality;
- and thirdly, a historical analysis of the development of architectural pedagogy during professionalisation, based on three elements of Bernstein's pedagogic device – production of knowledge, transmission of knowledge, and official regulation of knowledge (Bernstein, 2000).

The conclusion will relate this analysis back to the evidence on design and implementation knowledge, summarising the new insights gained into the inherent structuring of architectural pedagogy.

[8] Kaye draws on John Summerson's 'Architecture in Britain 1530 – 1830' (Summerson, 1953), the authoritative work of architectural history on this period of professionalisation.

2.0 Chapter 2: DESIGN AND IMPLEMENTATION

What kind of knowledge is architectural knowledge? The work of architects involves two kinds of knowledge. Firstly, it involves the conceptualisation and development of building design ideas which synthesise social, functional, spatial, aesthetic and technical requirements in the context of user needs, site conditions, financial and legal constraints. Secondly, it involves the management of processes of procurement and delivery of building projects. These are different kinds of knowledge: the first involves the ability to integrate complex requirements in coherent design proposals (hereafter called design knowledge) and the second involves the procedural ability to implement design ideas (hereafter called implementation knowledge[9]). But in architectural work these two different kinds of knowledge need to fit together: you don't get architecture without both the creative and technical ability to imagine and resolve design ideas, and the ability to marshal these ideas through complex processes of procurement and delivery, from inception to completion[10].

Two sources of data are examined here to develop an understanding of what design knowledge is and what implementation knowledge is. As described above, the first is drawn from the exhibition catalogue of the 2004 Venice Biennale International Architecture Exhibition in which architects 'talk to each other' about what is important in their design work; and the second is drawn from official reports of the professional organisation (the RIBA) which highlight what is important in implementation work.

2.1 DESIGN DATA

The 2004 Venice International Architecture Exhibition catalogue provides a snapshot of contemporary architectural knowledge which emphasises the design of architectural form[11] (Forster 2004a). The exhibition was organised into a series of six themes or 'Trajectories': 'Topography', examining the fusion of buildings and landscapes; 'Surfaces', describing enclosing skins which are active in the articulation of programme,

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[9] This procedural understanding will be called 'implementation knowledge' for the time being, until the argument is developed about what kind of knowledge this is,

[10] Except in the case of purely visionary un-built architecture, for which there is a place in the development of architectural ideas (Thomsen, 1994).

[11] Use of the term 'formal' hereafter refers to this design of architectural form.

circulation or information; 'Atmospheres', presenting illusive visual properties of new materials; 'Transformations', proposing adaptation of use and appearance of old buildings rather than their preservation; 'Concert Halls', showcasing major new cultural projects which integrate complex urban and architectural programmes; and 'Hyper-projects', comprising large urban developments[12].

In the 'Topography' exhibition the formal emphasis in design knowledge relates to:

- *the order which underlies formal composition* – e.g. order which is complex, non-linear, non-hierarchical, often underpinned by a mathematics of complex curves;
- the integration and synthesis of multiple requirements of a project in *a unifying idea*, which works at different levels - e.g. geometric order combined with non-linear systems of circulation and flexible patterns of occupancy integrated in a single form;
- and, definition of the *relationship between building and site* – e.g. fusing building, use and site in a single constructed landscape, combining the disciplinary knowledge of architectural design and landscape design.

In the 'Surfaces' exhibition the formal emphasis in design knowledge relates to:

- development of coherent or *unifying ideas* for the combination of form, space, activity and circulation – e.g. achieved through continuity and fusion;
- animation or *activation of the social programme* of the building in its urban context – e.g. through hybridisation of space and use;
- *materialisation of the form* – e.g. through the use of new materials;
- the development of *form which resonates with cultural conditions* – e.g. through the use of media and connectivity;
- and, manipulation of the *mathematics of three-dimensional form* – e.g. in the geometry of the folded surfaces.

In the 'Atmosphere' exhibition the formal emphasis in design knowledge relates to:

- the *visual appearance of massing* – e.g. the coherence of the overall shape;
- and, *visual appearance of surface* – e.g. the visual qualities achievable through the use of new materials and new manufacturing techniques.

[12] A detailed summary of the exhibition catalogue is provided in Appendix One.

In the 'Transformations' exhibition the formal emphasis in design knowledge relates to:

- understanding and *reinterpretating historical design ideas* – e.g. in the contrast of old and new form.

In the 'Concert Halls' exhibition the formal emphasis in design knowledge relates to:

- the *design of large, functionally and spatially complex public buildings* – e.g. in which there is an integration of visually complex spatial order with complex programmatic and technical functions, a reinterpretation of historical design typologies, the creation of urban landmarks and places for public assembly, and the orchestration of major public events.

In the 'Hyper-projects' exhibition the formal emphasis in design knowledge relates to:

- the *order within complex urban conditions which operate at both formal and social levels* – e.g. the prioritisation and balance of complex and often contradictory urban needs through large scale generative spatial frameworks which have short term fixity and long term flexibility, and the definition and activation of the spatial relationship of public and private activity.

Running through these thematically grouped descriptions of contemporary architectural design are a number of generic aspects of architectural design knowledge, e.g.:

- *Pattern:* knowledge of the order which underlies formal composition, which is often a geometric pattern (now generally underpinned by complex mathematics);
- *Material:* knowledge of the materialisation of form (now influenced by new materials and digital fabrication techniques);
- *Appearance:* knowledge of the manipulation of visual appearance, in terms of both material expression and formal massing (now often achieved by enveloping form in a way which does not express function);
- *Context:* knowledge of the relationship between buildings and their context (now often based on a contrast between new and old work), and requiring knowledge of the history of design ideas;

- *Culture:* knowledge of the relationship between built form and cultural conditions, and of the development of form which resonates with cultural context (now often achieved through the integration of interactive media with building fabric);
- *Programme:* knowledge of the activation of the social programme of buildings in their urban context (now often achieved through hybridisation of social programmes);
- *Coherence:* knowledge of the integration of multiple project requirements in coherent unifying ideas for the combination of form, space, activity and circulation[13] (now often achieved through continuously fused space, form and landscape);
- *Large works:* knowledge of the design of large, functionally and spatially complex public buildings (now often intended as iconic urban landmarks developed in association with urban places for public assembly);
- *Urbanism:* knowledge of large scale spatial design, including an understanding of design which works across occupancies (public and private), across scales (building and city), across disciplines (building design, landscape design and urban design), and across time (short-term need / long-term flexibility).

This list of key aspects of spatial design knowledge suggests two important things about what *kind* of knowledge it is:

- Although it includes some architecturally specific areas of knowledge (e.g. programming and contextualising a building), it is mainly a broad assembly which crosses into many other areas of knowledge - including mathematics and geometry; materials technology; visual studies and aesthetics; cultural, historical, social and urban studies; and landscape design. It is a kind of knowledge which recruits other areas of knowledge and deals with their *application* to the design of buildings.
- If there is something specific about design knowledge it seems from this data to be a kind of knowledge which enables the investigation of extremely complex sets of programmatic and urban conditions, particularly their resolution in terms of the spatial ordering, spatial coherence and spatial synthesis of buildings.

[13] These unifying design ideas which give a coherent order to a design solution are usually referred to in architecture as a conceptual order or 'concept'.

However what is interesting about this list of key aspects of design knowledge evident in the catalogue is that some issues which are central to architectural work are hardly mentioned, if at all. These omissions include:

- the integration of structural, technical and environmental functions with spatial design (these aspects do receive limited mention in the description of some work, e.g. Concert Halls);
- the design and assembly of construction detail, and the influence of construction methodology and processes (there is mention of the impact of new digital fabrication techniques, but very little explanation or presentation of the construction detailing which arises from these);
- the impact of processes of project initiation and delivery across commercial and public sectors in relation to design ideas, including finance and budget, cost control, client and risk management, land matters and legal issues ;
- the design of ordinary and everyday buildings – it seems from this data that architectural design knowledge is best applied to large, complex, public, 'one of a kind' projects.

While these omissions could be assumed to be implicit in the formal design knowledge emphasised in the catalogue, clearly they are not seen to be as important as the visual, spatial, conceptual and cultural aspects which dominate the exhibition catalogue. Indeed it is these apparently dominant areas of design knowledge which are amplified in the volume of essays which accompany the catalogue (Forster, 2004b).

The title of Forster's introductory essay - 'Architecture, its Shadows and Reflections' - suggests that architectural knowledge is vague and ambiguous, and he comments that it is now more difficult to pin down because of the rapid change in architectural responses which 'assimilate contemporary experience' and '[erode] architecture's idealised fixity' (Forster, 2004d, 7). While noting that 'it is difficult to say what this new architecture and its premises will be, if it will indeed have stable premises', Forster identifies three possible premises for current architectural design (op.cit., 7-9):

1. a re-ordering of the modernist premise of the separation of structure and surface, where 'continuous surfaces' now integrate structure;

2. a move from traditional tectonics (articulating the fixity of connections between the parts) to 'dynamics, fixity as a state of gradated and constantly changing rigidity';
3. and, the interweaving of building and site 'into a state of mutual inter-articulation'.

As premises for design these are all descriptions of form-making – the only *process* which Forster refers to is the impact of digital process on these forms: fusions of structure and surface, joint and detail, building and site 'depend in conception and realisation on the use of computer technology', which in turn allows for multiple elaborations of form and rapid diffusion of these new ideas (op.cit., 9).

So what then is the disciplinary discourse underpinning these ideas? Forster says only that 'the picture keeps changing and the frames of reference keep moving' and he avoids the issue of defining 'the terms that enable us to evaluate what we see and to characterise what is happening', as 'no one can pretend to do this all by herself' (op.cit., 10). However he emphasises the importance of an architectural design knowledge which goes beyond 'ordinary buildings' or 'crying needs in the world': 'building does not become architecture by being therapeutic, popular or redemptive'. He will only say that 'if a collective activity of such scope and cost as building sets the standard of civil achievement, then it better be of a calibre and quality that only architectural imagination can create' (op.cit., 13).

Kemp's[14] essay refers to one fundamental aspect of this architectural imagination - the ability to visualise the three-dimensional order of complex conditions, often indicated by an underlying geometric order (Kemp, 2004). Evidence of this characteristic emerges time and again in the descriptions of the exhibited work. Kemp argues that imaginative (or creative) thought in architectural design is similar to scientific thinking in its intuitive search for a structure of order (or of its underlying mathematical pattern)[15], and in its use of visual modelling to achieve this.

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[14] Martin Kemp is Professor of the History of Art at the University of Oxford. His research focus is visualisation and modeling in art and science, and he is an expert on Leonardo da Vinci.

[15] Kemp uses examples from Leonardo, Gaudi, Fuller, Foster, Ito and Gehry to illustrate the importance of the search for mathematical order in architectural form making (Kemp, 2004).

The rest of the essays assembled by Forster deal mainly with the impact of digital technology on visual imagination. Warner[16] notes that 'the arrival of new geometries' and 'the shaping and fashioning of flowing, tumescent forms [are made possible through] computer software programmes and their particular, intrinsic capacity for fluid optical morphologies'. Both of these changes 'strike at conventional aesthetics'. (Warner, 2004, 23, 27).

The importance of 'pattern recognition' (the 'recognition of hidden structures' or 'abstract diagrams') is developed in an essay by Carpo[17], in the context of digital processes (Carpo, 2004). Carpo argues that digital processes of pattern development introduce both an unpredictability of outcome and a lack of finiteness, in comparison to manually generated visual imaginings which traditionally have a singular and finite order: '[the forms] produced by electronic technologies are evanescent and mercurial. They change and morph relentlessly – sometimes by choice, sometimes by chance' (op.cit., 45). This 'generative variability that is specific to digital technologies' exacerbates the difficulty of pinning down what architectural imagination is in relation to architectural knowledge (ibid.). The creative work of finding architectural order becomes more 'mercurial', and the underlying order becomes more hidden - the organising principle of the mathematical algorithms which generate complex form being the *differences* between the parts of a digitally derived series, rather than the *similarity* between the parts of a hierarchical compositional order.

Rashid[18] develops two aspects of this impact of computers on architectural design (Rashid, 2004). Firstly the shift from analogue to digital methods of spatial visualisation, influencing the development of 'fluid' spatial geometries, and secondly the impact of digital technique on visual culture generally, fueling a fascination with the aesthetics of surface ambiguities (e.g. 'a layering of endless transparencies and translucencies', and 'these building 'skins' can be understood as a preoccupation and play on what constitutes the real versus the virtual from the point of view of perception') (op.cit., 74).

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[16] Marina Warner is a Professor of Literature at the University of Essex, and a specialist on mythologies of transformation.

[17] Mario Carpo is Head of the Study Centre at the Canadian Centre for Architecture. His research focus is the relationship between architectural theory and the history of media.

[18] Professor Hani Rashid specializes in digital design research and practice.

Dimendberg[19] discusses the influence of digital visual culture on architecture in terms of new media. The use of digital projection makes traditions of spatial definition and thresholds between inside and outside increasingly ambiguous, for example in the projection of internal activities onto screens built into the external envelope (Dimendberg, 2004, 83 - 93).

Böhme[20] continues this theme of the contemporary erosion of traditions of contained space, by discussing the phenomenological impact that the bodily experience of sound has on perceptions of space – experienced as 'atmosphere' rather than as 'space' (Bohme, 2004, 111 - 114).

Taken together these essays emphasise the primacy of visual knowledge of form in architectural design, and in particular they emphasise the influence of digital technology on visual complexity, ambiguity and instability - both quantitatively (in terms of processing power) and qualitatively (in terms of imagery and aesthetics).

The 2004 Venice Biennale exhibition theme of Metamorphosis aimed to:

> [...] represent the nature of the changes typifying this stage in the history of architecture, rediscovering some of its foundations in the past and some of its premises for the future, but in the awareness that there is now a metamorphosis in the discipline, nature and form of architecture and the world (Forster, 2004a, xiv)

In the data these metamorphoses relate to changes in form making, e.g. fluid three-dimensional form which fuses envelope and structure, surface and programme, and building and landscape. The impact of digital technology is evident in increasingly complex spatial geometries, and mention is made of the impact of digital fabrication techniques. Emphasis is given to the patterns of spatial and social order within complex conditions of use and context, and to the manipulation of visual qualities, which underlie these current trends. This kind of design knowledge is clearly a powerful resource, as is evident in the scope, extent and quality of the best international work on exhibition at the Biennale. Curiously though, lack of implementation content in the exhibition material is matched by widespread anxiety in the profession about pervasive difficulties and

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[19] Edward Dimendberg is Associate Professor of Film, Media at Visual Studies at the University of California.

[20] Gernot Böhme is Emeritus Professor of Philosophy at the Technical University of Darmstadt, and writes on technology, aesthetics, and 'bodily presence'.

increasing pressures which architects face in implementing design ideas. These tensions in implementation knowledge are examined next, using data derived from reports by the professional body.

2.2 IMPLEMENTATION DATA

Despite the *strengths* in spatial and visual ordering arising from design knowledge, there has been a longstanding debate in the profession about the *weaknesses* in implementation knowledge. Concern about these weaknesses generally emerges, not from the curators of international exhibitions, but from the committees of professional organisations. In this section the nature of implementation knowledge and its persistent weaknesses will be investigated, using two reports commissioned by the Royal Institute of British Architects (RIBA):

- MacEwan's 1974 report 'Crisis in Architecture', which examines *social* failures in the implementation of built work;
- and, the RIBA's 1992 - 1995 'Strategic Study of the Profession', which examines *management* failures in the implementation of built work.

These reports are examined here in an attempt to identify what weaknesses in architectural knowledge may underlie persistent failures of implementation.

GAPS IN THE SOCIOLOGY OF IMPLEMENTATION

Written soon after the first social failures of modernist urban redevelopment projects had started to emerge[21], MacEwen's 1974 report to the RIBA is essentially about the need to advocate the social purposes of architectural practice: 'to raise the level of public satisfaction with new buildings [by ensuring] the acceptance by architects of their social responsibilities' (MacEwen, 1974, 48). MacEwan argued for this need in the face of property racketeering and bureaucracy, which he considered to 'have widened the gap between the architect and the consumer into a gulf' (op.cit., 7). Arising from this social

[21] MacEwan's report was written six years after the collapse of a portion of twenty floors of the then recently completed 1986 Ronan Point housing project in London (a prefabricated 'systems built' high rise) resulting in the death of four residents, and two years after the implosion in 1972 of the 1951 Pruitt-Igoe multi-storey housing project in St Louis, Missouri - an event celebrated by Charles Jencks as the precise moment of the death of modernism in his seminal 1977 book 'The Language of Postmodern Architecture' (Jencks, 1977, 9).

agenda of addressing the needs of the users of buildings, rather than their owners or implementing authorities, his main purpose is to argue for a reorganisation of both professional practice and professional organisations[22]. Jencks (1977) comments that these 'prescriptions were wildly off the mark: the remedy was to overhaul a tiny institutional body, the Royal Institute of British Architects, by changing a style here and a heart there – as if these sorts of things would make the *multiple causes* of the crisis go away' (Jencks, 1977, 10). However he confirms that MacEwans summary of what was wrong 'was masterful' (ibid.).

In presenting his arguments about the crisis in the profession MacEwan refers to the following implementation tensions:

• *A tension between responsibility to the client and responsibility to society:*
Architects are generally educated for and professionally charged with the public good of the built environment, yet are most often appointed to serve the individual interest of clients to whom they are commercially accountable – posing a 'contradiction between the narrow requirements of doing a professional job (responsibility to the client) and the profession's 'world view' (responsibility to society)'. MacEwan further notes that architects often fail to differentiate between these roles, which tend 'to become badly blurred in practice' (MacEwan, 1974, 49).

• *A tension between public value and market value:*
Related to the above societal / client tension is an issue of power and control. Although built space has broad social purpose, gathering the resource necessary to make buildings requires political or economic power: 'Architecture is concerned with physical space, but the allocation, use, and design of space are socially controlled by those who command the resources, and deploy them in response to the market' (op.cit., 26).

[22] In terms of the practices of the profession MacEwan suggests that 'the hierarchical and bureaucratic structures of public and private practice [be] broken down in ways that facilitate collaboration with clients and users' (MacEwan, 1974, 8). In terms of the structure of the profession he promotes professional bodies which have more to do with public promotion than private promotion (his argument being that professional bodies compound the social tension around architectural practice by emphasising members' commercial interests at the expense of public engagement with architectural knowledge).

• *A tension between the architectural values of place making and the 'magnification' of projects:*

In the 1960s a convergence of the interests of commercial developers, local authority incentivisation of urban redevelopment, and industrialised building techniques together resulted in increasing size and impact of projects ('the tendency towards centralisation and 'magnification' ') (op.cit., 29). As this increased impact was often associated with bureaucratic arrogance or commercial greed, a condition was created where traditional architectural knowledge of good place-making was eroded ('this orgy of greed and destructiveness') (op.cit., 32).

• *A tension between architectural motives and administrative or commercial motives:*

Both the profit motive in commercial architecture and the administrative motive in the management of public works 'weakened the incentive to achieve high quality or standards in buildings, or in design [resulting in a] disincentive to architecture' (op.cit., 35). As MacEwan puts it, 'good design may pay, but bad design seems to pay as well, or in some cases even better' (op.cit., 36).

• *A tension between exclusive design knowledge and inclusive implementation:*

While architectural practice requires specialised knowledge which includes a specialised and rather inaccessible (or tacit) language of design, successful practice is 'entirely dependent on the participation of non-architects, ranging from the architects' technical collaborators at one end, to his clients, the users of his buildings, and the general public at the other' (op.cit., 51). Problems arise when the use of specialised design language excludes these other participants required in the process of designing buildings ('there are frightful dangers in architects talking to other architects in a semi-private language') (ibid.).

Inherent in MacEwan's description of these implementation tensions is an assumption that good design and effective implementation are inherently dichotomous. He notes that the understanding required for commercial property development such as 'property values and the mechanics of property development', 'a clear appreciation of building costs', 'the best economic solution', 'the maximum lettable floor area', or securing 'town planning authority approval' are 'the qualities required for success in the development world, not one of which is a specifically architectural quality' (op.cit., 36 - 37). This assumed dichotomy is extended to a stereotyping of the 'good' architect and the 'bad'

architect. He says that 'many architects try to keep as far as they can from the developers' world, and these include (in my judgement) most of the better architects' (i.e. the good architect), as opposed to 'the cultural legitimator for the sacking of the city organised by financiers, politicians and bureaucrats' (op.cit., 37) (i.e. the bad architect). For MacEwan the only way out of this conundrum is that 'the "good" architect needs a conscience and the ability to say "no" ' (ibid.).

But this conclusion of a right of refusal does not solve the apparently inherent contradiction between 'architectural qualities' and implementation processes and, having acknowledged that making architecture inherently requires the power to concentrate social resources, it does not explore what kind of knowledge of architecture is needed in order to make good architecture in the context of public and private implementation processes. MacEwan does not unpack these design and implementation tensions inherent in architectural knowledge, but can only assert that architects need to know it all, as in the conflated statement:

> What matters on the job, in education and in research is what people know, what they can do, how much responsibility they can take, and how well they can work with others (op.cit., 61).

GAPS IN THE MANAGEMENT OF IMPLEMENTATION

The RIBA's 'Strategic Study of the Profession' was conducted in four phases between 1991 and 1995. The first two phases which identified weaknesses in professional knowledge are discussed here. The second two phases in which these findings were reviewed by different sectors are summarised in Appendix Two.

In Phase One of the Strategic Study a series of discussion papers were prepared by a panel of experts, setting out the opportunities and threats facing the profession in the nineteen-nineties, and suggesting strategies for repositioning the profession competitively in a then eroding market (RIBA, 1992). The report asserts design and innovation as the core of architectural knowledge, emphasising the importance of 'architectural imagination' in design thinking ('the entire realm of the architect is ruled by innovation ... invention is the driving force which inspires design') (RIBA, 1992, 79). The professional strengths which go along with this architectural imagination include:

- 'a blend of artistic and technical skills';

- 'an understanding of how the separate elements of aesthetics, space and function can be effectively brought together in a building';
- 'the ability to visualise';
- 'vision / design flair';
- 'the ability to convert user requirements into reality' (op.cit., 25, 30).

Taken together, these 'skills and training combine artistic creativity and a high level of technical skill [with] a strong intuitive sense of what is appropriate and what will work' (op.cit., 28).

In addition to these design strengths, the report acknowledges that architects have historically taken 'general responsibility for projects', are 'by nature collaborators', and that many architects are indeed 'good managers' (op.cit., 41, 50). However despite the high regard which clients have for design excellence, particularly evident in the early stages of a project, implementation 'failures then actively undermine this credibility' (op.cit., 25). These failures include:

• *Lack of understanding of building economics in relation to design proposals:*
This includes poor understanding of 'the meaning of value for money [in relation to] design quality', of the relationship of 'building costs to clients' financial planning', of the financial risks associated with innovative design, and of awareness of project costs at an early stage of design (too many 'projects fail when a promising scheme is found to be too expensive late in the design process') (op.cit., 8, 79, 81).

• *Poor management of the design and implementation process:*
There is considerable client concern and disillusionment about 'the architects' claim to be able to manage the whole process' (op.cit., 103). These concerns relate to 'consistently poor performance on the time and cost control of projects', including 'delays, variations, cost-overruns and poor communication with the client' (op.cit., 16, 27). As a result clients feel that architects do 'not necessarily have the skills to control the construction process' and do not believe that project management 'is a naturally strong area for the architect' (op.cit., 30, 31).

• *Failure to meet the expectations of end-users of buildings:*
Architects are 'heavily criticised for designing buildings which are difficult to use' (op.cit., 106).

• *Poor teamwork and communication:*

While architects understand the need for collaboration, clients and other professionals often criticise the quality of this collaboration where architects are seen to act 'as the prima donnas of the industry, less willing to compromise or adjust than other building professionals' (op.cit., 48). So architects 'are not regarded as team players' by the rest of the industry, and 'are seen as arrogant, and an educated elite with whom it is difficult to communicate' (op.cit., 41, 97).

While these weaknesses in implementation knowledge seem to be in opposition to the strengths in design knowledge, the tension is amplified by two inter-related dynamics:

1. shifts in the market (such as a reduced proportion of public works projects and an increase in commercial projects of greater size and complexity) make failures in implementation more apparent and more serious;
2. failures in implementation in turn undermine confidence in design, and 'erode the added value that is delivered through design excellence' (op.cit., 25).

The result is that the traditional role of the architect as leader of the design and implementation team has been eroded to such an extent that it is now generally acknowledged that leadership of the delivery process may have been irreversibly lost to project managers, and that control of the briefing process may have been lost to facilities managers:

> Many major clients no longer see the architect in the team leader / key adviser role [...] They no longer expect the architect to project manage and others have moved forward to fill that role [...] As one developer said: 'I do not believe that architects can recapture their leading role within the process now' (op.cit., 27).

Nevertheless the study concludes that while core design knowledge must be protected and reinforced, the architect 'needs to add to his skills at least those of the project manager and the building economist if he is to retain his key advisor role [...]. The client will accept this only if the architect will then agree to be accountable for delivery against time and cost criteria' (op.cit., 27, 29).

In the record of discussion of the Phase One papers by various focus groups there is a split between those who agree with the argument that implementation authority should be regained by 'adjusti[ing] the boundaries of the profession', and those who argue that 'architects should concentrate on design and leave management to others' (op.cit., 77,

202). Both of these arguments are based on the premise that 'design professionals and management professionals operate in two different cultures on the basis of different bodies of knowledge' (op.cit., 192). The question which the first stage of the Strategic Study leaves up in the air is whether 'the conflict between "creative" and "management" aspects of the work is so great that they must be separated', or whether architects should regain responsibility for mediating design and implementation knowledge (op.cit., 74).

Phase Two of the RIBA's 'Strategic Study of the Profession' then focussed on the key relationship between architects and their clients, and was based on two surveys - one of clients' opinions ('how clients see architects') and one of architects' views and practices ('how practices are responding') (RIBA, 1993). This research confirmed the opinions of the Phase One authors that while 'the majority of clients interviewed expressed a considerable level of satisfaction with the core design element of architects' services [...] clients' level of trust in architects' ability to control projects within time and cost constraints is consistently low' (RIBA, 1993, 23). This distrust in architects' implementation ability included criticism of:

Team Leadership:

- 'not a single client viewed the architect as the natural team member to handle the management aspect of a project, and indeed two thirds felt that the architect was not in fact capable of performing this role satisfactorily at all' (op.cit., 28);
- 'some three quarters of the clients interviewed indicated that they would prefer to trust the implementation stage of a project to project managers, engineers or construction-related professionals, rather than to architects' (op.cit., 27).

Process and Cost Management:

- 'a recurring theme of the study was of clients being utterly despairing of the often cavalier attitude from architects with regard to cost, timetable and the management of the project process' (op.cit., 28);
- 'by far the most common [view expressed by all the clients] being dismay at architects' approach to cost control and appreciation for the value of money' (ibid.).

Communication:

- 'another consistent theme in the client responses was dismay at the arrogance displayed by architects [evident in] the attitude shown towards the clients themselves, in responding to their wishes, and in architects' dealings with other consultants, contractors and suppliers' (ibid.).

Brief Development:

- All of 'the clients interviewed felt that architects did not fully understand their needs' (op.cit., 31).

A consequence of these failings is that the 'position historically occupied by architects [as principal advisor to the client] is being removed from them fairly easily' (op.cit., 27). This in turn compounds the failings identified above, in that design work is then 'carried out without [architects'] input into important parameters of cost and timescale [and] the reduced contact with the client does little for the potential of the design to respond optimally to user needs' (ibid.).

Thus in terms of supply (i.e. delivering the product) and demand (i.e. articulating the product), 'the majority of clients believe that architects are firmly on the supply side, alongside other suppliers who were once under their control in terms of contact with the client [and] many of the clients interviewed indicated that architects have lost the right to articulate demand, and to control the project on the demand side, due to past performance' (op.cit., 29).

Despite a general acknowledgment of architects' design expertise ('all the clients interviewed [said] that they want good design ... and that the best design solutions come from architects'), the survey found that 'clients are increasingly unwilling to take on the other risks associated with using an architect in order to gain the elusive "magic" element which comes from good design [...] good or even exceptional design is not always seen as a counterbalance to problems on time, cost and management' (op.cit., 30, 31).

The study finds that a gap clearly exists between the 'aspirations and priorities' of architects and clients, notes that this gap 'is much larger than we could have anticipated at the start of the study', and that 'it seems to be growing' (op.cit., 20)[23].

This data on design and implementation highlights a contradiction between the creative power of design work on the one hand, and serious failures in implementation on the other hand which have eroded the role of architects – perhaps permanently. Is there some explanation for this contradiction in the knowledge structure itself which, as has been suggested above, spans 'different bodies of knowledge' (RIBA, 1992, 192)? Bernstein's analysis of vertical and horizontal discourse is examined in the next section in order to locate this question, where it is argued that the design / implementation 'gap' is an inherent condition of the region of architectural knowledge which breaches the vertical / horizontal divide.

2.3 HORIZONTAL + VERTICAL DISCOURSE

Bernstein (2000) sets out a range of forms of knowledge between the extremes of expert knowledge (which he calls 'vertical discourse') and common sense or everyday knowledge (which he calls 'horizontal discourse'). Vertical discourse is organised coherent knowledge, which can take one of two forms:

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[23] The authors unpack this gap into a primary gap in understanding between 'client expectations' and 'understanding clients' needs', and four secondary gaps in 'service definition', 'delivery', 'perception' and 'satisfaction':
A primary gap in understanding 'between the clients' expectations and the architects' understanding of those expectations': 'there is a failure on the part of the architects to share the client's expectations of the service he/she is to receive';
A gap in service definition 'between the architects' understanding of clients' expectations and the definition of the service': '... although the architect may have developed a good understanding of the client's expectations from the initial briefing process, this must be developed into a specification of the services to be provided. The research showed this to be a particular area of difficulty';
A gap in delivery 'between the architects' service specification and the architects' service delivery': '... the architect would often not deliver the full range of services offered in the specification. This was particularly the case with the project management aspects ... Clients questioned said that they were now reducing the scope of the architect's service at the appointment (with a corresponding reduction in fees)';
A gap in perception 'between the architects' service delivery and the clients' perception of the service': '... in general the architects interviewed considered they gave a very high standard of service, while the clients interviewed expressed a high degree of dissatisfaction';
A gap in satisfaction 'between the clients' expectations and his experience of the service': '... the gap which is the most concern to clients, where the service received from architects does not meet his/her expectations'. The study found 'a consistently high level of dissatisfaction among client organisations with the services delivered by the architect' *despite* a parallel finding that 'clients are highly satisfied with the quality of design work' (RIBA, 1993, 11 – 15).

- a 'hierarchical knowledge structure' as in the sciences, where knowledge is an 'explicit and systematically principled structure, hierarchically organised';
- or a 'horizontal knowledge structure' as in the humanities and social sciences, where knowledge 'takes the form of a series of specialised languages with specialised modes of interrogation and specialised criteria for the production and circulation of texts' (Bernstein, 2000, 157).

Knowledge in both forms of vertical discourse is organised in 'specialised symbolic structures of explicit knowledge [where] procedures are linked to other procedures hierarchically' (op.cit., 160).

Horizontal discourse on the other hand is based on everyday experiences, which do not necessarily have any hierarchical relation to each other. In this case experience is organised 'segmentally', where there is no imperative for integration of meanings between segments (ibid.). Whereas horizontal discourse is distributed through this principle of 'segmentation', knowledge in a vertical discourse is distributed through 'recontextualisation'.

Horizontal discourse develops individually as a personal repertoire from the reservoir of everyday knowledge available in a local cultural context. Knowledge in vertical discourse develops institutionally through increased integration of meanings (in the case of a hierarchical knowledge structure through 'greater and greater integrating propositions, operating at more and more abstract levels [and] development of theory which is more general, more integrating, than previous theory', and in the case of a horizontal knowledge structure through 'the introduction of a new language') (op.cit., 158, 162).

Refer to *Diagram 1: Vertical and Horizontal Discourses of Knowledge*.

Bernstein further differentiates this basic spectrum of knowledge systems by unpacking horizontal knowledge structures into those with a 'strong grammar' and those with a 'weak grammar'. A horizontal knowledge structure with a strong grammar has 'an explicit conceptual syntax capable of *relatively* precise empirical descriptions and / or of generating formal modelling of empirical relations', e.g. economics (op.cit., 164). In a horizontal knowledge structure with a weak grammar these powers of description are less explicit, e.g. in sociology or cultural studies. In these cases there are 'an array of

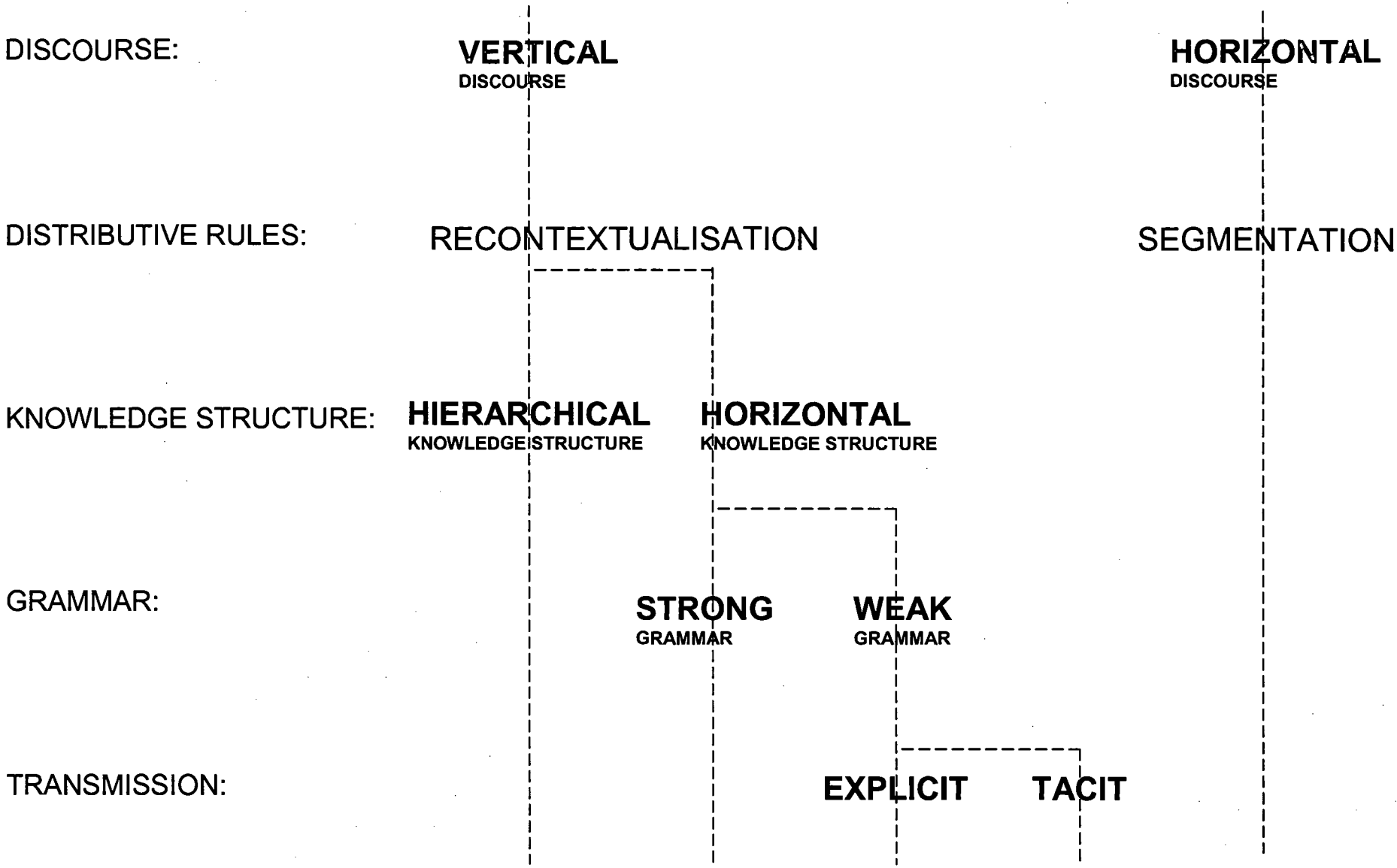

Diagram 1: **Vertical + Horizontal Discourses, with Differentiation of Horizontal Knowledge Structures**
(Based on Bernstein: 2000:168)

languages', and 'managing names and languages together with their criticisms, becomes both the manner of transmission and acquisition' (op.cit., 164).

Horizontal knowledge structures with a weak grammar can be further differentiated into those with explicit transmission and acquisition ('a pedagogy which makes explicit (or attempts to make explicit) the principles, procedures and texts to be acquired', as say in cultural studies) and those with a tacit transmission and acquisition ('where showing and modelling precedes "doing" [as] with the transmission of crafts') (op.cit., 169).

In this array of knowledge structures, spatial design knowledge (as in architecture, but including urban design, landscape architecture, and interior design) is located as almost as close as you can get to horizontal discourse (bar pure craftwork), i.e. as a horizontal knowledge structure with weak grammar and mainly tacit forms of transmission and acquisition as experienced in the design studio.

Overlaid on this general location of architectural knowledge is a further differentiation used by Bernstein: that of 'singulars' and 'regions'. A singular (or specialist) knowledge structure has 'a specialised discrete discourse with its own intellectual field of texts, practices, rules of entry [...] orientated to their own development, protected by strong boundaries and hierarchies [...e.g.] physics, chemistry, history, economics, psychology, etc' – i.e. these are found in both hierarchical and horizontal knowledge structures (op.cit., 52). Regions, on the other hand, are 'constructed by recontextualising singulars into larger units which operate both in the intellectual field of disciplines and in the field of external practice. Regions are the interface between disciplines (singulars) and the technologies they make possible [...] Thus engineering, medicine, architecture are regions' (ibid.). These regions 'face inwards towards singulars and outwards towards external fields of practice' (op.cit., 55)[24].

The architectural region of knowledge cuts across the whole spectrum of Bernstein's differentiation of knowledge discourse and structures, from 'maths science and technology' (with a tendency towards systematic all-encompassing hierarchies of theory with strong grammar) and histories or theories of design loosely derived from social sciences and humanities (with multiple layers of weak but explicit grammar), to intuitive and creative design knowledge (tending toward the weak and tacit grammar of craft) and

[24] 'The "classical" university regions, medicine, engineering, architecture, reflect this double position with professional bodies setting standards of practice and often creditation' (Bernstein, 2000, 55).

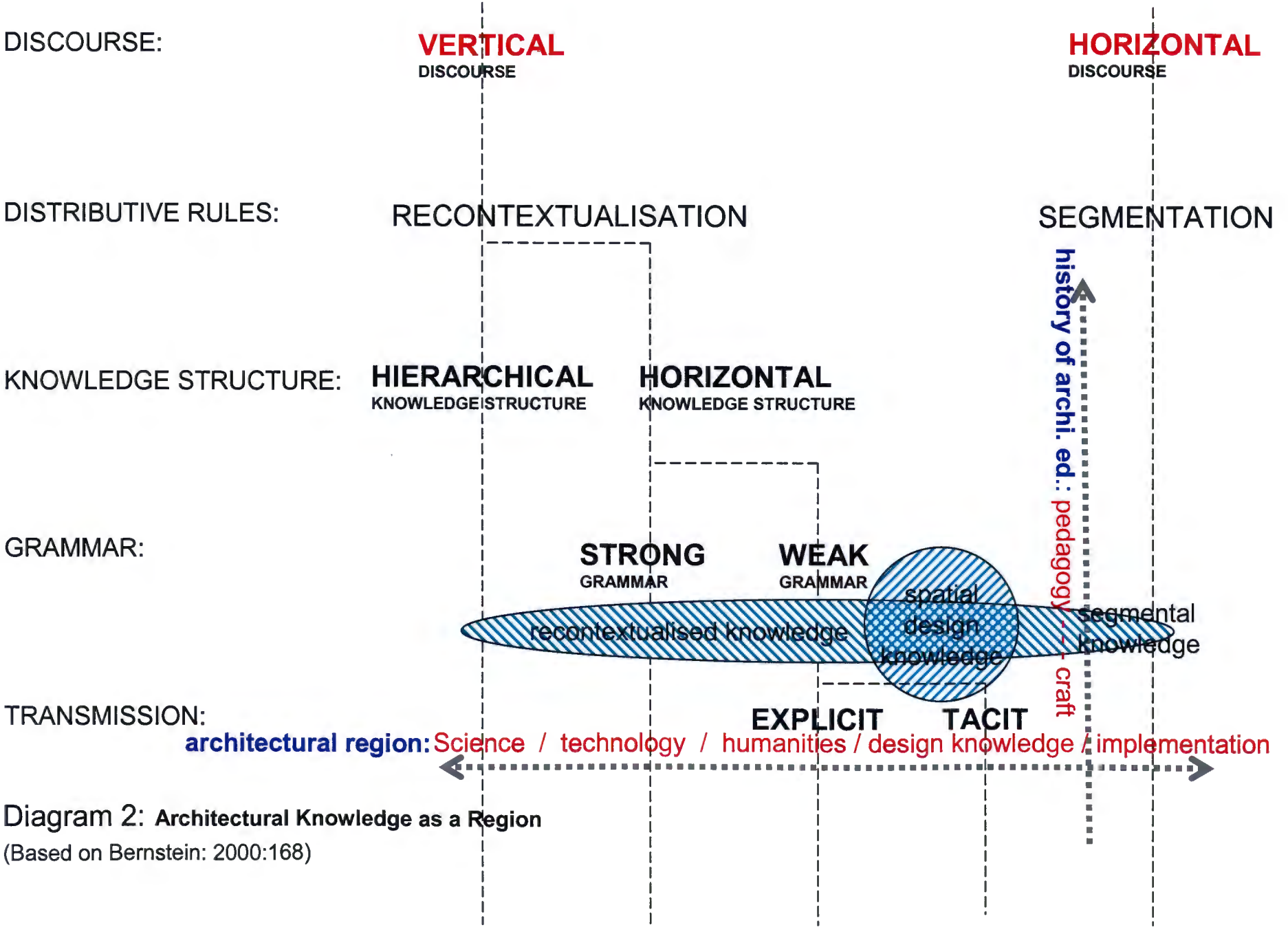

Diagram 2: **Architectural Knowledge as a Region**

(Based on Bernstein: 2000:168)

the segmental knowledge of practice (where rigorous procedures may exist in isolation of each other).

Refer to *Diagram 2: Architectural Knowledge as a Region.*

As will become apparent in Chapter Four, the history of the pedagogising of architectural knowledge is a struggle over shifting the transmission from a tacit craft base to a more explicit grammar (i.e. up the vertical axis on *Diagram 2*). However this trajectory is overlaid by the regionalised complexity of architectural knowledge, where the hierarchic nature of building sciences or the mathematics of form, the horizontality of cultural studies, the tacit craft of spatial design synthesis, and the segmentality of professional practice all get mapped onto the pedagogy (i.e. across the horizontal axis in *Diagram 2*).

The design / implementation 'gap' happens at the point in the region where the core body of the creative design knowledge of form, located at the extreme horizontal and tacit edge of vertical discourse, tips into the horizontal discourse of practical procedures[25]. This poses a dilemma for the pedagogy, as the segmental operations of implementation could be expected to be difficult to recontextualise into a vertical discourse, compounded by the problem that the knowledge structure with which this segmental discourse is attempting to integrate has a weak and tacit grammar which lacks clear hierarchical description. How does the architectural curriculum handle this double dilemma? This is examined in the next chapter which deals with the structure of the generic architectural curriculum in relation to Bernstein's analyses of classification, framing and coding.

[25] Whereas Bernstein does not strictly speaking refer to knowledge in horizontal discourse – since horizontal discourse does not have a principle of recontextualisation – I shall refer hereafter to architectural repertoires of implementation ability as tacit implementation knowledge, until the argument is developed further about what kind of knowledge this is.

3.0 Chapter 3 THE ARCHITECTURAL DESIGN CURRICULUM

In this chapter the generic architectural curiculum which derives from a Royal Institute of British Architects (RIBA) template used for the international 'validation' (professional accreditation) of architectural degrees (RIBA, 2003) is described and analysed using Bernstein's principles of classification, framing and coding. The operation of the design curriculum in weakening the classification and framing of the underpinning knowledge systems of the region is examined, and a proposal is developed to explain this through the processes of recontextualisation and pedagogisation. The question raised in the previous chapter of why gaps between design and implementation persist in the professional knowledge is examined in this context, and it is argued that despite the syllabus' stated intentions to leverage the integration of design knowledge and tacit implementation knowledge the embedded structure of knowledge in the pedagogy acts against this intention.

3.1 THE RIBA OUTLINE SYLLABUS

Since its establishment in the 1830s the RIBA has acted as gatekeeper to the profession, controlling membership and increasingly defining the professional knowledge required for entry into its ranks through its own examination system (Kaye, 1960; Saint, 1983). From the first decade of the 20th century schools of architecture have been able to apply to the RIBA to have their own exit exams 'validated' by RIBA inspection panels, exempting their graduates from the RIBA's professional entry exams. To guide the validation process the RIBA provides an outline syllabus as the basis for inspection, which has thus become the generic template for the curriculum at architectural schools which seek the status and international benchmarking which RIBA validation provides.

The current outline syllabus (RIBA, 2003) is a succinct and elegant statement of the structure and intentions of the requirements for professional architectural education. It is based on a minimum of seven years of education and training, in a three part structure comprising:

- Part One: three years of undergraduate study (followed by an optional year of practical experience);
- Part Two: two years of graduate study;

- Part Three: two years of practical experience under the supervision of a registered architect.

The first two parts are divided into the following five subject themes:
• *Design*, which is traditionally a studio-based form of project-based learning, and which is required to comprise at least 50% of the evaluation and credits;
• *Technology and Environment*, involving the integration of construction methods, structural integrity, environmental sustainability principles, and the legal compliance of all of these in the development and execution of design ideas;
• *Cultural Context*, locating design thinking in histories and theories of architecture, as informed by broad trends in cultural studies and global issues;
• *Communication*, linking both visual and academic literacy to the graphic, written and verbal communication of design ideas, including the ability to interact with other kinds of professionals;
• and *Management Practice and Law*, relating design work to an understanding of professional, financial, business and legal principles.

The third part comprises two years of prescribed professional experience in the following areas, in preparation for an examination in professional practice and management:
• the context of architectural practice, in professional, social, economic and legal terms;
• management of architecture, in relation to services, standards and legislation;
• management of construction and procurement, in relation to the administration of building contracts;
• practice management and business administration.

A summary of the outline syllabus for these subjects in each of the three stages is tabulated in

Diagram 3: Outline Syllabus Requirements for Validation of Architectural Programmes.

DIAGRAM 3

OUTLINE SYLLABUS REQUIREMENTS FOR VALIDATION OF ARCHITECTURAL PROGRAMMES (compiled from RIBA: 2003)

	DESIGN	TECHNOLOGY + ENVIRONMENT	CULTURAL CONTEXT	COMMUNICATION	MANAGEMENT PRACTICE + LAW	PROFESSIONAL EXPERIENCE
PART ONE OBJECTIVES	Ability to demonstrate, through a coherent portfolio of work: an understanding of the **interdependence** of thematic areas of the syllabus; the ability to create architectural designs that **integrate** social, aesthetic and technical requirements; the ability to produce designs that demonstrate the **integration** of structure, building materials and constructional elements; the ability to produce designs that demonstrate an understanding of the **integrative relationship** between climate, service systems and energy.					Optional year following Part One allowing application and development of knowledge and skills in practice; understanding of the roles and responsibilities of an architect and the pressures and priorities of practice exploration of personal strengths and personal development.
REQUIREMENT OF OUTLINE SYLLABUS	Demonstrate coherent architectural designs that **integrate** a knowledge of: the ways that analysis, research, context, budget, preparation and development of a brief inform a design proposal; the regulatory frameworks, and health and safety considerations that guide design and building construction; architectural histories and theories of physical, artistic and cultural contexts, and their use in informing design process. Ability to work as part of a team.	Demonstrate within coherent arcitectural designs and the academic portfolio the ability to **integrate** knowledge of: the principles of building technologies, environmental design and construction methods in relation to human well-being, the welfare of future generations, the natural world, consideration of a sustainable environment, use of materials, process of assembly, structural principles; the impact on design of legislation, codes of practice and health and safety both during construction and the occupation of a project.	Demonstrate within coherent architectural designs and the academic portfolio awareness of the influences on the built environment of individual buildings, the design of cities, past and present societies and wider global issues; knowledge of the history and theories of architecture and urban design, the history of ideas, and the related disciplines of art, cultural studies and landscape studies; ability to form considered judgements about the spatial, aesthetic, technical and social qualities of a design within the scope and scale of a wider environment; ability to reflect upon, and relate ideas to, a design and the work of others.	Demonstrate within coherent architectural designs and the academic portfolio ability to: use visual, verbal and written communication methods and appropriate media (including sketching, modelling, digital and electronic techniques) to clearly and effectively convey and critically appraise design ideas and proposals; use the conventions of architectural representation from two-dimensional and three-dimensional graphics to computer generated and physical models; listen, and critically respond to, the views of others.	Demonstrate within an academic portfolio: an awareness of the principles of business management and how a small business operates; knowledge of how buildings are designed and built in the context of architectural and professional practice and the framework of the construction industry within which it operates; and ability to manage and appraise their own working practices, whether working independently or collaboratively.	Involvement in a range of architectural, administrative and project management tasks related to the delivery of architectural services in order to understand client-architect relationships, finances, technologies and materials, legal contractual and precedural aspects, ethical responsibilities, communication, and office resources.
PART TWO OBJECTIVES	Ability to demonstrate, through a coherent portfolio of work: understanding of the interdependent roles of architect, prof. team, contractor + client in producing high quality architecture which meets budget and programme; understanding of the ways large and medium sized buildings are conceived, designed, serviced + assembled now + in future; ability to produce well-resolved + **integrated** building design based on understanding of society, natural + built environments; ability to combine imagination with knowledge, communication, technical, design + professional managment skills.					
REQUIREMENT OF OUTLINE SYLLABUS	Demonstrate coherent architectural designs that **integrate**: knowledge of the social, political, economic + professional context that guides building construction; understanding of brief and site appraisal re budget + sustainability, regulatory requirements, and cultural theory; and ability to generate + test design options, and to work as part of a team.	Demonstrate within coherent architectural designs and academic portfolio: **integration** of knowledge of visual thermal + acoustic environments, climatic design + energy consumption; understanding of building technologies, environmental design + construction methods re human well-being, welfare of future generations, natural world, sustainability, impact on design of legislation, codes of practice + health and safety; ability to devise structural strategies for complex buildings which **integrate** structural theory, construction, properties of materials and buildings services.	Demonstrate within coherent architectural designs and academic portfolio: understanding of influence on contemporary built environment of buildings, cities, societies and global issues. histories and theories of architecture and urban design in relation to the history of ideas, art, cultural studies and landscape studies, the interelationship between people, buildings and environment; ability to critically appraise and form design judgements, in relation to the work of others.	Demonstrate within coherent architectural designs and academic portfolio: understanding of the contribution of other professionals in the design process, team working skills, and methods in the construction industry; ability to use visual, verbal and written communication methods and media to test + represent complex design proposals to professionals and lay audiences, critically appraise appropriate representation techniques, produce documentation + reports which are clear, analytical and logical.	Demonstrate within an academic portfolio: knowledge of operation of cost control mechanisms within the development of a project; understanding of principles of business management related to running a design practice; administration of an architectural project re emerging trends in the construciton industry; value engineering and risk management; inter-relationships of individuals and organisations involved in procurement and delivery of projects. reflected in contractual and organisational structures; legal, profesional and statutory requirements relevant to design and practice; duties and responsibilities of architects; ability to manage continuing learning needs.	
PART THREE OBJECTIVES						24 months of prescribed experience of: architects' obligations and responsibilities to clients, employers, the profession, the building team and to society, in preparation for an exam in Professional Practice and Management which demonstrates readiness for practice.
REQUIREMENT OF OUTLINE SYLLABUS						CONTEXT OF PRACTICE: Knowledge of the construction industry and its policy formation, organisations within the built environment; understanding of social and economic investment; ability to apply legal principles, act professionaly, comply with regulatory codes, apply health and safety standard to design. MANGEMENT OF ARCHITECTURE: Knowledge of health and safety legislation; understanding of fee structures and bidding, integrated project teams, legislation and statutory bodies, quality standards and control, brief and budget preparation, client communication, procurement methods, scope of work in relation to services, co-ordination and itegration of work of others, team communication, information management, programme and budget control, forms of documentation; awareness of technical standards and sources of specialist information. MANAGEMENT OF CONSTRUCTION: Knowledge of site organisation and communication, dispute resolution; uniderstanding of project planning and execution, doucmentation, procurement methods, value engineering, supply chain management, team communication, risk managementpost completion assessment, cost planning and financial control; abilty to analyses contract types, administer the building process, administer forms of contract, evaluate claims, prepare post-completion information. PRACTICE MANAGEMENT + BUSINESS ADMINISTRATION: Knowledge of legal obligations of business administration; uniderstanding of technical financial and human resources, types of legal structure for practice, organisational structures, HR mnagement skills, creation of a practice envirnoment, financial mangement; awareness of protection of intellectual property, marketing, new trends in appointment.

Diagram 3 highlights design knowledge (blue text), tacit implementation knowledge (green text), and the integrative objectives which cut across design and tacit implementation knowledge (red text). Clearly the integration of both design knowledge and tacit implementation knowledge in 'coherent design work' infuses the entire syllabus statement both within subjects and across subjects in the first two parts. Despite these intentions it is clear from the data presented in the previous chapter that this objective of integrating design knowledge and tacit implementation knowledge in coherent design work is difficult to achieve. Why this is so requires an analysis of the inherent divisions within the knowledge region as they relate to the subjects in the syllabus. Bernstein's analytical tools of classification and framing are used in this analysis in the next section.

3.2 CLASSIFICATION + FRAMING

While Bernstein's theory is articulated through many inter-related 'set[s] of descriptors with internal subdivisions' (Bernstein, 2000, 156), these are all based on the principle that the transmission of knowledge is grounded in social organisation ('the social construction of pedagogic discourse') (op.cit., 3). This social organisation of pedagogy relates firstly to the degree to which the *parts* of a knowledge system are differentiated, or classified, and secondly to the nature of the *communication* in pedagogy, or its framing.

Classification can be either strong (where there is clear separation between the parts of the knowledge) or weak (where boundaries are more diffuse). Underlying the strength of classification is the issue of power, which 'establishes the legitimate relations between categories' of knowledge (op.cit., 5).

Framing can be either strong (where the transmission is more explicit) or weak (where the transmission is less explicit). Underlying the strength of framing is the issue of control, which 'regulates and legitimises communication in pedagogic relations' (op.cit., 12). Within framing, however, there are two systems of communication which operate to shape the framing: an instructional discourse and a regulative discourse. Instructional discourse relates to the evident organisation of the knowledge transmission - e.g. the 'selection, sequence, pacing and criteria of the knowledge' (op.cit., 13). But in Bernstein's sociological understanding of pedagogy there must be a social basis for this organisation of instruction, which he terms regulative discourse – e.g. the 'expectations

about conduct, character and manner [governed by] the forms that hierarchical relations take in the pedagogic relation' (op.cit., 13). Thus instructional discourse comprises the 'rules of discursive order', and regulative discourse comprises the 'rules of social order' (ibid.). In this understanding the regulative discourse is dominant, and the instructional discourse is embedded in it.

These generic principles of classification and framing shape two primary patterns of pedagogy (termed 'codes' or 'code modalities'), based on different combinations of their strength or weakness (op.cit., 159). Where strong classification is combined with strong framing, Bernstein calls this a collection code, and where weak classification is combined with weak framing, Bernstein calls this an integration code (op.cit., 10). Collection codes therefore act to keep specialised knowledge ensembles apart and provide explicit control over the criteria in their transmission to the transmitter, whereas integration codes act to bring knowledge groups together and provide apparent control over the criteria in their transmission to the acquirer.

Refer to *Diagram 4: Classification, Framing and Codes.*

The region of architectural knowledge spans across this curricular codification: at one extreme of the region the horizontal nature of design knowledge with its tacit criteria of transmission and individualised creative explorations seems to point to the definition of an integration code, while at the other extreme of the region the hierarchical nature of, for example, building science with its absolute criteria in transmission, seems to point to the definition of a collection code. The mix of knowledge systems in the region which spans across the entire spectrum of vertical discourse (as indicated in Diagram 3) also spans across the division of code modalities. This seems to imply that the architectural curriculum has a dual coding. While the emphasis in the curriculum on design learning (minimum 50% of the assessment as prescribed by the RIBA template) seems to give dominance to an integrated code, the balance of knowledge in the region is coded into subjects that are distinctly 'collected', not integrated.

Refer to *Diagram 5: Dual Code Modalities in the Architectural Region.*

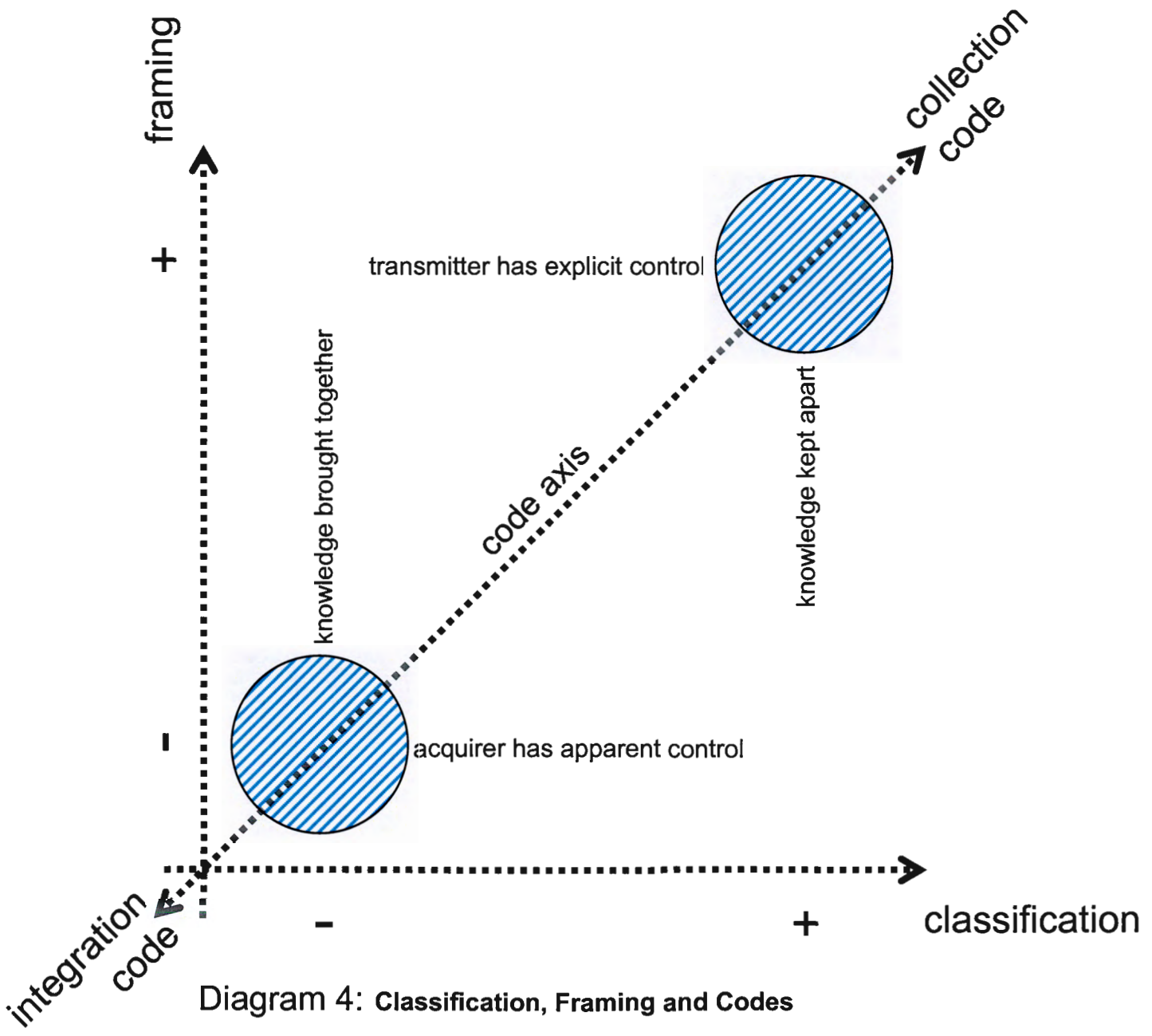

Diagram 4: **Classification, Framing and Codes**

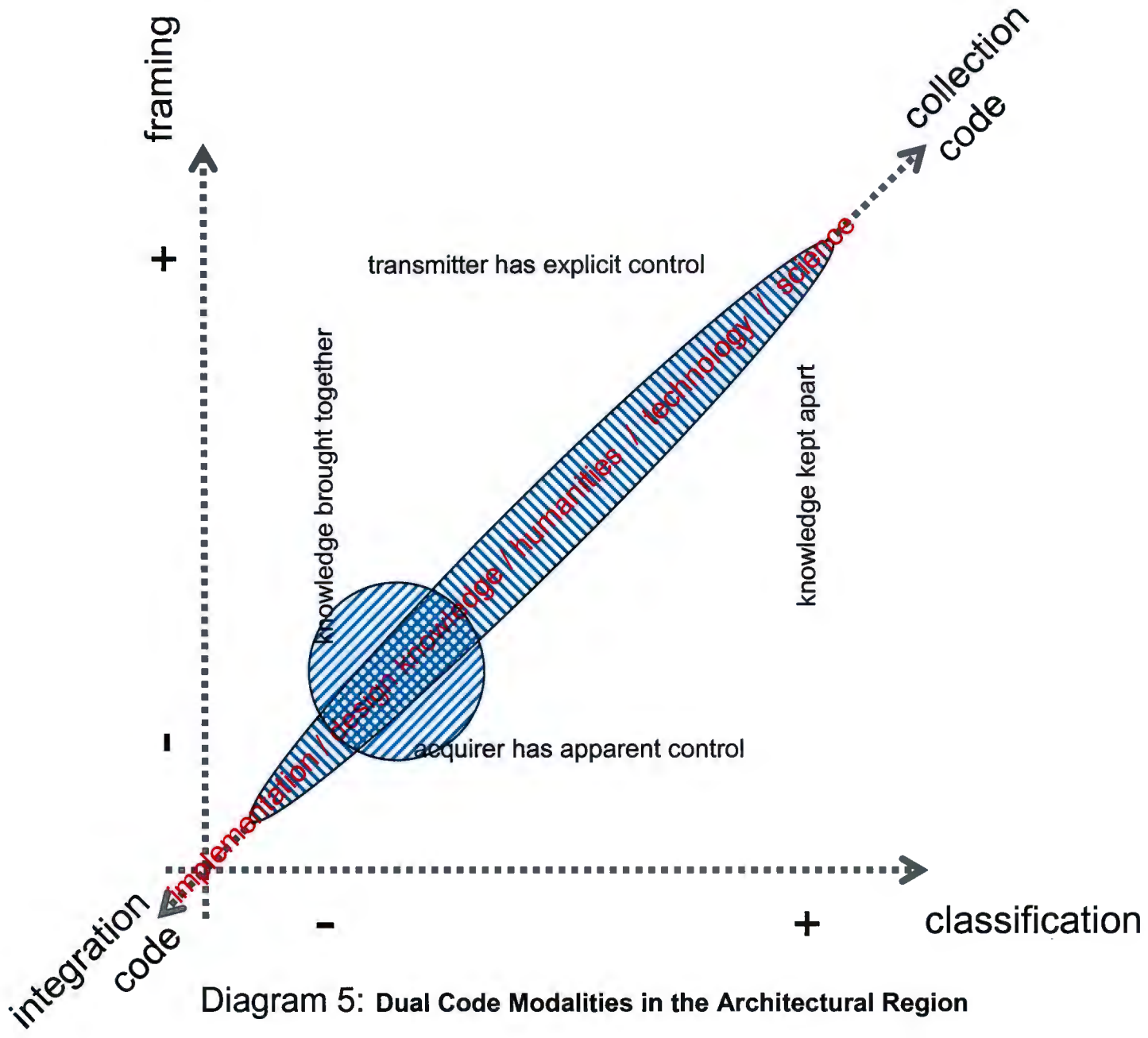

Diagram 5: **Dual Code Modalities in the Architectural Region**

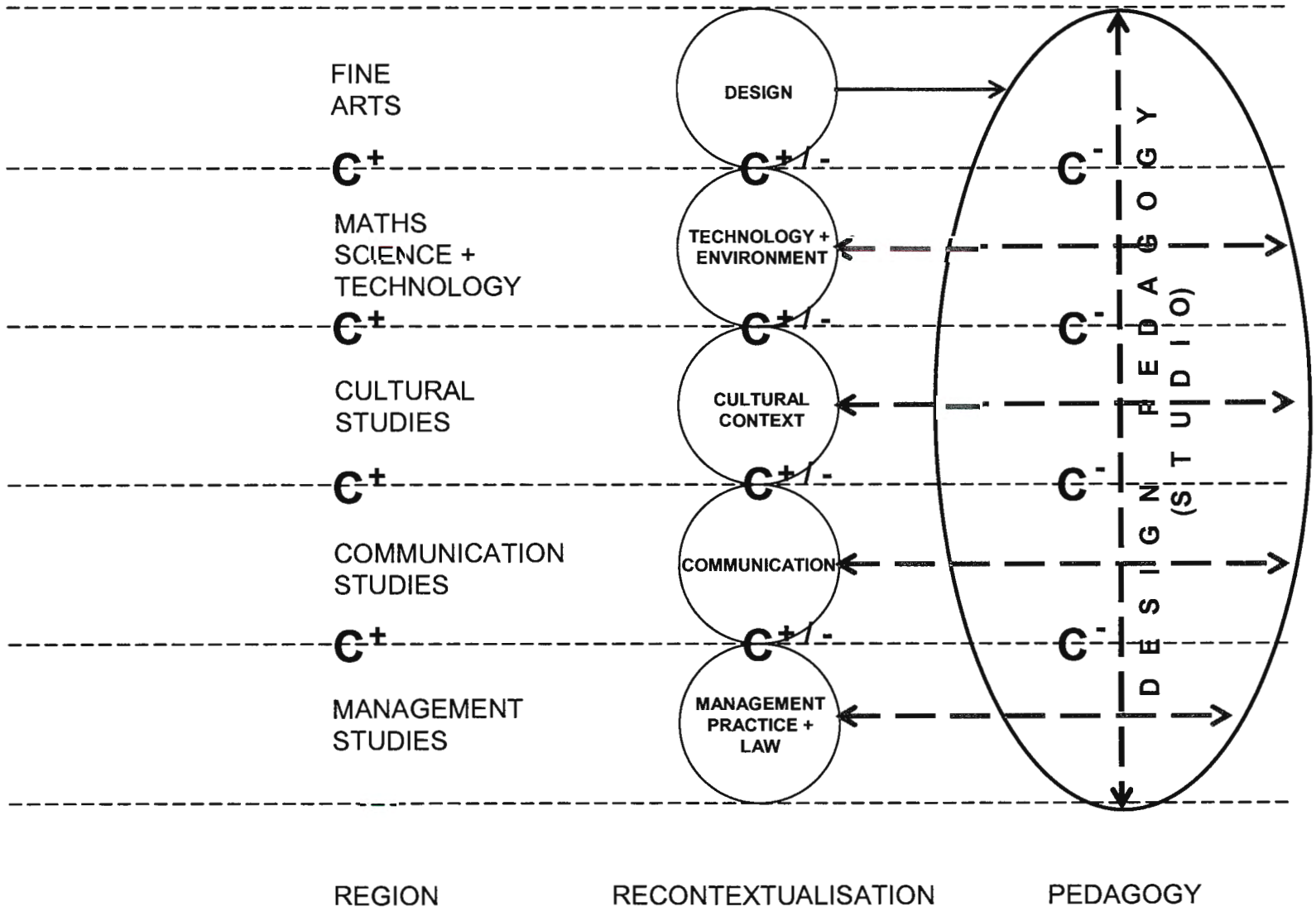

Diagram 6: **Weakening of Classification in architectural recontextualisation and pedagogy**

acts as the device of the integration code which cuts across the classifications of the subjects.

Refer to *Diagram 6: Weakening of Classification in architectural recontextualisation and pedagogy.*

In parallel with this incremental weakening of classification in the recontextualisation and pedagogy, the strength of framing is also weakened, i.e. communication in the pedagogy shifts from stronger framing of the knowledge derived from the region (where criteria of transmission are more explicit) to weaker framing in design pedagogy (where criteria of transmission are less explicit).

While it would seem logical that the recontextualised architectural subject 'Management Practice and Law' might follow this same logic of the incremental weakening of classification and framing and shift in the dual coding from collection towards integration, which facilitate the coherence of design learning, the evidence in the previous chapter of serious problems in integrating design and implementation suggests that this somehow does not happen in the transmission. Something must then be happening in the pedagogy which undermines this intention of the RIBA's outline syllabus. Further analysis of the pedagogy is required to explore this possibility, for which the framework of Bernstein's pedagogic device will be used.

3.3 THE PEDAGOGIC DEVICE

Bernstein provides a comprehensive analytical framework for unravelling the distinctive processes which cohere in any pedagogy, which he calls the 'pedagogic device'. His diagram of this device depicts three layers of operation (fields of production, regulation and reproduction) activated by three sets of rules (distributive, recontextualising and evaluative rules).

Refer to *Diagram 7*, from Bernstein, 2000, 37.

This diagram has been adapted here in an attempt to clarify this structure of the pedagogic device.

Refer to *Diagram 8: Structurings of the Pedagogic Device.*

If this hypothesis about a dual pedagogical code is plausible, how then does the architectural curriculum leverage the integration required in design learning across this range of code modality? It is argued here that this is achieved through incremental weakening of classification and framing, firstly through recontextualisation of the region's knowledge structures in different subjects, and secondly in the pedagogy.

In the recontextualisation of the Region's knowledge into architectural subjects, the strong classification which exist between these underpinning knowledge structures (strong classification, or C+, in Diagram 6) is weakened (strong and weak classification, or C+-, in Diagram 6). In the recontextualisation classification remains strong because there are still separations between the architectural subjects - e.g. 'Cultural Context', dealing with histories and theories of architecture and based on knowledge derived from the humanities, is separated as a different subject in the architectural curriculum from 'Technology and Environment', with its basis in knowledge derived from the sciences. However the internal classification of the region's knowledge which lies within these subjects is weakened, e.g.:

- within the architectural subject 'Cultural Context' competing theoretical languages in the Humanities which may be fiercely bounded become an eclectic mix which is less bounded, and architectural studies dip in and out of a palette of cultural theories which may have spatial relevance in design application;
- within the architectural subject 'Technology and Environment' scientific knowledge systems tend to be applied in principle with little empirical rigour, and the separations between sciences become blurred in the investigation of making buildings.

In the architectural curriculum and its pedagogy, a second process of the weakening of classification occurs between these recontextualised architectural subjects via the project based method of the design studio – which draws the knowledge gained from lecture-based subjects into applied design work. In the studio integration is required between 'Cultural Context' and 'Technology and Environment' in coherent design work which is both theoretically informed and technically sound[26]. In this pedagogy the studio

[26] E.g. the RIBA outline syllabus requires that 'a student will be able to demonstrate, through a coherent portfolio of work:
• an understanding of the interdependence of the thematic areas of the syllabus;
• the ability to create architectural designs that integrate social, aesthetic and technical requirements' (RIBA, 2003, 19).

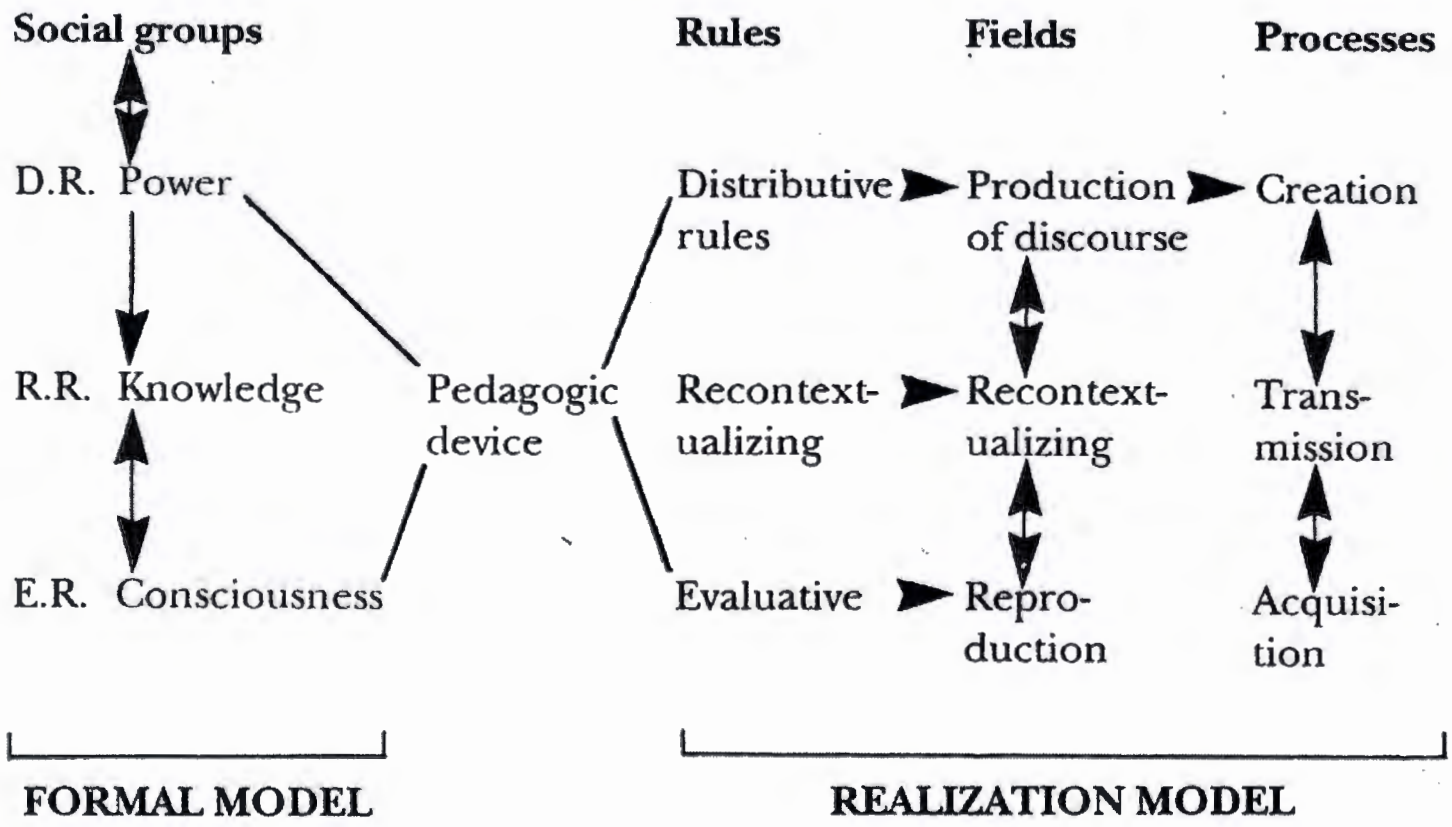

Diagram 7: **The pedagogic device and its structurings** (Bernstein, 2000, 37)

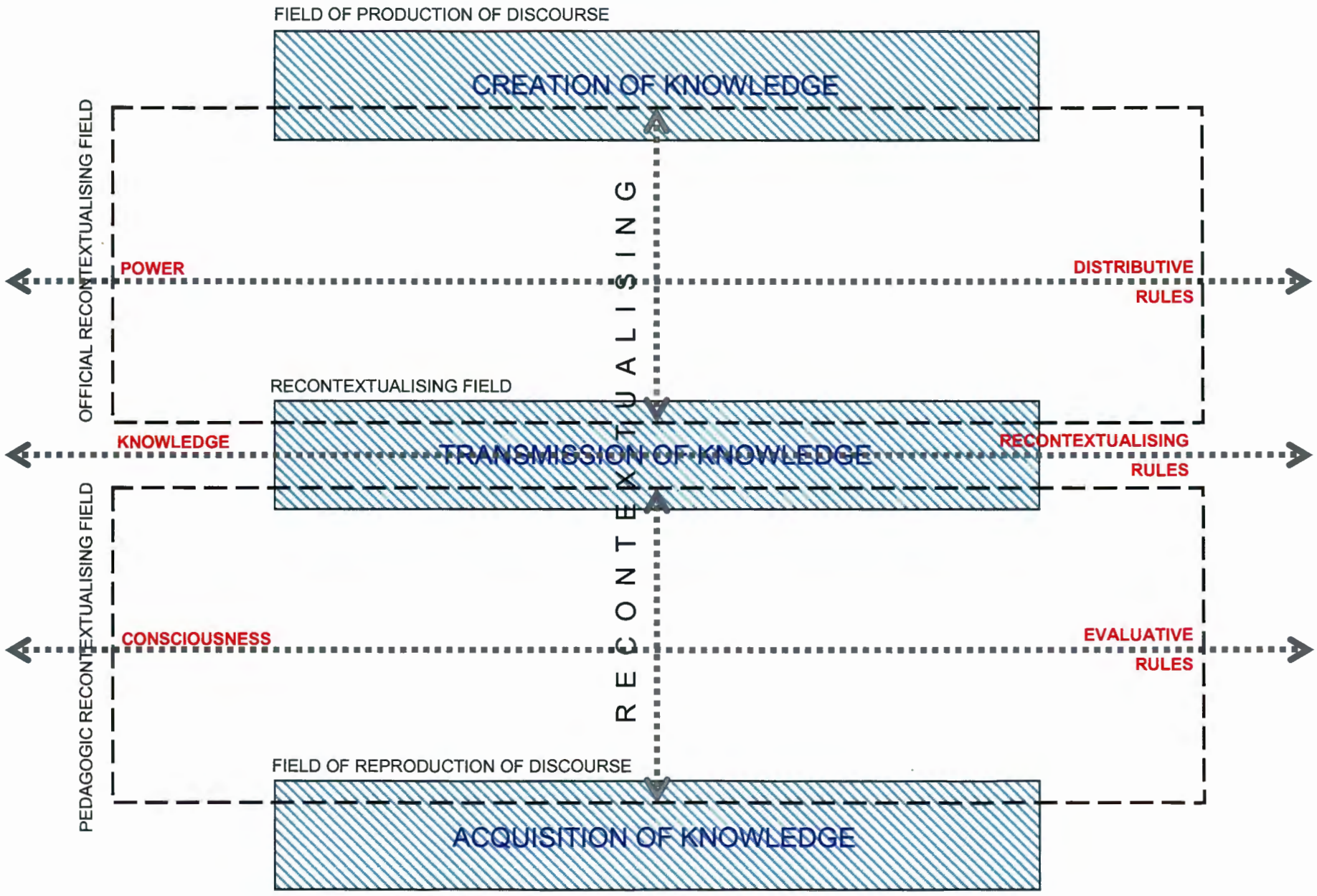

Diagram 8: **Structurings of the Pedagogic Device**
(Based on Bernstein: 2000:37)

Central to Bernstein's theory of 'the pedagogising of knowledge' is the 'recontextualising' of knowledge (op.cit., 25). Knowledge as it is created in a 'field of production of discourse' is not the same as knowledge as it is transmitted, or knowledge as it is acquired in a 'field of the reproduction of discourse'. In-between creation and acquisition, knowledge is recontextualised in a 'recontextualising field'. Through this recontextualising 'discourses are appropriated and brought into a special relationship with each other, for the purpose of their selective transmission and acquisition' (op.cit., 32). The transmission of knowledge, then, is bound up with this selective recontextualising of knowledge.

The recontextualising field has two sides to it: an official side dominated by the state, its officials and agencies (which Bernstein calls the 'official recontextualising field'), and a pedagogic side dominated by pedagogues and educational institutions (which Bernstein calls the 'pedagogic recontextualising field'). However underpinning the recontextualising of knowledge in the official and pedagogic recontextualising fields is a set of rules which define the appropriation, selective transmission and acquisition of knowledge. Bernstein calls these 'distributive rules', 'recontextualising rules' and 'evaluative rules'.

The distributive rules regulate the shift of an actual discourse of knowledge as it occurs in the field of production of discourse (i.e. embedded knowledge) to a 'virtual' or 'imaginary' discourse of knowledge as it occurs in the field of reproduction of discourse (i.e. disembedded knowledge). Knowledge moving between these two sites is abstracted from 'the material world' to 'the immaterial world', from 'an everyday mundane world' to 'a transcendental world', and from 'thinkable' knowledge to 'unthinkable' knowledge (op.cit., 28, 29). This detachment of meaning from 'a specific material base' opens up a gap or space which Bernstein calls the 'potential discursive gap', a gap where there is the potential for 'alternative realisations of the relation between the material and the immaterial' (op.cit., 30). However this potential for alternatives will be regulated by the distributive rules arising from the power relations between agents active in the official recontextualising field. So the 'distributive rules mark and distribute who may transmit what to whom and under what conditions, and they attempt to set the outer limits of legitimate discourse'[27] (op.cit., 31).

[27] In Bernstein's sociological understanding of pedagogy these distributive rules regulate (or 'attempt to regulate') not only *what* knowledge is recontextualised but *who* has access to it (Bernstein, 2000, 30).

The recontextualising rules create specific pedagogic discourse through 'the circulation and reordering of discourses': 'discourses are appropriated and brought into special relationship with each other, for the purpose of their selective transmission and acquisition' (op.cit., 32). So a recontextualising rule '..selectively appropriate, relocates, refocuses and relates other discourses...' (op.cit., 33).

The evaluative rules constitute pedagogic practices, which transmit criteria. The differential internalisation of these criteria, in terms of recognition and realisation rules, begins to differentiate the 'consciousness' of acquirers, what they know and can do. This is thus 'the level which produces a ruler for consciousness' (op.cit., 28).

These three sets of rules are interrelated and stand in a hierarchical relation to each other: 'recontextualising rules are derived from distributive rules, and evaluative rules are derived from the recontextualising rules' (op.cit., 28).

This analytical framework is used in the next chapter to locate the history of professionalisation, regulation and pedagogisation from the beginning of the 19th century when professional structures in architecture arising from industrialisation first started to be organised, up to the mid-20th century when the pedagogy was stabilised. This historical analysis attempts to explore structurings of the pedagogic device in the case of architecture which may work against the official objective of integrating design knowledge and tacit implementation knowledge.

4.0 Chapter 4 HISTORICAL ANALYSIS OF THE CREATION, TRANSMISSION AND OFFICIAL RECONTEXTUALISATION OF ARCHITECTURAL KNOWLEDGE

In this chapter the historical development of the architectural profession, its disciplinary knowledge and pedagogy is examined in three categories of analysis (taken from the top half of the diagram of the Pedagogic Device, refer to *Diagram 8*), i.e.:

1. the field of production of discourse: professional divisions and organisation arising from industrialisation, leading to the definition of a domain in which architects operate in the creation of knowledge (the top block in *Diagram 8*);

2. the transmission of knowledge: development of the definition of knowledge systems in the Region, and their recontextualisation in the pedagogy (the middle block in *Diagram 8*);

3. the official recontextualising field: the power relations between professional groupings operative in the definition of distributive rules controlling access to the profession via examinations (the top horizontal arrow in *Diagram 8*).

These three layers of historical analysis are examined from the beginning of the 19th century when professional structures arising from industrialisation first started to be organised, up to the mid-20th century when the pedagogy settled into a pattern which has since persisted. However conditions of pre-19th century craft production are examined in all cases, as it will be seen that pre-industrial patterns inherent to craft production persist in industrial professionalisation. The source data for this chapter is derived from Barrington Kaye's 'The development of the architectural profession in Britain, a sociological study' (Kaye, 1960), supplemented by Saint (1983) and Crinson and Lubbock (1994). In this brief historical analysis the focus is on the relationship between design and implementation knowledge during professionalisation, rather than on comprehensive architectural history.

4.1 FIELD OF PRODUCTION OF DISCOURSE

In this section the history of professionalisation is examined, together with the definition of areas of knowledge within which architects worked, and the development of organisations which regulate definition of and access to the profession (i.e. agents sanctioned by the state to regulate the distribution of knowledge)[28].

SEVENTEETH-CENTURY PROFESSIONALISATION AND SCOPE OF KNOWLEDGE

Up to the period preceding the industrial revolution architects were elite master craftsmen who operated across the full spectrum of craft knowledge of the creative arts and building technologies, managed the political and business relations with patrons, controlled the building costs, ran the site operations and developed the engineering solutions. The role of the architect as a specialist in the design of buildings begins to separate from this craft base in the UK during the 17th century. Whereas craftsmen designed and built buildings on the basis of established trade conventions which integrated design and implementation, architects who operated separately from craftsmen then started to emerge. These architects started to design buildings in terms of an abstract compositional art de-linked from the craft-based processes of construction[29]. Kaye identifies two sources for this development:

- firstly, it arose organically from the practices of some master-masons, 'who were able, not only to execute a building from a rough sketch, but also, if need be, to provide a sketch itself, in other words, to *design*' (Kaye, 1960, 34);
- and secondly, it arose institutionally through the Office of Works responsible for buildings commissioned by the Crown.

The principal officers of the Office of Works were master-craftsmen until 1615, when Inigo Jones was appointed Surveyor-General. As an artist and designer of theatrical

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[28] Timelines of the establishment of professional organizations and of 17th and 18th century architects are included in Appendix Three.

[29] '...it was the separation of the architectural from the construction function of craftsmen which ultimately led to the formation of the architectural profession as a separate entity': Harvey (The Education of the Medieval Architect, RIBA Journal, LII, 230-4), quoted in Kaye, 1960, 33.

masks he had studied Italian neo-classical architecture, and immediately began to introduce Palladian[30] principles of composition to the design of royal buildings.

Simultaneously the seventeenth-century saw the emergence of 'gentleman architects' – gentry or nobles 'who had no special training for the profession they adopted beyond their own reading and travels', and who designed country houses for their own or their friends' estates (op.cit., 40).

While craft-based production remains the dominant form of building delivery, architecture as a profession starts to emerge from these two groupings - the Surveyors-General[31] and their assistants[32] in the Office of Works, and the gentleman architects[33] - followed by a few architects who then start to practice independently[34].

Kaye notes that all of these groups had three common characteristics:

- none had any background in building craftsmanship[35];
- all developed their architectural knowledge through the study of Renaissance and Classical architecture;
- all designed their buildings, pre-conceiving them in terms of abstract compositional rules of aesthetic order (op.cit., 36-37).

The beginnings of the profession therefore emerge in the separation of specialisation in aesthetics from craft production, particularly through knowledge of the abstract grammar of neo-classical composition. This neo-classical style of building started to override the local Elizabethan vernacular, in which a building's aesthetic developed from the familiar use of traditional medieval architectural elements. Now the individual designer's creative interpretation of neo-classical rules of composition becomes valued – i.e. the ability to achieve a 'personal synthesis'[36].

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[30] Andrea Palladio (1508 – 1580), designer of neo-classical villas and public buildings in and around Venice, and author of 'Quattro Libri dell'Architettura' ('The Four Books of Architecture', 1570) which became a widely disseminated basis for the spread of neo-classical architecture in Europe and North America.

[31] E.g. Inigo Jones (1573 – 1652), Sir Christopher Wren (1632 – 1723).

[32] E.g. John Webb (1611 – 1672), Hugh May (1622 – 1684).

[33] E.g. Robert Hooke (1635 – 1703) of Micrographia and Hooke's Law of Elasticity fame, William Talman (1650 – 1720), Henry Bell (1653 – 1717), William Winde (1645 – 1722).

[34] E.g. Sir Roger Pratt (1620 – 1684), John Webb (who left the Office of Works after the death of Jones).

[35] Although Kaye notes that Inigo Jones may have been a joiner's apprentice (Kaye, 1960, 35).

[36] E.g. the 'fine taste and exquisite balance' of Jones, the 'exciting contrasts' of Pratt, and Wren's 'correct understanding of (classical) grammar' (Kaye, 1960, 37, 41). Curiously, these English architects' work was an

While Jones dominates English architecture in the first half of the seventeenth-century, Sir Christopher Wren dominates the second[37]. Wren continued Jones' neo-classical design tradition, and his background as a celebrated mathematician and Professor of Astronomy at Oxford University, emphasises the importance then of mathematical order in neo-classical design[38]. Kaye comments that Wren's shift from mathematics to architecture is:

> not so surprising, given the seventeenth-century tradition that architecture was a matter of calculation and ingenuity [and, that] a man who was a known master of mathematics and famous for his ingenuity was qualified for the Surveyorship on those grounds alone[39] (op.cit., 39).

At this time knowledge of materials and construction detailing ('attention to correct detail') is peripheral to architectural knowledge, remaining the province of artisans and craftsmen, who are able to interpret and execute schematic compositional design drawings ('capable of executing the details of Palladian architecture from the roughest indication')[40] (op.cit., 40, 41). However there are overlaps between the abstract architectural knowledge of composition and the craft knowledge of implementation, as Kaye notes that the high standard of English craft skill 'partly derive[ed] from the traditions of rigorous training given by Wren to his own artisans' (op.cit., 40).

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austere form of neo-classicism, with none of the baroque virtuosity of their Italian contemporaries such as Bernini (1598 – 1680) or Boromini (1599 – 1667).

37 Having designed the Sheldonian Theatre at Oxford in 1662, Wren became involved in the rebuilding of London after the great fire of 1666, and was appointed Surveyor-General from 1669 to 1718 (Kaye, 1960, 39).

38 Mathematics had been linked to classicism since the time of Vitruvius (1st century BC), Roman author of 'De architectura' ('The Ten Books of Architecture', from which the phrase 'firmness, commodity and delight' originates). This text was revived by the Renaissance architect Alberti in his 'De re aedificatoria' ('On the Art of Building', ca. 1450) – both of these books being primary sources of neo-classical design theory for architects in the 17th and 18th centuries.

39 Kaye, quoting Summerson J., 'Architecture in Britain 1520 – 1830' (1953, 120).

40 Kaye, quoting Blomfield R., 'A History of Renaissance Architecture in England',(1897, 213).

EIGHTEENTH-CENTURY PROFESSIONALISATION AND SCOPE OF KNOWLEDGE

In the eighteenth-century Palladianism revived after a brief phase of English Baroque design[41] largely through the political patronage of the 3rd Earl of Burlington[42], and an increasing number of architects in fulltime practice lead to a thriving Palladian style in the second half of the Eighteenth-century[43]. The increase in political patronage was matched by a decline in Royal patronage and in the influence of the Office of Works[44]:

> [Architects] sought and found their patrons among the leaders of the great political parties. The effects of this shift on architecture were manifold: among them was the adherence to Palladianism as the aesthetic badge of Whiggery. Burlinton's influence among his friends gradually permeated the whole aristocracy. The definite and easily recognizable 'rules' of Palladian design recommended themselves to an age and class which set store by correct form (op.cit., 45).

The development of the fulltime professional architect is linked through this patronage with this 'fashionable interest in design by members of the upper classes', and successful architects[45] became very eminent in society, establishing the social prestige of the occupation of architecture (op.cit., 46).

The seventeenth-century interest in neo-classicism was reinforced through the publication in 1715 of an English translation of Palladio's 'Quattro Libri dell'Architettura' (Four Books of Architecture), together with the first of three volumes of Campbell's 'Vitruvius Britannicus' ('consisting of a collection of plates of houses in the classical style

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[41] In the early Eighteenth-century the 'English Baroque' work of Vanburgh (1664 – 1726), Hawksmoor (1661 – 1736) and Archer (1668 – 1743) is a less rule-bound form of neo-classicism than Jones' and Wren's, with more emphasis on mass and surface - resulting in 'the extreme heaviness for which the works of Hawksmoor and Vanbrugh have always been criticised' (Kaye, 1960, 42).

[42] 'The Palladian movement (was) 'directed' by Burlington [1694 – 1753], whose effective patronage of Campbell and Kent, whose own designs, and whose political jobbery were all deliberately aimed at a result which he was successful in achieving, that of making the somewhat modified Palladianism of Inigo Jones the official English style of architecture' (Kaye, 1960, 43).

[43] Sir Robert Taylor (1714 – 1788) and James Paine (1716 – 1789); James and Robert Adam (1730 – 1794 and 1728 – 1792), whose 'style is mainly characterised by what he (Robert) described as 'movement', a picturesque quality deriving from the contrasting of various parts of the building, and by the elaborate and refined decoration' (44); Sir William Chambers (1726 – 1796), whose 'style was an orthodox Palladian classicism (with) the solid comforts of scholarship' (44); and Robert Mylne (1734 – 1811), George Dance the Younger (1741 – 1825), Henry Holland (1745 – 1806) and James Gandon (1743 – 1823), all of whose 'architecture was, for the most part, solid and scholarly, renouncing the effeminancies of Adam's decorations, yet maintaining grace of outline with sureness of treatment' (Kaye, 1960, 44).

[44] Summerson's description of a series of disastrously incompetent 18th century officials of the Royal Works ends with the comment 'Wyatt enjoyed the same title, but proved once and for all the unreliability of artists as administrators' – a complaint still evident in the RIBA reports of the late 20th century (Summerson, 1953, 180).

[45] E.g. Wren, Adams and Chambers.

in Britian, with special emphasis on those attributed to Inigo Jones, (which) stressed the debt owed to Palladio') (op.cit., 42). These were followed by a flurry of books on Classicism and English Palladianism[46] (op.cit., 43, 44).

In this period, architectural composition remains at the centre of knowledge, and individual interpretations continue to proliferate based on the latest conventions of taste[47]. Kaye comments that this aesthetic priority created a precarious position for architects:

> Having once set up as exponents of taste, they were inevitably led a dance in trying to justify their own as opposed to that of others. Moreover, no sooner was one set of aesthetic criteria established than it became the property of laymen, and it was, in this sense, only a continual change in taste that enabled the profession to justify its existence (op.cit., 47).

This dilemma was compounded by both the widespread public knowledge of neo-classical design principles and the continued activity of amateur 'gentleman architects', and builders' ability to execute schematic design proposals without the involvement of an architect. With no monopoly on knowledge of design principles or execution, architects could only secure a position through scholarship and superior knowledge of style and the incremental shifts in style:

> By keeping ahead of both the builder and the layman in his knowledge of the new trends in architectural style, the eighteenth-century architect was able, slowly, to consolidate his position. Two attributes enabled him to demonstrate the need for his (services): scholarship and fashion. Neither the builder, on account of his limited education and time, nor the gentleman, on account of his etiquette and

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- William Halfpenny: 'Magnum in Parvo, or the Morrow of Architecture', (1728), and 'Practical Architecture';
- Robert Morris: 'Rural Architecture' (1750), 'Architectural Remembrancer' (1751), 'Select Architecture' (1757);
- Isaac Ware 'A Complete Body of Architecture' (1756);
- William Chambers 'Treatise on Civil Architecture' (1759), 'which immediately became the standard work on the use of the classical orders, and remained so for the next sixty years' (44);
- Robert Adam: 'Ruins of the Palace of the Emperor Diocletian at Spalato; (1764), 'Works in Architecture of Robert and James Adam' (1773) (Kaye, 1960).

47 E.g. Vanbrugh, Hawksmoor and Archer's 'concern was, as Summerson has pointed out, with the mass and form of the building, as opposed to Jones' and Wren's concern with the details of classical architecture'. In terms of aesthetics this 'change is a fundamental one, a change of feeling, a renewed interest in the *intrinsic* qualities of mass, rhythm and proportion as opposed to the *extrinsic* management of form by the apparatus of classical design'. Kaye (1960, 41), quoting Summerson J., 'Architecture in Britain 1520 – 1830' (1953, 213).

> lack of serious inclination, could afford to keep up with these matters. The architect made it his duty to do so (op.cit., 67)[48].

Technical knowledge of construction detailing remains at the edge of architectural knowledge, still embedded in the artisan class, and the 'gentleman architects' find it distasteful to get too close to this (it was 'expected of the eighteenth-century gentleman that he would design the minima of technical details')[49] (op.cit., 46). Although this social etiquette influences architectural knowledge, architects do straddle the divide between aesthetic and technical knowledge: while their social status derives from the compositional aspects of architectural knowledge, they are also involved in supervising construction[50]. This tension in architectural knowledge between command of the latest good taste in the aesthetics, and the practicalities of materials and construction, already evident in the seventeenth century, remains in the eighteenth-century. Kaye comments that:

> An aristocratic contempt of 'minute and mechanical' detail, a fad for designing, the interpretation of contemporary taste – these things were precarious foundations on which to build a profession (op.cit., 47).

Refer to *Diagram 9: Professional Division of Labour Stage 1, 18th century – Separation of Aestheticians from Craft Production.*

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[48] Kaye continues 'During the latter half of the eighteenth century, two highly successful architects illustrated in their practices these two attributes. Sir William Chambers and Robert Adam both established their indispensability, the one with his scholarship, the other with his flair for decorative art' (Kaye, 1960, 67).

[49] Lord Chesterfield writes to his son in 1749: 'You may soon be acquainted with considerable parts of Civil Architecture; and for the minute and mechanical parts of it, leave them to the masons' (Kaye, 1960, 46), and 'It would not be amiss, if you employed three or four days in learning the five Orders of Architecture, with their general proportions; and you may know all that you need know of them in that time. Palladio's own book of Architecture is the best you can make use of for that purpose, skipping over the lowest mechanical parts of it, such as the materials, the cement, etc' (op.cit., 45).

[50] Their 'reputation for ingenuity' may even derive from technical knowledge, e.g. the Adams brothers took out a patent on stucco construction (a plastering technique which was central to their highly decorative style), and Hooke was involved in resolving the construction of Wren's dome of St. Pauls.

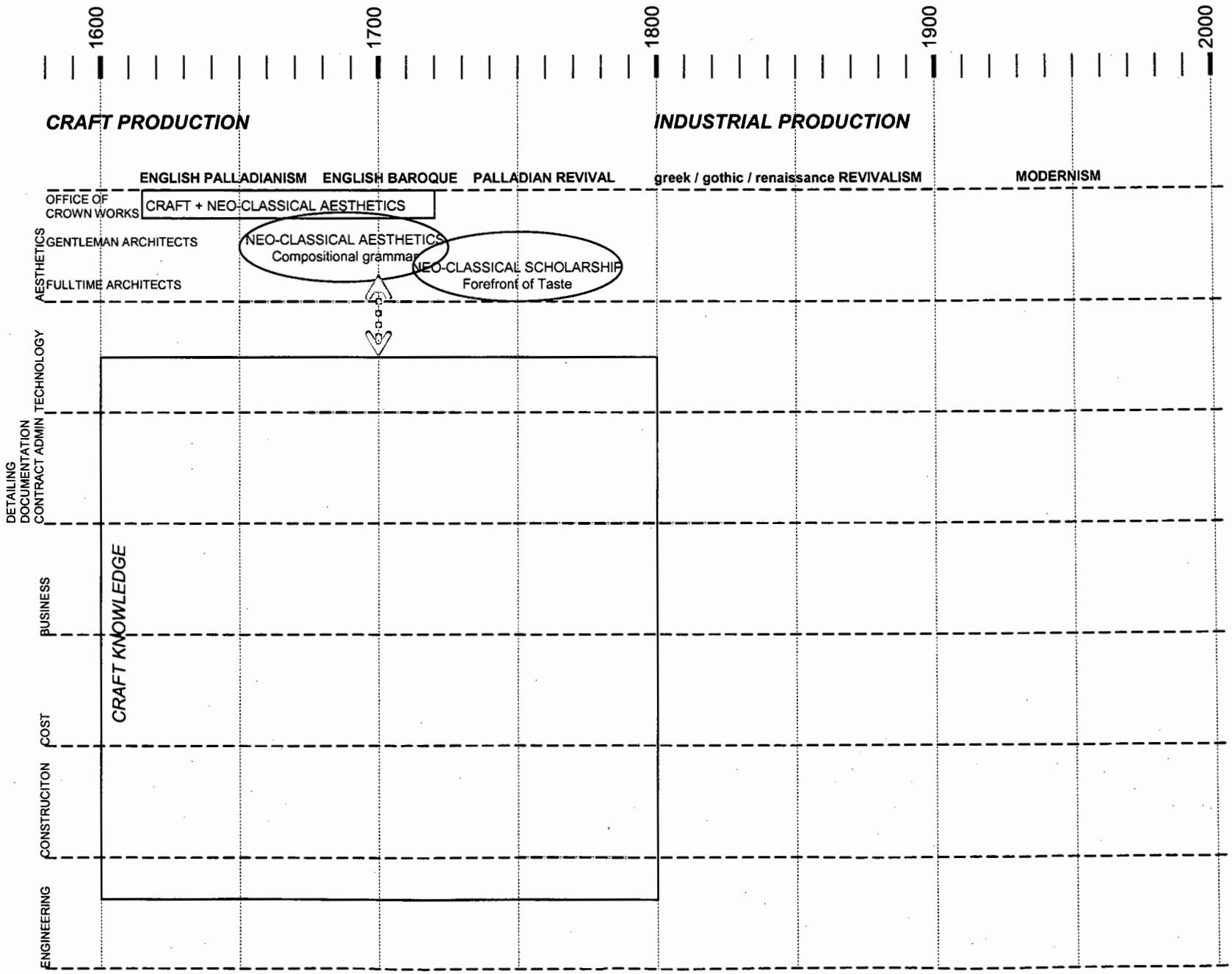

Diagram 9: Professional division of labour **Stage 1** (17th +18th c.) **Separation of Aestheticians from Craft Prod.**
(Data from Kaye, 1960)

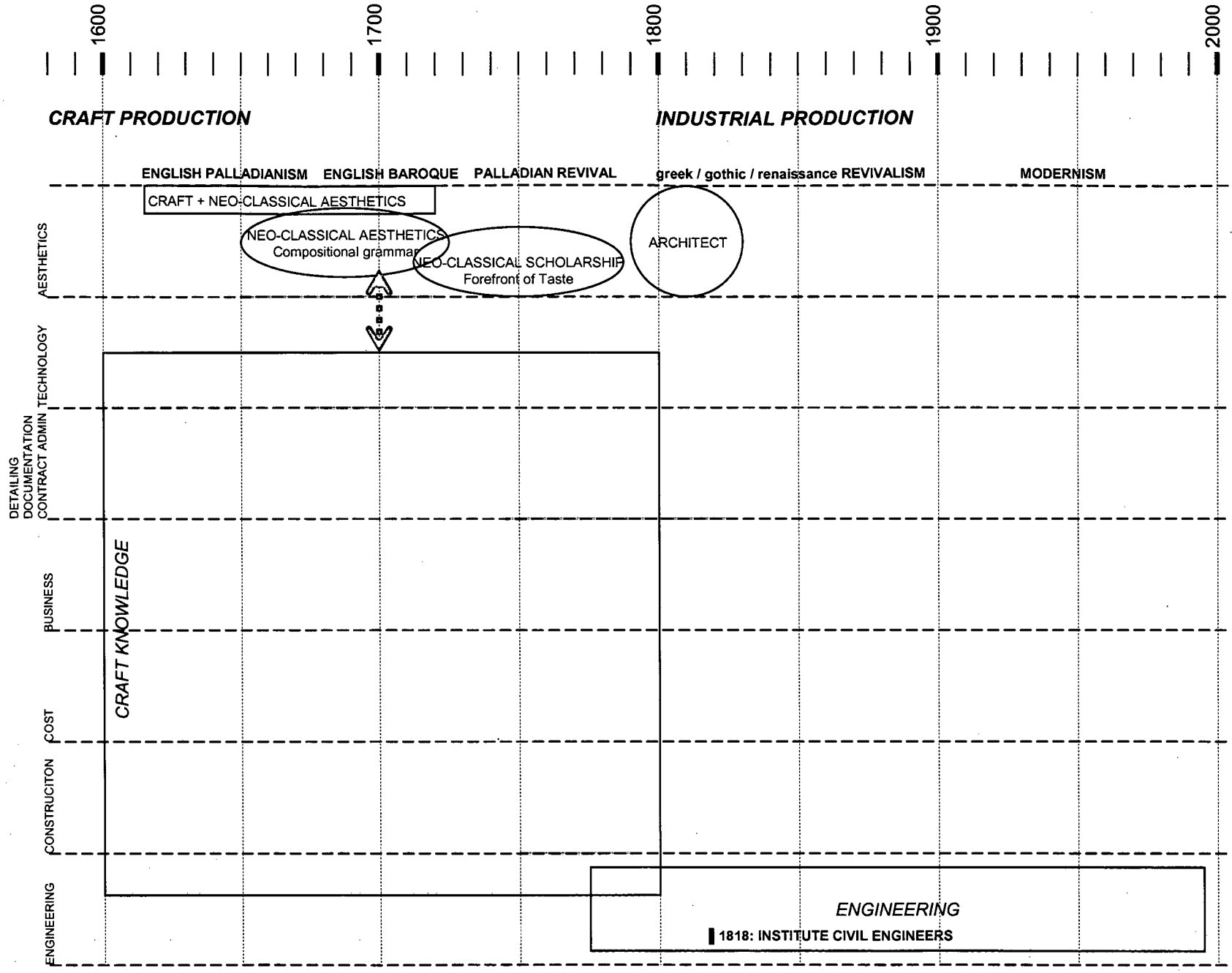

Diagram 10: Professional division of labour **Stage 2** (turn of 19th c.) **Separation of Architecture + Engineering**
(Data from Kaye, 1960)

NINETEENTH-CENTURY PROFESSIONALISATION AND SCOPE OF KNOWLEDGE

At the beginning of the 19th century the role of the architect had been established as a specialist in the aesthetics of composition. Mastery of the innovations in industrial technology were not a priority in terms of the role of the architect as a classicist aesthete, and a parallel process at this time led to the development of the engineering profession centred on knowledge of industrial production and fabrication. Within the built environment sector this engineering profession was the first to formally constitute itself as an institute of civil engineering in 1818, twenty years before the formal establishment of an institute of architecture.

Refer to *Diagram 10: Professional Division of Labour Stage 2, turn of the 19th century: Separation of Architecture and Engineering*.

While the establishment of the Engineeering profession was spurred by *inclusion* of a new domain of knowledge of industrial production, the formal constituting of the Architectural profession had more to do with the *exclusion* of areas of knowledge which were seen to conflict with the role of the architect as an authoritative independent advisor on issues of style and taste. These exclusions related to architects' involvement in property development, building construction, the costing of built work, and to the separation of roles of the building contractor and the architect (Saint, 1983, 51 – 71).

Although there had been a gradual separation of the roles of master-mason and architect in the 18th century, there was still an overlap between these functions and a range of permutations of role:

- 'gentleman architects' preferred to have little involvement in the detail of construction, leaving this to the skill of the master-craftsmen;
- some architects were very involved with site processes, and with the adaptation of craft skills to suit new styles of architecture;
- and builders continued to provide a 'design-build' service without the involvement of architects, as the master-masons had done in the past.

During the development of commerce in the early nineteenth century a wide range of business and financial interactions developed around this mix of roles:

- while some architects maintained a separation from the building role, others acted as building contractors themselves, were partners of builders, or had financial interests in aspects of the building trade;
- some architects designed and built speculatively without clients, producing buildings for sale;
- and some architects worked for builders, either as their designers or as their 'measurers' (op.cit., 56, 72 – 74). The work of these 'measurers' relates to a further overlap of roles, in this case between design and cost estimating, which was to become a crucial issue in the development of professional organisation in architecture.

As these commercial overlaps between the roles of architects, developers[51] and builders provided opportunities to defraud clients, it became important for the emerging profession to separate itself from these fraudulent practices in order to establish the credibility of architects as independent advisors on style – the role of the architect as artist, in the tradition of the 'independent scholarly gentleman' (Saint, 1983, 57). The RIBA was therefore established in 1834 with the purpose of regulating the conduct of members through a code which specifically excluded commercial relationships with builders or the building process. To this end architects who acted as builders' 'measurers' were excluded from membership, and 'architects shed their less congenial tasks' such as 'arranging leases, assessing rents, measuring property, taking out quantities and so forth' (op.cit., 57 – 58).

Refer to *Diagram 11: Professional Division of Labour Stage 3, beginning of 19th century – Separation of Architects from business relationships with Builders.*

[51] Saint notes that the role of the 'architect-developer' declined due to the impact of increasingly organised and financed builders (Saint, 1983, 59).

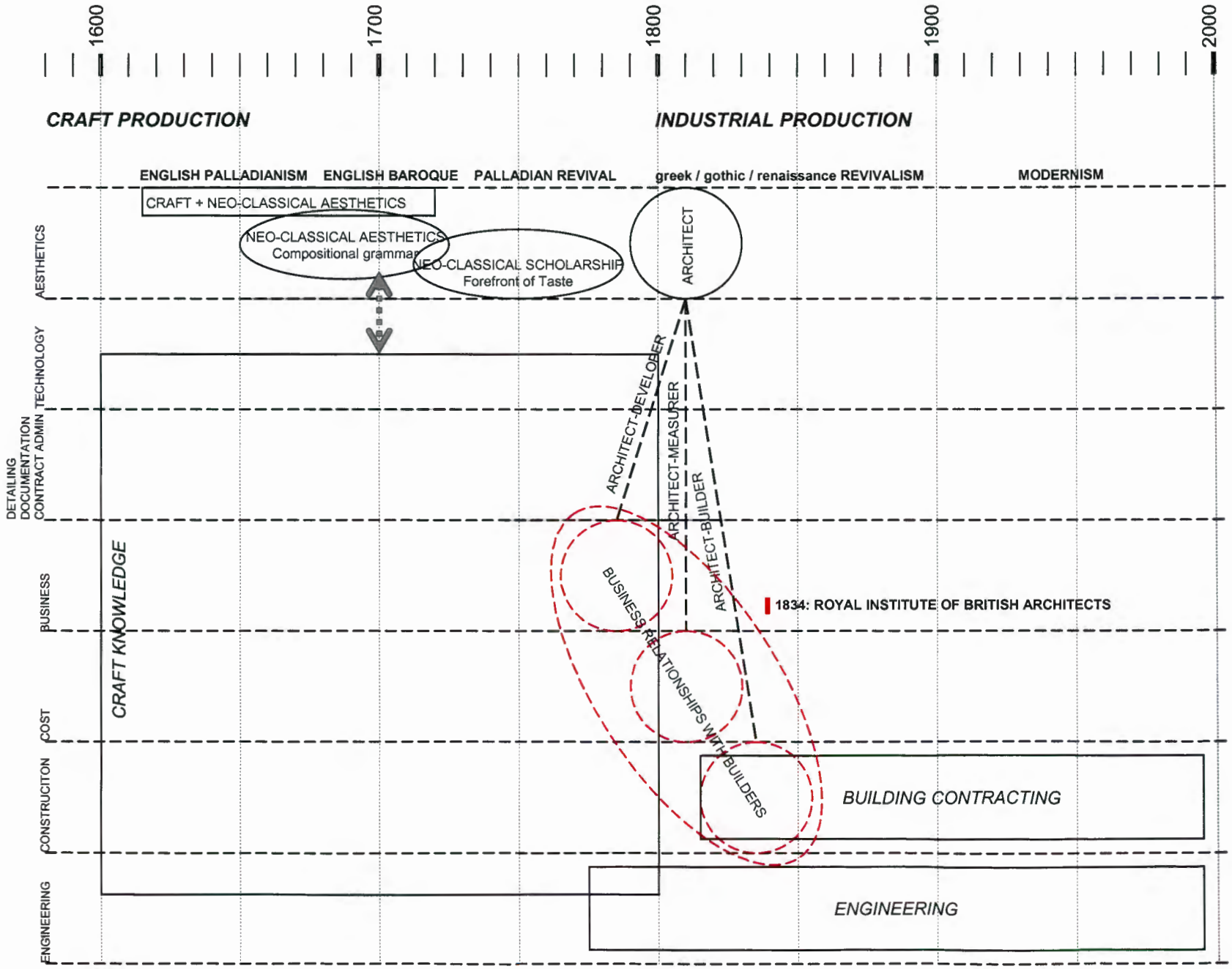

Diagram 11: Professional division of labour **Stage 3** (beginning of 19th c.) **Separation of Architects from Builders**
(Data from Kaye, 1960)

While professionalisation in the nineteenth-century cleaned up the business relationships between architects and builders, it also marked a shift in their responsibilities. Industrialisation brought with it new materials and structural systems, and increasingly complex building types, all requiring construction methods for which craft skills were no longer suitable. Until then the 'difference between architect and builder was only one of degree; the former specialized more on the design; the latter more on the execution. It was not until the introduction of the complicated buildings of the Gothic Revival that builders were obliged to demand detailed, exact and scale drawings, or architects to provide them' (Kaye, 1960, 66).

Knowledge of materials science and construction detailing now start to shift towards the centre of architectural knowledge, bringing with it a need for more detailed knowledge of contract law and administration, and the organisation of information for working drawings. However there is a hierarchy in the artistry and practicality of this work: '[...] those at the privileged end of the profession [started speaking of] employing 'the Art Architect to design, and the practical architect (lower case of course) to carry out and superintend' (Saint, 1983, 61, quoting C. R. Cockerell).

While knowledge of cost estimating had remained in the domain of architectural knowledge despite the embargo on architects working as builders' measurers[52], the demands of more detailed contract documentation and tendering procedures resulted in

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[52] Although architects acting as builders' measurers were excluded at the first stage of professional organisation, the assumption here is that knowledge of building economics and cost estimating remained within the domain of architectural knowledge. Evidence for this in the Kaye text includes:
- Sir John Soane (1753 – 1837, best known for the Bank of England, for which his appointment included the roles of both Architect and Surveyor) includes costing as integral to the work and knowledge of architects: 'The business of the architect is to make the designs and estimates, to direct the works, and to measure the value of the different parts...and, above all, he is to take care that the workmen's bills do not exceed his own estimate' (Kaye, 1960, 60) quoting Bolton, A., 'The Portrait of Sir John Soane, R.A. (1753 – 1837) Set forth in his letters from his Friends (1775 – 1837) (1927, 620)).
- In a dispute in the Architects Club in 1795 on overcharging, Soane argued that the standard fee of 5% of the cost of the works should include measuring the quantities, whereas others felt that this work should incur an additional fee of 2,5% (Kaye, 1960, 60). Either way, it seems clear from this debate amongst the architectural elite of the time that measuring and costing were intergral to the work of architects, and to architectural knowledge.
- The founding regulations of the Institute of British Architects in 1834, while excluding measuring work for builders, specifically included costing of architects' own contracts. A member would be expelled for undertaking 'measurement, valuation, or estimation of any works undertaken...by any building artificer, except such as are ...executed under the Member's own designs or directions'[52].
- An 1840 schedule of fees from the Institute of the Architects of Ireland includes a charge of 1% for a detailed estimate (op.cit., 90).
- 'Although the professions of architect and surveyor may be said to have become distinct by the middle of the nineteenth-century, there still remained a large number of persons who practised both, and who styled themselves 'architect and surveyor' (op.cit., 151).

a duplication of measuring, costing and documentation work by architects and builders. In 1868 a separate Institute of Surveyors was established who provided this service to both parties, and the pre-industrial overlap of construction, design and cost-estimating roles achieved formal separation[53].

Refer to *Diagram 12: Professional Division of Labour Stage 4, mid 19th century – Inclusion of knowledge of construction detailing and contract documentation.*

As the 19th century proceeds, the increasingly technical demands of industrialisation bring about a tension between architecture 'as art' (centred on the visual aspects of style), and the 'business' of practising architecture in an increasingly complex economy and 'science' of making increasingly complex buildings. This tension is evident in debates within the profession around stylistic autonomy on the one hand, and business compromise on the other.

Kaye quotes a letter sent by an architect to a prospective client c.1825, in which the 'pretensions' to correct style are stressed (as opposed to mere construction) in a continuing 'emphasis on the ornamental aspect of the architect's work' (Kaye, 1960, 55):

> It is presumed your primary object in securing the services of an Architect involves the recognition of his pretensions as an Artist. The ordinary *Builder* may construct the edifice required: you apply to an *Architect* for the superadded graces of correct design and suitable decoration (ibid).

The letter goes on to state the authority of the architect in these matters, over the interests of the client if needs be (though the limits of budget are recognised):

> *In matters of Taste* he engages to give you what he conceives to be correct, and to the amount only which your means allow, and *not* to sacrifice without reluctance his repute as an Artist to your individual wishes, not to suffer under your censure for limiting his decorations to their just proportion in the general outlay (ibid.).

[53] However the combined role of architect-surveyor continued to exist, later emerging as a force in opposition to the RIBA.

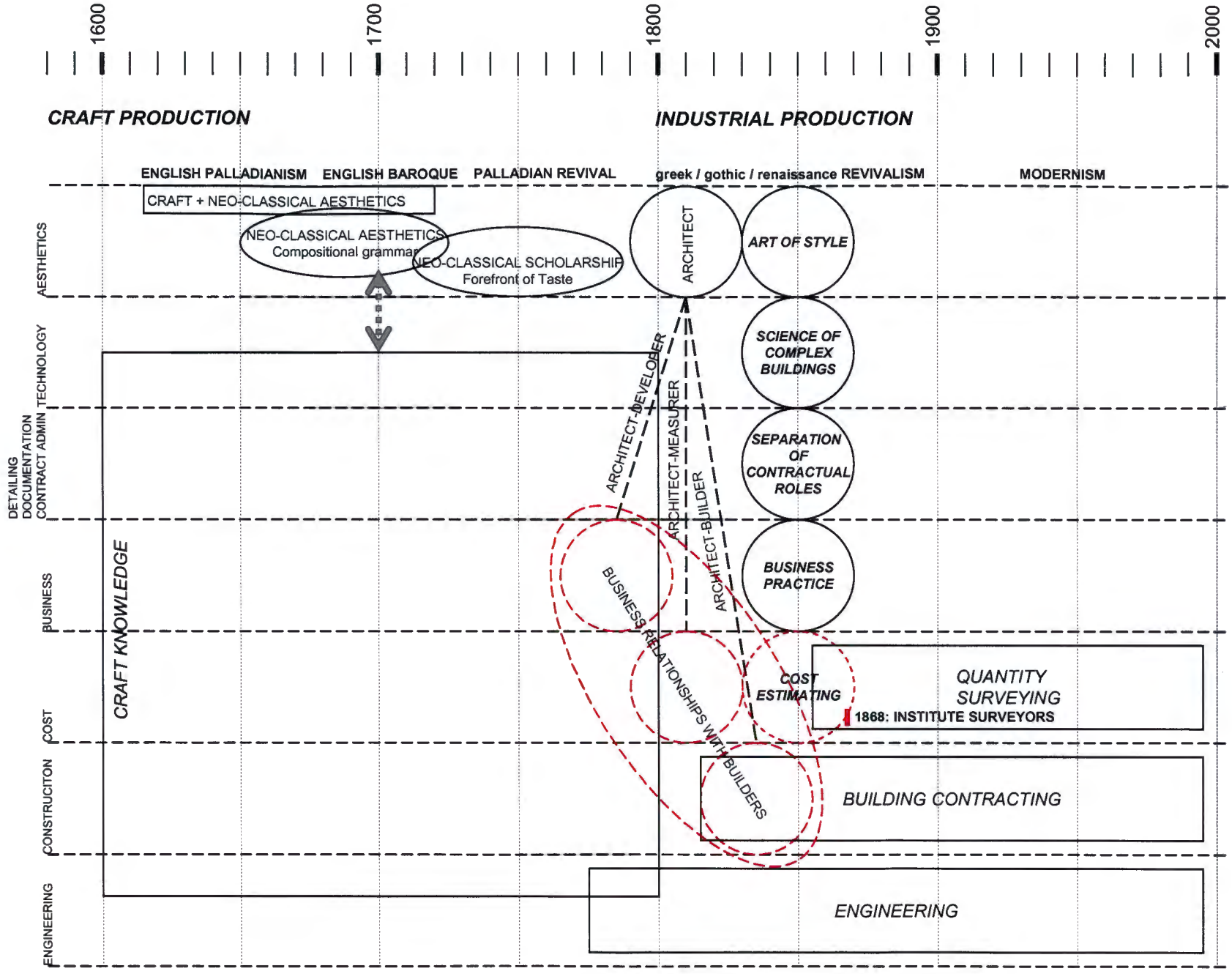

Diagram 12: Professional division of labour **Stage 4** (mid-19th c.) **Inclusion of Detailing + Contract Docs.**
(Data from Kaye, 1960)

This emphasis on knowledge of the rules of architectural composition, and their artistic interpretation, sees architects working their way through multiple revivals of historical style. In the early nineteenth-century architectural style shifts from Palladianism to Greek Revivalism[54], an interest in Grecian architecture having developed during the second half of the eighteenth century with the publication of a number of illustrated books of Greek antiquities[55]:

> [...] the movement spread with rapidity. With the end of the Napoleonic Wars in 1815, there was a great increase in building activity, particularly in public buildings and clubs. The Greek style lent itself to architecture on the grand scale (ibid.).

Greek Revivalism then gave way to a Gothic Revival, developing from 'the taste for ruins that formed part of the Romantic Movement in literature' (op.cit., 69)[56]. Books of Gothic measured drawings and details began to be published in the eighteen-twenties, fuelling architects interest in the style. The religious grounding of Gothicism led to an argument advocated by Pugin and Ruskin that as classical architecture was pagan, neo-classical architecture must be immoral, and a decision by Parliament to rebuild the Palace of Westminster after a fire in 1834 in Gothic style 'undoubtedly marks the beginning of (the) revival of Gothic architecture' (ibid.).

However the Gothic Revival and neo-classicism coexisted in the mid nineteenth-century[57], and the Italian Renaissance style regained dominance in the eighteen-sixties. Simultaneously, there was a Queen Anne revival of domestic architecture, and reaction against industrial production led to the Arts and Crafts movement (Frampton, 1980, 42 – 47). Throughout the building boom which lasted most of the century this 'battle of the styles' flourished, and as styles invariably became predictable and mechanistic the

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[54] Kaye notes that 'the Greek style .. began to lead to an emphasis on the ornamental aspect of the architect's work. Behind their becolumned facades, the houses of the Greek Revival continued to be built in accordance with the traditional proportions handed down from builder to builder, and set out in the (building) handbooks of the earlier eighteenth-century. The layout of rooms, especially in town houses, had hardly varied for a century, and all that was left to the architect was the addition of such ornament and decoration as would give the building style' (Kaye, 1960, 55).

[55] Stuart and Revett, 'Antiquities of Athens' (published in four volumes between 1762 and 1816); Society of Dilettanti, 'Ionian Antiquities' (1769), and 'Unedited Antiquities of Attica' (1817).

[56] Kaye notes that during Palladianism the Gothic and Elizabethan styles of building had never completely disappeared (Kaye, 1960, 69).

[57] Kaye comments that 'the fact that the Revival developed out of romanticism and the picturesque discouraged many of the sterner designers, who had been brought up in the classical tradition') (Kaye, 1960, 69).

creative imperative was to continually seek out new forms of revivalism (Kaye, 1960, 117 – 124).

In all of these eclectic revivals the key architectural debates were aesthetic ones, and the role of the architect as arbiter of beauty and good taste, established during eighteenth century Palladianism, remained primary[58]. To maintain domination of the public shifts in style the architect required both knowledge and imagination – knowledge of the history of architecture and the creative imagination to apply historical design principles to contemporary conditions in a coherent way. However if the client could learn the canons on which beauty was based then the architect's design authority could be challenged, so the architect needed 'superior scholarship' and 'superior artistic imagination' to maintain superiority over the client in aesthetic decisions (op.cit., 84). In this disciplinary domain the key knowledge was visual knowledge, and its application required thinking and creative work analogous to that of an artist.

However architects' possession of visual design knowledge and position of creative authority was not without its critics, as it could be viewed as arrogant, elitist and unaccountable. For example, a motivation to exclude architects from aesthetic decisions in the rebuilding of the Parliament was that:

> [...] the artist, who imagines himself placed above his compeers, assumes a claim to direct exclusively a mystery which not even one of his own craft, much less an amateur or one of the public, can presume to gainsay or control. A painter or a sculptor, a merchant or a retail dealer, must condescend to suit his article to the market; but the leading architects of our time has aspired to bend the public to their fancy, and haughtily refuse any obedience to the spirit of the age (ibid.)[59].

This argument produced heated response from some architects, who asserted their right to artistic autonomy:

> [...if] the experience of the professor is rendered unavailable through the intervention of those not versed in the principles of his art, the buildings in which his judgement is thus controlled, no longer form a criterion of his talent, or of the

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[58] That this historicism had little to do with the increasing impact of the new materials and structures of industrial production was a contradiction that would only be resolved by the emergence of modernist architecture in the early twentieth-century.

[59] Kaye (1960, 84), quoting Cust, Sir E., 'A letter to the Right Honourable Sir Robert Peel, Bart. M.P., on the expedience of a better system of control over buildings erected at the public expense; and on the subject of rebuilding the Houses of Parliament', 1835. Cust became the chairperson of the new Parliament's client committee, which removed aesthetic choice from architects entering the design competition by prescribing the style as 'Gothic or Elizabethan' rather than the then dominant neo-classical style (op.cit., 68).

> nation's taste; and, moreover, reflect discredit on both, through the incongruities and absurdities resulting from such injudicious interference (op.cit., 85)[60].

Other architects, who had less artistic zeal and were more business orientated, were prepared to countenance compromise:

> Our modern boards of management seldom treat their architects with that liberal confidence which is requisite in order to derive the proper advantage of their skill and talent. The benumbing effect of alterations forced upon them by ignorance and conceit, has been felt and complained of by many.
>
> It has been said, that the architect who feels the dignity of his art would not, or ought not, to submit to such dictation; but it must be recollected, that those who live to please, must please to live [...] the necessity of employment for the means of living [...] urges them to accept business on terms which their better judgement would condemn (ibid.)[61].

This tension between the art and business of architecture surfaces in the debate on registration in the eighteen-eighties, when the Society of Architects proposed a system of qualifying exams leading to registration and legal protection of the role of the architect. This will be dealt with in the next section on regulation of the Official Recontextualising Field.

Refer to *Diagram 13: Professional Division of Labour Stage 5, late 19th century – Tension between stylistic autonomy and business compromise.*

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[60] Kaye (1960, 85), quoting Hakewill, A. W., '...a Refutation of the Many Mistatements respecting the Practice of Architecture in this Country [by] Sir Edward Cust...'.

[61] Kaye (1960, 85), quoting response by Savage, J., 'Observations on Style in Architecture; with suggestions on the best mode of procuring Designs for Public Buildings...', 1836. Kaye notes that Savage is the probable author of the original RIBA prospectus and code of conduct.

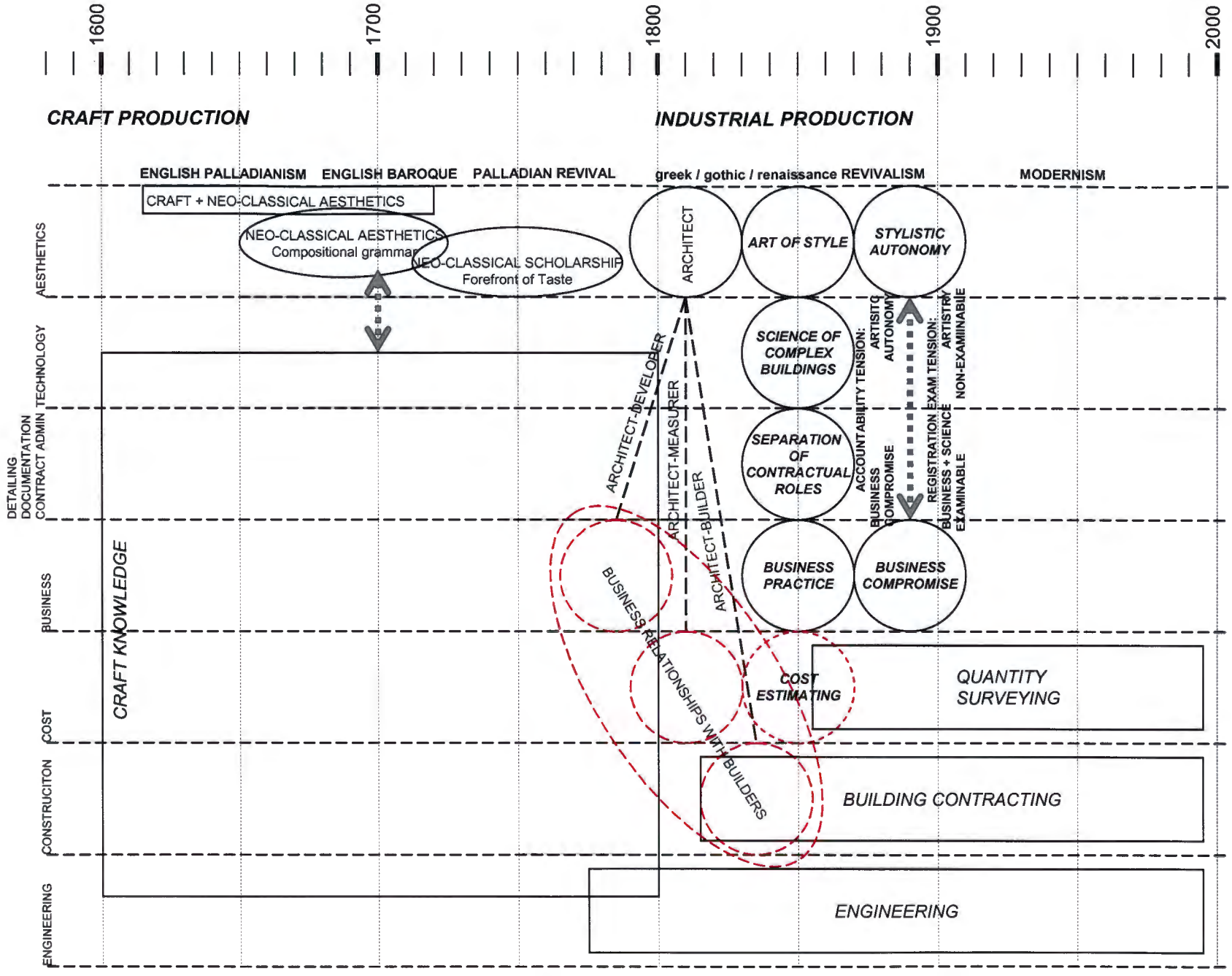

Diagram 13: Professional division of labour **Stage 5** (late 19th c.) **Stylistic autonomy / Business compromise**
(Data from Kaye, 1960)

TWENTIETH-CENTURY PROFESSIONALISATION AND SCOPE OF KNOWLEDGE

At the beginning of the twentieth-century British architecture continued to be revivalist and eclectic, and architects in Europe and the United States took the lead in exploring the use of new industrial materials such as reinforced concrete, the visual expression of function rather than historical decoration, and new models for industrial institutions and cities. This Modern Movement in architecture started to influence British design in the nineteen-thirties (Yorke, 1937).

Modernism shifted the emphasis of architecture 'as art' to architecture as 'functional problem solving', increasing the importance of knowledge of scientific analysis in design – e.g. materials science, daylight calculations, and quantitative town planning:

> ...a trend away from the picture of a creative artist expressing a unique vision, and towards that of a professional seeking to find the best possible technical solution to a highly complex problem; a trend, in other words, away from the artist towards the technician' (Kaye, 1960,167).

After almost one and a half centuries of industrialisation during which architecture had continued to emphasise knowledge of historicist styles, design thinking finally became aligned with industrial production. However this alignment crystallised stylistically, as a 'modern movement' in architectural style driven by a new set of compositional rules[62]. By the mid-twentieth century the hierarchy of knowledge in the architectural region had become organised primarily around the modernist *style* (informed by science and technology), and secondarily around contract documentation and administration, and business management.

Refer to *Diagram 14: Professional Division of Labour Stage 6, early 20th century – Hierarchy of knowledge in the Region.*

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[62] E.g. le Corbusier's 1926 formulation of 'The Five points of the New Architecture': 'pilotis', 'free plan', 'free façade', 'horizontal window' and 'roof garden', governed by a Euclidian geometry of 'regulating lines' and, subsequently, a proportional system based on the golden mean (le Corbusier, 1927, 1954).

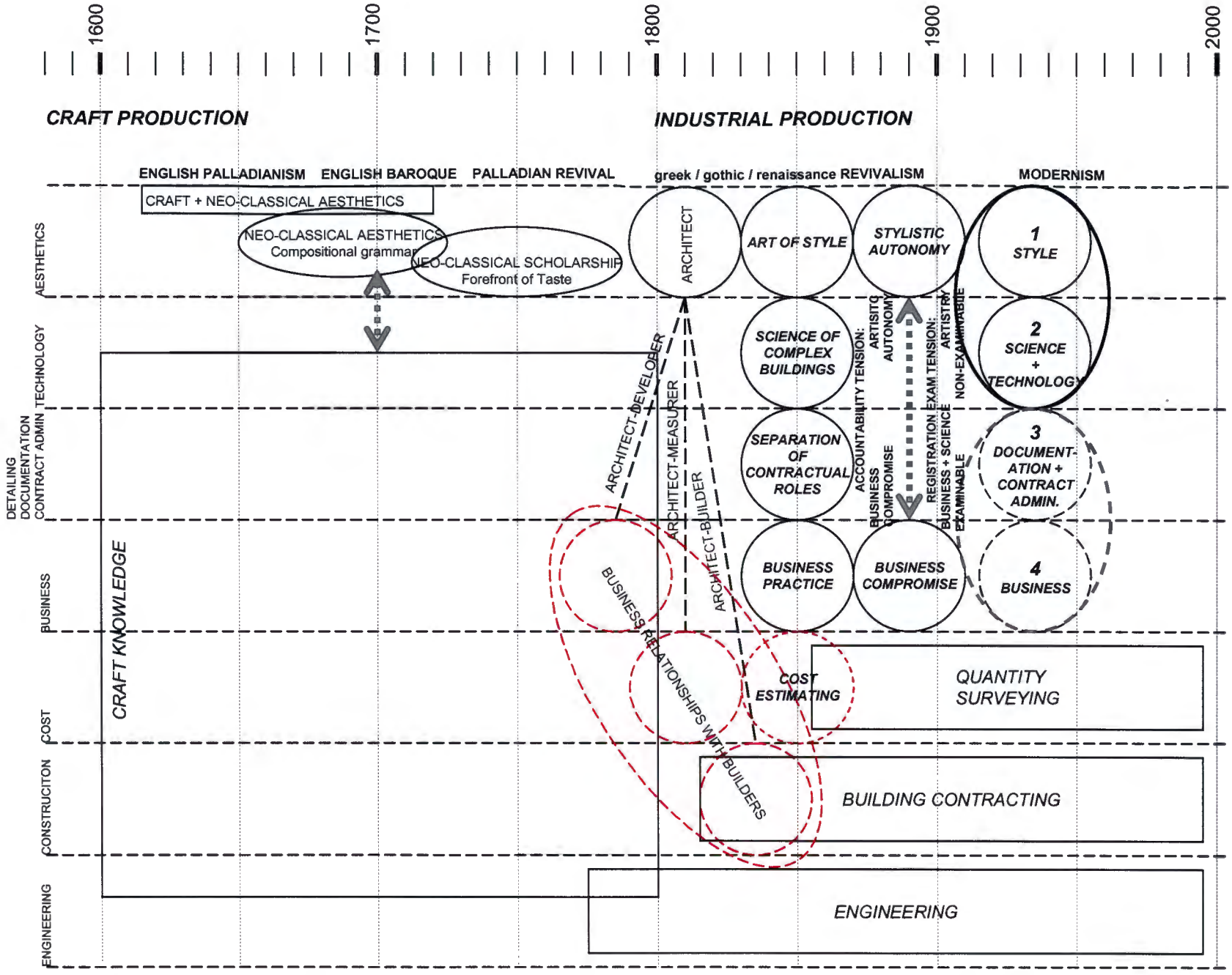

Diagram 14: Professional division of labour **Stage 6** (early 20th c.) **Hierarchy of Knowledge in the Region**
(Data from Kaye, 1960)

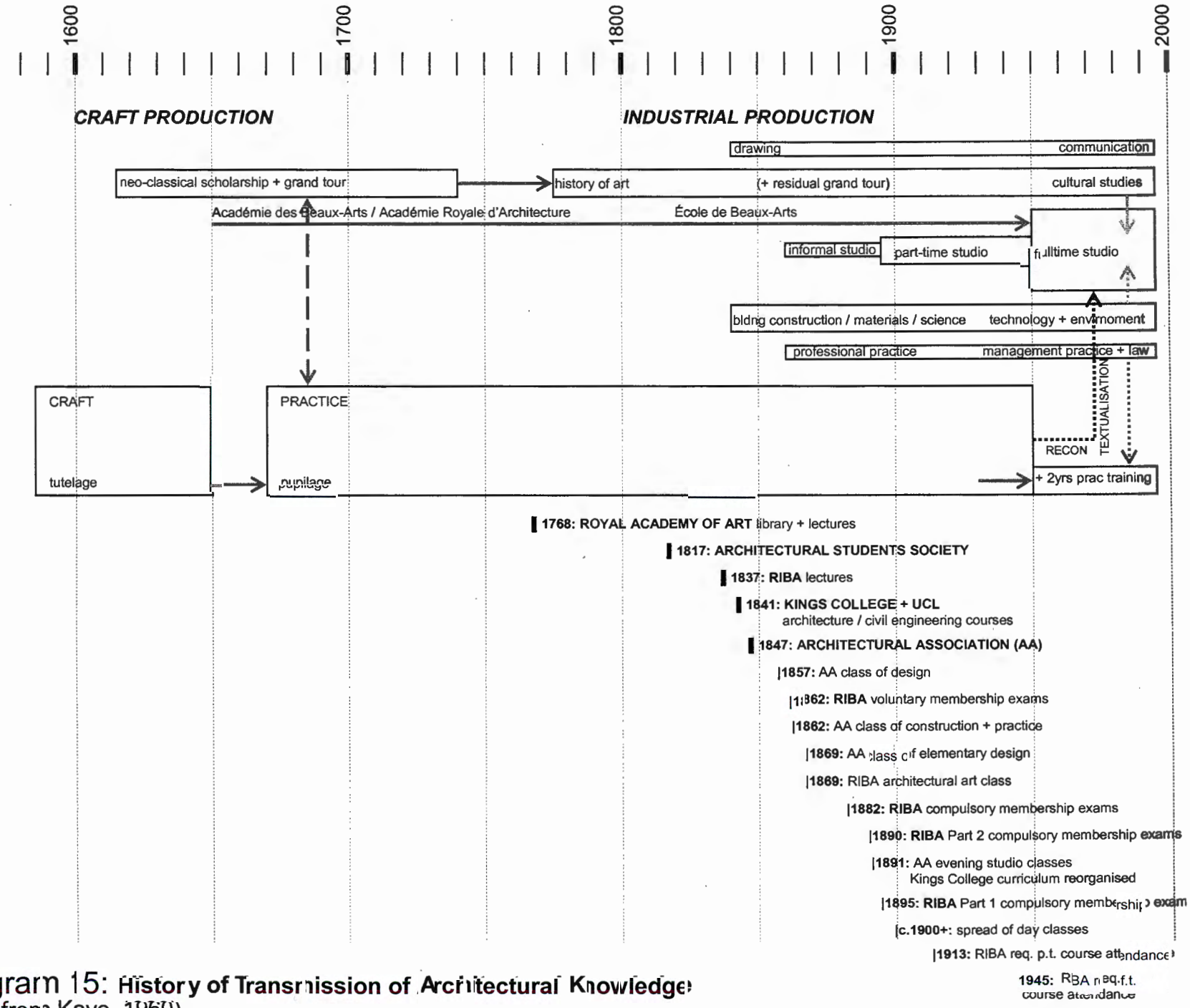

Diagram 15: History of Transmission of Architectural Knowledge
(Data from Kaye, 1960)

4.2 TRANSMISSION OF KNOWLEDGE

In this section the pattern of transmission of architectural knowledge is traced from its origins in craft artisanship translated into pupilage in an architects office, to fulltime courses in architecture centred on the Design Studio as a recontextualisation of the drawing office environment.

Refer to *Diagram 15: Transmission*.

SEVENTEENTH-CENTURY TRANSMISSION

In craft production construction and design knowledge was transmitted via apprenticeship to a master craftsman. The beginning of the separation of design and construction roles marked by Inigo Jones appointment as Surveyor General in 1615 also marks the beginning of a shift in architectural education, which now starts to include the independent study of classical architecture.

Inigo Jones was self-taught:

> [He] fitted himself for his work by his extensive travels overseas, during which he examined and measured the monuments of antiquity, critically annotating his copy of Palladio's *Quattro libri dell'architecttura* as he did so. He also discussed technicalities with Scamozzi in Venice, and filled his sketch-books with the drawings of the Italian masters. In short, he invented a form of architectural education which was to set the model for the next two centuries (op.cit., 36).

This form of architectural education based on the study of classical texts and the 'grand tour' of ancient monuments became increasingly accepted practice in the 18th century, supplemented by work in an architect's office as a pupil – a continuation of the craft tradition of apprenticeship. Nevertheless, entry into the profession was varied at this time, with some designers emerging directly from a craft background.

EIGHTEENTH-CENTURY TRANSMISSION

During the eighteenth-century Kaye notes that 'pupilage or apprenticeship in an architect's office appears to have been a recognized form of training for the architectural student, and such records as are available suggest that about half of the entrants

passed through an architect's office at some time in their career' (op.cit., 47)[63]. While others enter architecture through an artisan route, 'a large number of eighteenth-century architects received no training at all ... though training in an architect's office and travel in Italy were desirable[64], they were by no means essential' (op.cit., 50).

Kaye quotes an essay written in 1773 on 'the Qualifications and Duties of an Architect', attributed to George Dance the Younger, which describes the ideal format of pupilage and travel:

> [...] having received a liberal Education[65], [the youth is] articled to an eminent Architect [...] the first Year or two, he instructs him how to reduce to Practice those Rules of Arithmetic and Geometry he has learned at School, by applying them to Mensuration of the several Artificers Works, taking Care at the same Time that he improves himself in his Drawing [...]
>
> When about two or three Years have elapsed, the Youth is taught to design, and to draw correctly the Plans, Sections, and Elevations of all Kinds of Edifices [...] and our Youth is instructed in Mechanics, Hydraulics and Perspective [...]
>
> [...] his Master, in order to complete his Education, and form his Taste, takes an Opportunity of either sending him or taking him Abroad [...] the Youth now makes the tour of France and Italy, &c., inspects all the ancient Remains of Architecture, measures and makes accurate Drawings of the Ruins, as well as of their original State; studies their Proportions; searches into their Antiquity, explores the Materials of which they are composed, and the Manner in which they are put together, and makes every observation that is likely to prove of the least Utility: when this is done, he turns to the Works of the Moderns, examines *them*

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[63] Summerson traces the beginnings of pupilage to the mid-18th century offices of Taylor and Paine, who 'were among the first architects to take articled pupils into their offices ... thus inaugurating a practice which was to continue for two centuries and is indeed still in being. The significance of this is that from this period we can date the real existence of an architectural *profession*, a profession to which young men are trained up and not merely one whose members have all either graduated from a trade or which they have adopted through a combination of circumstance and predilection, often late in life' (Summerson, 1953, 223).

[64] Summerson gives an account of various 18th century architect's activities on their travels, including Robert Adam (in whom 'the student, the explorer, the architect, and the grand-tourist were united'), Mylne ('who must have been studying in Rome for several years'), Chambers (whose 'studies ranged over renaissance as well as antique work, and were strongly inflected by contemporary France', and who 'had been to China as super-cargo on a Swedish merchantman'), Wyatt (who 'was in Italy, measuring antiquities in Rome and studying architectural painting'), Harrison ('who made a small stir at the Papal Court'), and Soane. Summerson notes that this travel also brought exposure to 'the current architectural thought of the Italian academies and this was at least as important to English architecture as the advantages gained from the measurement of antique buildings' (Summerson, 1953, 252 – 254).

[65] 'When an Infant, he very early discovers an extraordinary Genius for Drawing, and particularly for Drawing of Buildings for Civil Use...(his parents) place our young Gentleman, from the Time he can speak to the age of about Fifteen, under the tuition of the most eminent Masters where he improves himself considerably in Drawing, learns to write, makes no small Progress in Arithmetic and Geometry, attains likewise tolerable proficiency in the Latin tongue, and has some little knowledge of Greek; he makes also no small Improvement in French, and is enabled to speak it with fluency; which from its Universality, we may reasonably suppose will be no small Advantage to him on his Travels' (Kaye, 1960, 48).

> carefully, compares them with the ancient Works, marks their Difference, and improves upon both in his own Designs: Thus he proceeds, 'till he has informed himself of every Thing curious and useful among the Works of either the Ancients, or the Moderns. He now returns Home, at the Age of about Two or Three and Twenty, after having made the very best Use of his Travels, and in a Time after commences Business for himself, and is by Profession an Architect (op.cit., 48-50).

Through this pupilage and travel we see a build up of the applied knowledge of geometry and construction gained through the preparation of measured drawings, instruction in building physics and perspective, the 'correct' design of civic buildings (implicit in correctness being the use of neo-classical canons), careful study of the composition and proportion of ancient and contemporary buildings, and the reinterpretation of this precedent in individual design work. While apparently learning from the performance of a master through the craft-based tradition of pupilage, the pupil is actually learning by modelling the performance of masters from previous eras.

This eighteenth-century summary of the 'qualifications of the architect' does not stop at the achievement of professional status: interestingly the pamphlet goes on to state a dilemma in the knowledge and education – that at the point of entry into the profession it is incomplete and contradictory, and will probably remain so:

> [...and yet] he is still amazingly deficient; he knows nothing of the practical Part of Business, is almost totally unacquainted with the major Part of the Materials used in Building, is a Stranger to their Nature, their use, their Value, etc.; he has little Knowledge of the several Tools, Utensils, and Machines used in Building, and not knowing the practical Part of the several Artificers Works, he cannot fix their Value; and I will venture to assert, if our Architect was now to attend to the practical Part of the Bricklayers, Carpenters, Masons, Plasterers, Plumbers, and Glaziers Work, &c. he would be so far from ever being fully qualified, that, while he was attending to one Branch, he would be losing another; not to mention that his Attention to the Artificers Works would infallibly erase from his Mind almost every Thing he had learned in his younger Years, and he would in Process of Time, for Want of Practice, be almost as Great a Stranger to Drawing and Designing as if he had never learned either (op.cit., 49 – 50).

At this early stage of the formation of the profession there already appears to be a gap in the transmission of professional knowledge: knowledge of business, of costs, of building materials, trades and construction processes – all essential to resolving and implementing a design – does not seem to have been learnt. Dancer points to an apparent contradiction between design knowledge and tacit implementation knowledge at this time: neo-classical design education does not provide adequate knowledge of

practical building work, but if one were to concentrate on learning that knowledge there is a fear that one might loose a grasp of design. At the outset, neo-classical education seems to de-link design knowledge and tacit implementation knowledge, and sets them in opposition[66].

Towards the end of the 18th century the first formal classes in architecture start at the Royal Academy of Art founded in 1768, which set up a library, provided travelling scholarships and occasional medals to promising students (op.cit, 58)[67]. The founding articles included provision for the appointment of a Professor of Architecture with the obligation to deliver six lectures per year[68].

NINETEENTH-CENTURY TRANSMISSION

As the nineteenth-century proceeds pupilage begins to be supplemented by part-time courses which gradually become more formalised as progress is made towards implementing the first compulsory professional membership exams in the eighteen-eighties.

Although Kaye notes that 'the actual training received in most offices was probably both haphazard and inadequate' (op.cit., 62)[69], pupilage in Sir John Soane's rather large office was systematic, and serves as a model of the ideal system of pupilage at the turn of the century. It was:

> [...] a rigorous and comprehensive system of study, usually lasting for a period of six years, and including intensive study of the principles of construction, experience of all the tasks of an architect and not a few of those of the builder, some sort of employment on the works then in hand, and usually ending with a visit abroad (ibid.)[70].

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66 Kaye does not explain how those who enter the profession from an artisan route experienced this dilemma. Did they experience it in reverse – competent in the practical art of building, but 'amazingly deficient' in design?

67 The establishment of the Royal Academy was facilitated by Chambers, whose 'position in relation to the King, first as tutor, then as architect, gave hum a special standing and he used this to forward the foundation of the Royal Academy' (Summerson, 1953, 260).

68 The first Professor was Thomas Sandby (1721 – 1798).

69 Saint (1983, 54 – 57) documents a number of these inadequate experiences of pupils.

70 Notable here is the integration of design and construction knowledge, developed both through study and practical site experience.

Soane became the Royal Academy's second Professor of Architecture in 1806, and 'his carefully prepared lectures there were designed to fit in with the instructions his pupils received in his office' (ibid.). At that time the Royal Academy's library and lectures provided the only voluntary supplement to pupilage:

> The facilities were provided free to those who had qualified by submitting evidence of artistic ability; in the case of architectural students, this consisted of a number of ornamental drawings (ibid.)[71].

The Greek Revival style brought with it an increased need for 'scholarship and skill' (ibid.), and together with the variable quality of pupilage this resulted in increasing efforts by pupils to motivate for courses and teaching facilities. In 1817 'the Royal Academy students formed themselves into the Architectural Students' Society, to press the Council for the formation of a School of Architecture, but without success' (op.cit., 63)[72]. The Architectural Society founded in 1831 aimed 'to provide facilities for architectural students', but establised 'little more than a library' (op.cit., 63, 65).

The founding prospectus of the RIBA proposed 'the formation of a school of drawing, and lectures for students [...] including provision for instruction on professional practice' (op.cit., 77). The RIBA did start a small class in 1838, and an Architectural Art Class in 1869, both of which had little success[73]. It had no further involvement in educational provision, but became instrumental in determining the scope of architectural education from the eighteen-fifties onwards through a regulatory role, which is dealt with in the next section.

In 1841 the first chairs of architecture were established at Kings College and University College, London. At University College the three year course combined architecture and civil engineering, with the curriculum comprising:

> First Year: junior mathematics, natural philosophy (experimental), inorganic chemistry, general geology, and drawing;

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[71] A procedure which marks the beginning of a persistent method of portfolio selection for entry to architectural courses.

[72] Summerson notes that 'a lapse into sentimental antiquarianism' in the 1830's resulted in part from 'the peculiar constitution of the Royal Academy which, far from being a national school of design, was simply a private society whose loyalties inclined to self-interest' (Summerson, 1953, 322).

[73] 'In 1838 the Institute started a class of student members ut the education it offered them was sporadic and piecemeal. Students were encouraged to 'draw from the antique' using the collection of casts in the Institute's museum, were given occasional lectures in chemistry, botany, geology, building materials, construction and mechanics, and were offered prizes and medals for essays and designs and a few traveling bursaries' (Mace, 1986, 113).

> Second Year: senior mathematics, natural philosophy (mathematical), civil engineering, architecture, economic geology, and drawing;
>
> Third Year: civil engineering, architecture, organic chemistry, and drawing (op.cit., 93)[74].

Various classes also started to be set up at regional colleges, and at a Government School of Design for ornamental art (op.cit., 91-93). None of these provided comprehensive courses, but they did provide some opportunities to supplement pupilage.

Pupils remained frustrated with the 'haphazard instruction they received in the office'[75], and were anxious to attain 'a systematised form of education' (op.cit., 103). Eventually they took the initiative of setting up their own educational support system for evening study, by pooling their resources and establishing the Architectural Association (AA) in 1847 - a self-help proposal which Kaye and Jencks note fitted the Victorian ethos of the time[76]: the young founders 'were attracted to prevailing ideas of self-determination characteristic of the Victorian age: a mixture of laissez-faire, self-help and the anarchistic doctrine of mutual aid' (Jencks, 1975, 151). This self-determination also infused these pupils' educational goals, centred on individual creativity:

> Art lies not in the mere obtainment of knowledge of facts or the acquirement of skill in operation by laid-down rule and rote, but in attaining a power of invention – fancy – creation [based more on] self-education by careful observations and thought – self-dependent and within, than anything which can be communicated by systematic instruction from without (foundation address by Robert Kerr, quoted in Jencks, 1975, 151).

In 1857 the AA finally managed to set up a regular fortnightly design class (where the pupils taught each other).

Kaye summarises this educational scene:

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[74] These courses were attended by thirty to forty students each (Kaye, 1960, 102).

[75] Dickens' 'Martin Chuzzlewit', published in 1843, caricatures this malaise: Chuzzlewit is pupil to the architect Pecksniff, who 'to the world [is] a gentleman, a scholar and an artist; but he builds nothing and lives on premiums extorted from "pupils" to whom he teaches nothing' (Summerson, 1947, 1).

[76] Summerson's centenary history of the AA provides the full story, starting with letters to the trade press 'complaining in modest, moderate but distinct terms of the complete lack of any provision to supplement the thin educational diet of an architect's pupil' (Summerson, 1947, 2).

> The general picture of architectural education in the eighteen-sixties and seventies remains that of pupilage in an architect's office, possibly supplemented by evening classes at one of the various institutions: the AA, whose class in design was held fortnightly; the Government Schools of Art, for instruction in drawing; the lectures at the Royal Academy; or the RIBA's students' class, admitted by the Council to be 'merely a nominal one' (Kaye, 1960, 102)[77].

The RIBA adopted a membership exam policy in the late 19th century, starting with voluntary exams in 1855 and leading to the commencement of compulsory exams in 1877. This had the effect of spurring the development of courses in architecture offered outside of the system of pupilage. From 1913 compulsory attendance at these courses became a requirement of professional admission, but they remained part-time evening classes until the mid-twentieth century, attended in combination with practical office experience through the system of pupilage.

TWENTIENTH-CENTURY TRANSMISSION

Various European conferences on architectural education held in the nineteen-twenties[78] signalled the influence of French neo-classical Ecole des Beaux-Arts pedagogy on the British teaching model, particularly its 'atelier system' of studio based education. This provided an effective substitute to the office as a basis for learning applied knowledge. However the system of full-time studio based education was taken up faster in other parts of the world such as the US than in the UK, and for the next twenty years the dominant form of education was still that of a part-time supplement to office training. In 1939 the RIBA Board of Education appointed a Special Committee to review education. Their 1945 report recommended five years of full-time training: '...while practical experience in an office was considered a necessary part of training, the report made it clear that pupilage could no longer be considered as an acceptable form of architectural education' (op.cit., 161).

From then full-time attendance started to be required at courses, the system of pupilage with part-time study fell away,[79] and a formal full-time system of education came to be established - based on the studio system. This finally marked the end of the craft

[77] It is not clear why Kaye (1960) does not mention the two University courses started in 1841 in this summary. His text indicates that the RIBA is supportive of the AA's self-help model, making the occasional financial contribution, but he includes no record of the RIBA's response to the University courses.

[78] A Franco-British conference was held in Paris in 1920, and an International Congress in London in 1924.

[79] The 'Oxford conference' of 1958 agreed to abolish the part-time courses completely, and they were phased out in the 1960s (Crinson and Lubbock, 1994, 191).

induction influence in the modern period. However a form of pupilage continued in a requirement for two years of practical experience after graduation from the full-time courses. While courses in professional practice did form a minor part of the full-time curriculum, knowledge of the implementation conventions of professional practice mainly remained embedded in this residual pupilage.

Diagram 15: Transmission summarises this history, indicating the start dates of courses which grew into the five subjects which remain the basis of the current RIBA outline syllabus, i.e.:

- History of art and architecture classes which started in the 1760s, and which in the development of architectural subjects has the longest tradition going back to the 17th century practice of independent neo-classical scholarship and the grand tour of ancient monuments around which the profession had first constituted itself. This developed into the current subject 'Cultural Context'.
- Courses in drawing which started in the 1840s, developing into the current subject 'Communication'.
- Courses in building materials, construction and building science which started in the 1840s, developing into the current subject 'Technology and Environment'.
- Courses in professional practice which started in the 1860s, leading to the current subject 'Management Practice and Law'.
- And lastly, design classes which started on a part-time basis in the 1890s (following informal tutoring amongst pupils themselves which started in the 1860s), remaining the current subject 'Design'.

This organic and incremental recontextualisation of the region of architectural knowledge into five (initially part-time) subjects ran in parallel with the system of pupilage as the major vehicle for transmission right up to the 1950s – i.e. architectural knowledge and its transmission remained primarily embedded in the field of production of discourse. The big recontextualising move comes in the 1950s, when transmission shifts from pupilage with part-time attendance at classes to full-time studio-based design classes, with the design studio serving as a recontextualised drawing office. However the pattern of transmission which was adopted in this full-time design studio remained that of a centuries old tradition developed at the French École des Beaux-Arts (Picon, 1992), based on:

> '[a] demanding and rigorous [teaching method] requiring scholarship (the knowledge and appropriate use of historical precedent), draftsmanship (the acquisition of visualisation and drawing skills), and the mental discipline and physical stamina needed to formulate, develop, and present an architectural project under intense pressure. This methodology was meant to strengthen mental discipline and to instruct and train students on several levels: first, in the ability to generalise, typify and synthesize programme requirements rapidly; second, to encourage a logical approach to the project; and third, to develop and improve drawing skills (Caragonne, 1996, 46).

This neo-classicial studio tradition emphasises the link between the study of 'cultural context' and 'design' (closest to each other in the horizontal knowledge structure), but de-emphasises the link between studies of 'technology and environment' and 'design' (furthest from each other in the horizontal knowledge structure and operating across the dual code), and does not link 'management practice and law' with 'design' studies (which tend to breach the vertical and horizontal discourse divide) (refer to diagrams 2 and 5). Since the earliest formulation of this curriculum, studies in professional practice (management practice and law) have been only a minor component of the syllabus. In fact, despite the 1950s shift away from pupilage as a basis for transmission, a residual pupilage remained in the form of two years of practical experience after graduation from full-time classes in which the management of implementation and its relation to design was transmitted tacitly – i.e. this was never fully recontextualised[80].

4.3 OFFICIAL RECONTEXTUALISING FIELD

In this section contestation over the definition of professional entry exams is traced, which generally divide along art and science lines of argument. As the state sanctioned agent of the Official Recontextualising Field, the RIBA always brings these opposing tendencies into balance in the agreement on the scope of exams. As these agreements precede the actual teaching, the exam regulation compromise then shapes the teaching practices. In the processes of balancing the traditions of arts education with the new pressures for scientific knowledge, segmental implementation discourse – usually the starting point for proposals for exams – is generally excluded, as will be shown below.

Refer to *Diagram 16: Tabulation of Exam arguments and agents.*

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[80] From here on in the argument tacit implementation knowledge will be called segmental implementation discourse.

DIAGRAM 16: TABULATION OF EXAM ARGUMENTS + AGENTS (Data from: Kaye, 1960; Crinson+Lubbock, 1994)

		AGENTS	PROFESSIONAL ROLE: ART	EXAMINABLE KNOWLEDGE: ARTS	EXAMINABLE KNOWLEDGE: SCIENCES	PROFESSIONAL ROLE: SCIENCE + BUSINESS	AGENTS
			Visual knowledge: stylistic scholarship + aesthetic taste	**Creative authority + artistic autonomy**	**Acceptance of business terms + aesthetic compromise**	**Implementation knowledge: industrial production + project delivery**	
VOLUNTARY MEMBERSHIP EXAMS	1830	**RIBA** (founding prospectus)		Proposal for *membership* exams (not implemented initially): **theory + practice of design**	**theory + practice of construction + business**		**RIBA** (founding prospectus)
	1840						
	1850				...based on **technical competence**	1855: accepts proposal for voluntary *membership* exam...	**RIBA** officials (business)
	1860	**Architectural Association** (pupils)	Motivate for compulsory diploma conferring right to practice as a qualified architect...	...based on architecture as an **art**			
		RIBA members (art)	artistic design ability is innate and...	...cannot be examined	...attested articles at end of appreciceship confirm competence	Oppose pupils' proposal for exams: architecture can only be learnt in the office where the practical work is done and...	**RIBA** members (business)
		RIBA		1863: Voluntary RIBA *membership* exams: **Design / History**	**Science / Technology** (+ Professional Practice as a minor component)		**RIBA**
COMPULSORY MEMBERSHIP EXAMS	1870				...**Professional Practice** only	1877: Agree to compulsory exam for RIBA *membership* in...	**RIBA** officials (business)
	1880	**RIBA**		1882: Compulsory exam for RIBA *membership* **Design / History**	**Science / Technology** (+ Professional Practice as a minor component)		**RIBA**
		RIBA (old guard)	1889: Object to Soc. Of Architects registration Bill, which is defeated in Parliament			1884: Propose *registration* exams linked to legal protection of role re competition for work with non-architects	**Society of Architects** (breakaway of young associates from RIBA)
		RIBA		1887: Scheme for 'complete system of education' **Arts**	**Sciences**		**RIBA**
		Architectural establishment (senior fellows of RIBA + succesful non-RIBA architects)	1889: Imagination + aesthetic judgement...	...cannot be examined			
	1890	**'Memorialists'**	1891: Oppose legislative protection of role, as architecture is a fine art and good design cannot be legislated	Artistic qualifications cannot be examined, although...	...**construction + sanitation** could be examined		
					...the need to examine **scientific + business knowledge**	1891: Architecture not only an art, but also a science and business. RIBA agrees it cannot prescribe artistry, but insists on...	**RIBA** (business)
		RIBA		1890 - 95: Revised *membership* exams implemented **Arts**	**Sciences**		**RIBA**
	1900	**RIBA** Board of Education		1905: Recommend 2yr full-time + 2yr part-time (*membership* exam validation) **Design + History** (analysis rather than archeology)	Emphasis on **Construction** throughout		**RIBA** Board of Education
						1906: Adoption of statutory *registration* policy	**RIBA**
REGISTRATION EXAMS	1910	**RIBA** Board of Education		1913: 2 - 4 day design exam, and thesis elective in either: **History / Design / Applied Science**		Compulsory course attendance for membership exams	**RIBA** Board of Education
	1960	**RIBA** Board of Education		1962: Thesis electives+design exam reomved in lieu of **Full-time Studio Projects**			**RIBA** Board of Education
	1970	**RIBA** Board of Education		1970: **Part 1 + Part 2 Studio-based Design Curriculum**		1973: **Part 3 Prof. Prac. + Management** statutory registration exam	**RIBA** Board of Education

NINETEENTH CENTURY REGULATION OF THE OFFICIAL RECONTEXTUALISING FIELD

The initial prospectus of the RIBA prepared in **1834** proposed that membership be linked to examination, and that the membership exam should include:

> The theory and practice of design or competition in Architecture.
> The theory and practice of construction.
> The usual and customary practice of Business[81].

Kaye notes that this statement in the 1834 RIBA prospectus 'was the first suggestion of an examination in architecture'; but it was not to be implemented for another 30 years[82], as the RIBA's first priority was to establish 'professional respectability' and to exclude 'the disreputable, that is, those with trade contacts, and until this was done, little was attempted in the way of a guarantee of competence' (Kaye, 1960, 77, 92). A proposal for a membership exam was accepted by the RIBA in **1855**, on the basis 'that it was to be a test of *technical competence*, not one of artistic taste', and that it be a voluntary exam conferring no diploma (op.cit., 98, emphasis added).

The AA students, who had formed themselves into a study group in **1847**, motivated for examinations and a diploma to certify competence at the completion of courses, conferring the right to practice as a qualified architect (i.e. a professional entry exam) - arguing that teaching should be based on *'architecture as an art'* (op.cit., 104, 96, emphasis added). This idea was strongly opposed by many members of RIBA, who it seems feared loosing their 'premiums' from pupilage (op.cit., 127). Mace notes that 'many senior and successful Institute members derived a considerable income from the system of articled pupilage and had no interest in fostering alternative methods of training' (Mace, 1986, 115). Their position was that the record of 'attested articles which every pupil received at the end of his apprenticeship' was the confirmation of competence (Kaye, 1960, 100, 128). This argument in favour of pupilage was expressed by the president of the RIBA in **1863**:

> To learn *practical architecture* effectively it must be learnt in the office where the work is constantly going on; where the working drawings are actually made by

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[81] Kaye (1960, 77) quoting Institute of British Architects, 'Prospectus for the formation of a society to be called the Institution for British Architects', 1834.

[82] '...the original regulations of the Institute adopted in July 1834 merely stated that Associates must be at least twenty-one years old and have been engaged in the study or practice of civil architecture for less than seven years' (Mace, 1986, 113).

> which the workmen execute everything. That can only be learnt in the office of an architect (op.cit., 103, emphasis added)[83].

This counter-argument to entry exams, based on the strength of the craft tradition of pupilage, was matched by an artistic counter-argument - that 'a test of technical skill was of little value without reference to *artistic capacity*', and that as 'talent for architectural design was innate' and not a skill there was no purpose in an exam (op.cit., 104, emphasis added).

There were thus two opposing tendencies in the second half of the eighteenth-century vying over the definition and assessment of architectural knowledge:

- increasing professionalism, by business-oriented architects whose aim was professional regulation (and ultimately statutory qualification and registration), on the basis of the technical and professional competence required in the office;
- and increasing romanticism, by artist-oriented architects who were opposed to examination and registration on the basis that artistic capacity was an innate talent which could not be tested[84].

Despite these initial objections, the RIBA resolved to take 'upon itself the labour of constituting an Examination to promote a systematic professional education'[85]. The exam was to be structured in two sequential parts[86] and although the RIBA's initial objective in 1855 was that it 'be a test of technical competence, not one of artistic taste', it turns out that it did include design, as well as literature and aspects of art education. For entry to the 'Class of Proficiency' (later to become the Part One exam) the student had to first submit a portfolio 'consisting of a measured sketch, a perspective sketch, a drawing of an ornament, and a perspective view with working plans, sections, elevations and a specification' (op.cit., 99). Seven subjects were then examined (ibid.)[87]:

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[83] Kaye (1960, 103), quoting W. Tite's submission to a commission of enquiry into the Royal Academy, 1863.

[84] Kaye comments that the RIBA 'came in between these two views...and by 1911 the professional viewpoint had prevailed' (Kaye, 1960, 143).

[85] Kaye (1960, 99), quoting 'RIBA Journal (1895, II, 138).

[86] This two part (or 'progressive' system) is still the basic structure of architectural education in Commonwealth countries.

[87] Crinson and Lubbock (1994, 184 – 192) give some description of the content of these exams.

SUBJECT	MARKS
Drawing and Design	1,500
History and Literature	1,250
Construction	750
Materials	750
Mathematics	750
Physics	500
Professional Practice	500

In this syllabus design / history and science / technology are equally weighted at 2,750 marks each, or 46% of the total. Professional practice weighs in at 8%.

For entry to the 'Class of Distinction' (later to become the Part Two exam) a portfolio also first had to be submitted 'consisting of more complex measured sketches, drawings from the human figure, subjects of landscape gardening and specimens of modelling and carving' (ibid.). Eight subjects were then examined (ibid.):

SUBJECT	MARKS
History and Literature	700
Drawing and Design	600
Mathematics	600
Professional Practice	500
Construction	500
Materials	400
Mathematics + Physics applied to practical purposes	400
Languages	300

In this syllabus professional practice remains a minor component, with 12.5% of the marks. Science / technology comprises half the marks (1,900 or 47.5%) and design / history comprises a third (1,300 or 32.5%) (in an 1870 revision these were brought into equal weighting of 42.5%) (Crinson and Lubbock, 1994, 185).

The first of these exams was held in **1863**. They were never very successful, as few candidates presented themselves for a voluntary assessment which conferred no qualification. Nevertheless the RIBA's voluntary exam format did have the effect of intiating more systematic course development. In 1862 the AA added a 'Class of

Construction and Practice' to its 'Class of Design', and an 'Elementary Design Class' in 1869 (Kaye, 1960, 100)[88].

Members of the AA continued to motivate for compulsory exams which conferred a diploma, and by the 1870s were being supported by the provincial associations, who proposed discussion on:

> The absurdity of a profession like that of Architecture being without systematic examination for entrance, and the course to be pursued to render such an examination legally necessary before an Architect can practise (op.cit., 129)[89].

In 1877 the RIBA finally agreed to a compulsory (one stage) exam for Associate membership, to commence in **1882**, which was to be 'in reference to *Professional Study and Practice only*' (op.cit., 129, emphasis added). However as with the 1863 exam it, too, ended up including design and history (as well as 'ornamental features'), with professional practice reduced to a minor component. Preliminary work had to be submitted, including 'the plan, elevation and section of a building of the candidate's own design, together with a perspective drawing, a sheet of details, and drawings of ornaments' (op.cit., 130). Seven subjects were then examined:

SUBJECT	MARKS
Design, including Plans, Sections and Elevations of a set building	200
History	100
Mouldings, Features and Ornaments	100
Materials, Construction, etc.	100
Sanitary Science, Strength of Materials, Shoring, etc	100
Specifications and Costing	75
Professional Practice (Contract Law)	25

In this syllabus Design / History comprises 400 marks or 57% of the total, pure knowledge in mathematics and physics disappears, applied knowledge of Science / Technology comprise 200 marks or 29% of the total, and Practice / Management (including 'specifications and costing') comprises the minor component of 100 marks or 14% (with Professional Practice itself relegated to a mere 3.5% of the total marks).

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[88] Kaye notes that 'these three classes were the backbone of the AA system of study' to which various other short-term classes were added at different times, e.g. in life drawing, water-colours, chemistry, surveying, science, and reading groups (Kaye, 1960, 100).

[89] Kaye (1960, 129), quoting the Architectural Alliance of provincial societies, 'The Architect' (1869, I, 272).

There was a good response to this compulsory membership exam, and the RIBA then turned its attention to regulating education itself (op.cit., 132). In **1887** it decided to 'prepare a scheme for a complete system of education' based on the two stage system of intermediate ('for the general principles of art and construction') and final exams (op.cit., 130). For entry to the intermediate (part one) examination 'testimonies of study' had to be submitted 'consisting of eleven sheets of drawings of classic details, mouldings, freehand sketches and details of joinery' (op.cit., 131). Ten subjects were examined, now specifically grouped into *arts and sciences* (ibid.):

SUBJECT	MARKS
Arts:	
Varieties of Classic Ornaments	75
Characteristic Mouldings and Ornaments of Each Period	75
Orders of Greek and Roman Architecture	50
English Architecture 1066-1500, and thereafter	50
Sciences:	
Elementary Principles of Construction	40
Materials	40
Calculation of Strengths	40
Elementary Physics	40
Mensuration, Land-Surveying and Levelling	40
Applied Plane Geometry	40

In this syllabus arts and sciences are equally weighted at 250 and 240 marks respectively[90], and there is no professional practice exam.

For entry to the final (part two) examination, 'more detailed testimonies of study were required' (ibid.). Nine subjects were examined, also grouped into *arts and sciences* (ibid.):

[90] Crinson and Lubbock (1994, 187) note that by 1902 the arts and science subjects in this exam had become exactly equal weighting at 250 marks each, with different science subjects: elementary applied construction (125), theoretical construction (75) and descriptive geometry (50).

SUBJECT	MARKS
Arts:	
Design of a Set Building	275
Architectural Features, Mouldings and Ornaments	150
History	100
Sciences:	
Construction	100
Principles of Hygiene Applied to Architecture, Ventilation	100
Nature of Materials	75
Strength of Materials	75
Specification and Estimates	75
Professional Practice	50

In this syllabus design / history comprise half the weighting with 525 marks or 52.5%, science / technology comprise a third with 350 marks or 35%, and practice / management (including 'specification and estimates') comprise 125 marks or 12.5%, with professional practice relegated to 5% of the total marks. By 1902 professional practice had been dropped altogether (Crinson and Lubbock, 1994, 188).

In 1884 young associate members of the RIBA broke away to form a rival organisation, the Society of Architects, whose aim was to achieve statutory protection via a professional entry exam. This idea was opposed by the architectural establishment whose ethos was voluntary regulation of the profession, and their opposition to the statutory registration of architects was conflated with opposition to the RIBA's proposed membership exams. A lobby of influential architects (comprising both RIBA members and non-members) argued against examination, on the basis that *architecture was an art*. They wrote to the RIBA as follows:

> We maintain that no one is entitled to be declared an architect merely because he has answered the questions of an examiner in such subjects as admit examination, inasmuch as, without *imagination, power of design, and refinement of taste* and judgement, he can have no true claim to the title; and these are qualities that cannot be brought to the test of examination. Consequently we deprecate any attempt to make examination and diploma conditions of admission to the pursuit of architecture (Kaye, 1960, 137, emphasis added)[91].

The RIBA's response was to disclaim any link between its membership exams, which commenced in 1885, and the legislative initiative for registration exams (ibid.). However

[91] Kaye, 1960, 137, quoting 'RIBA Proceedings' (1889).

the anti-registration exam lobby grew, becoming known as the Memorialists after the publication of their 'Memorial to the RIBA' in 1891, stating:

> [...] that the attempt to make Architecture a close profession, either by the Bill now introduced into Parliament or by any similar measure, is opposed to the interest of *Architecture as a fine art.*
>
> We believe that, while it is possible to examine students in construction and matters of sanitation, their artistic qualifications (which really make the architect) cannot be brought to the test of examination, and that a diploma of architecture obtained by such means would be ... useless as a guide to the public...
>
> [...] We think that no legislation can protect the public against bad design (op.cit., 138).

The 'interest of architecture as a fine art' also implied for the Memorialists that links to other arts needed to be maintained:

> Architecture has for some time been less constantly associated with the sister arts of painting and sculpture than, in our opinion, is desirable and we think that examinations and diplomas, by raising up artificial barriers, would have the tendency still further to alienate these branches of art (ibid.)[92].

The RIBA replied that 'it is in sympathy with the memorialists in that it does not attempt to make architecture a close profession', but disagreed with their fine arts bias:

> The Institute [...] recognizes the fact that an architect ought to be many sided. He should be an artist, a man of science, and a man of business. The Institute cannot make an artist of him, but it can see that before he enters its ranks, he shall have a *knowledge of certain scientific facts and business matters*, which are as necessary for architects as artistic attainments (op.cit., 139, emphasis added)[93].

The Memorialists responded that the RIBA placed 'too much insistence on bricks and mortar, and not enough on art' (ibid.), and the Institute continued to insist that 'the ideal architect is the man in whom these qualities are united – who is an artist, a constructor, and a man of business' (op.cit., 140). The outcome of this debate was that the issue of statutory registration and professional entry exams was put into abeyance until the nineteen-thirties[94].

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[92] Kaye, B. (1960, 138) quoting 'The Times' (March 3, 1891).

[93] Kaye, B. 1960, 139, quoting 'RIBA Proceedings' (1891).

[94] The Society of Architects, the initial proponents of registration, re-joined the RIBA in 1925. Compulsory statutory registration and examination of qualifications was finally implemented in 1931.

However the RIBA's compulsory membership exams went ahead, with the new Final exam replacing the 1882 exam in **1890**, and the Intermediate exam becoming mandatory in **1895**. These membership exams then impacted on the existing courses, which started to be re-arranged accordingly. Kaye gives two examples of this:

- the AA shifted from its self-help ethos to a 'systematic course...with a studio and paid instructors' consisting of two two-year components, still based on evening classes until 1901 when it opened a day school (op.cit., 132, 142);
- the Kings College, London, curriculum was re-organised in 1891 (op.cit., 142).

More formalised courses based on the RIBA exams then spread throughout the provinces, being established variously by independent architectural societies, Art Schools, Technical Colleges, and Universities (University of Liverpool in 1894, and Manchester University in 1903) (op.cit., 141-2).

Kaye comments that 'the examinations preceded the education, instead of vice versa. Provisions for full-time systematic education only began to come up in the eighteen-nineties, long after the Institute's examination system was in force. Consequently, architectural training has tended to be governed by the needs of the examination syllabus, rather than by the needs of architectural practice' (op.cit., 157).

A consequence of these exams was the erosion of the system of pupilage, which then started to be replaced by full-time study:

> The pupilage system dominated architectural education throughout the nineteenth-century, and all schemes of formal instruction, even including the courses offered by the university colleges, were intended to supplement office training. During the last few years of the century, however, [...] suggestions that some kind of formal instruction should replace office training were first made [as] it began to become clear that the existing system was not adequate to equip candidates for the Institutes examinations with the technical knowledge necessary to pass them (op.cit., 156).

TWENTIENTH-CENTURY REGULATION OF THE OFFICIAL RECONTEXTUALISING FIELD

In 1904 the RIBA set up a Board of Education, with a membership of 16 included four non-RIBA members (who were all Memorialists). The Board's **1905** review of education recommended:

- a syllabus with 'an emphasis on construction throughout, and, in history and design, on analysis rather than archaeology';
- a four year course, with two full-time years and two years divided between the office and advanced courses (op.cit., 158).

Kaye suggests that the proposal to shift from part-time education as a supplement to pupilage to full-time education with reduced exposure to the office arose 'partly, no doubt, owing to the need for theoretical instruction occasioned by the use of new building materials and methods of construction' (op.cit., 159).

In both halves of this course 'the syllabus was reduced to a simple list of five subjects "governed by the principle that construction is the basis of architecture, and its correlative principle that architecture is the interpretation of construction into forms of aesthetic value" ' (Crinson and Lubbock, 1994, 188)[95]. These subjects were building materials / construction / architectural drawing / design / history of architecture. There was no professional practice exam, which 'was to be left for study in the architect's office' (op.cit., 189).

These proposals were accepted by the RIBA, and students of schools which were in compliance were exempted from the RIBA's entry exams, a policy of 'recognised schools' which still applies[96]:

> '[...] by 1931 twenty-seven schools had been recognised for exemption from either the Intermediate only or both the Intermediate and Final. Of these twenty-seven schools one was in Australia, three in Canada, two in South Africa and one in India (Mace, 1986, 115).

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[95] Quoting the RIBA Kalender, 1905-6: x.

[96] '...recognised schools were required to base their syllabuses on that laid down by the Board of Architectural Education at the Institute, and were subject to inspection by the Board's inspectors' (Kaye, 1960, 159)

The RIBA's decision in 1906 to adopt a statutory registration policy included decisions to:

- empower the RIBA to 'supervise the education and examination of candidates';
- 'make an approved course of education compulsory', based on the existing system of 'progressive examinations' (Kaye, 1960, 148).

By 1913 this goal had been achieved, in that 'no one was to be permitted to take the qualifying examination for associateship unless he had taken an approved course of education' (op.cit., 149). At this time the Board of Education changed the exams to include *options* in either history of architecture, applied science, or design. The Intermediate exam then comprised (Crinson and Lubbock, 1994, 189):

SUBJECT	MARKS
Testimonies of study (drawings)	100
History of architecture	250
Construction	250
Special paper in *either*: history of architecture, mathematics and mechanics, or design	200

Professional practice returned to the Final exam as a minor component, which now comprised (op.cit., 190):

SUBJECT	MARKS
Testimonies of study (designs)	200
Thesis in *either:* historical architecture, applied building science, or design and decoration	350
Design (two day exam)	350
Construction	150
Building materials	50
Hygiene, drainage, ventilation, heating, lighting, water	50
Professional practice	50

In 1925 the Final design exam was extended to four days, and a one day design exam was introduced into the Intermediate exams in lieu of the optional exam in arts, sciences or design. The thesis (with these same options) was removed from the Final exams in 1962 (ibid.), when the full-time design studio had become established.

Mace notes that 'between 1964 and 1968 the whole system of RIBA exams was reviewed and a new structure was adopted in 1970' (Mace, 1986, 116 - 117). It was

agreed to change the Intermediate exam to Part One, the Final exam to Part Two (following the second period of full-time study), and to introduce the Part three exam in professional practice (following the period of professional experience, and coming fully into effect in 1973) (Crinson and Lubbock, 1994, 192).

The sequence of these exam proposals, arguments and counter-arguments is scheduled in Diagram 16, which indicates the two broad lines of argument – architecture as an art (on the left of the table) and architecture as a science and business (on the right). Three cycles of examination debate occur:

- the establishment of voluntary RIBA membership exams (1830 – 1860);
- the establishment of compulsory RIBA membership exams (1870 – 1890);
- the establishment of statutory registration exams (1960 – 1970).

The first two follow a similar cycle of argument:

1. The debate commences with agents of business who are officials within the RIBA proposing a test of technical competence in professional practice and construction.
2. This is followed by agents of creative design who are eminent practitioners both within and outside of the RIBA (as well as novices) arguing against a test of technical competence on the basis that architecture is a fine art.
3. The debate is resolved by an agreement brokered by the RIBA which gives equal weighting to evaluation of applied arts and sciences; in this process however, the management and practice of architecture – the initial driver for examination – becomes a minor component of the exam.

In-between the second and third cycles there is a period when the roles of the architect as historian, artist and scientist are given some equivalence with the inclusion of elective studies in these areas. However this suggestion that there may be different kinds of architect is closed down once the design studio has become fully established in the mid-20th century.

Full-time studies were followed by one year of professional experience, extended to two years in the 1960s when the requirements for this 'practical training' were tightened up (Layton, 1962). An exam entirely in matters of professional practice and management to

be taken after this period of work was instituted at that time (the 'part three' professional registration or entry exam), finally achieving the objectives of the RIBA's initial proposals for exams, namely the 1855 proposal for voluntary membership exams based on technical competence only, and the 1877 proposal for compulsory membership exams based on professional practice only - and as is still the case in the current RIBA outline syllabus for Part Three (refer to Diagram 3). Although management and practice are now examined, it can be seen that horizontal implementation discourse remains embedded in professional experience *outside* of the recontextualised design-based curriculum[97].

4.4 SUMMARY OF THE HISTORICAL DEVELOPMENT AND RECONTEXTUALISATION OF DISCIPLINARY KNOWLEDGE

Architecture emerged as profession in the UK in the separation during industrialization of the master craftsman's roles of designer and implementer. However this 19th century design role was influenced by the 18th century identity of the 'gentleman architect' schooled in neo-classical compositional principles. The body of professional knowledge grows from this source in historicist aesthetics, in sharp contrast to the parallel definition of an engineering body of knowledge centered on new industrial technologies.

In the 19th century professional associations of architects developed in order to separate the business relationships of architects from builders on the one hand, and architects from builders' 'measurers' on the other, as fraudulent activities between these parties had undermined the confidence of clients in the credibility of the emerging profession. Various initiatives to formalise these organisations coalesced around the formation of the RIBA, whose code of conduct explicitly excluded any collusion with builders or any work as builders' 'measurers'. In so doing knowledge of the relationship between design and the economics of property development was excluded from the emerging official disciplinary knowledge base, followed by a gradual exclusion of knowledge of cost estimating.

Contractual divisions of labor between architects and builders arising from increasingly complex building types and construction technologies resulted in the inclusion of detail design and documentation, and contract administration, in architects' scope of work, but

[97] With the exception of the minor subject 'management practice and law' in the design-based curriculum.

this technical knowledge sits uncomfortably with the aesthetic knowledge derived from neo-classical compositional arts.

With the advent of modernism in the early 20th century design knowledge starts to shift from historicism to functionalist determinants of form, and industrialisation coheres in architecture primarily as a new style and secondarily as an understanding of technique and process. By the mid 20th century a hierarchy of architectural knowledge had developed with an emphasis on form over implementation.

Transmission is centered on two elements from the 17th century right up to the mid 20th century: pupilage (as a continuation of craft-based artisanship) and neo-classical scholarship. The subjects of drawing, building construction, professional practice and design are added in the second half of the 19th century, all as part-time courses which complement pupilage. The shift from pupilage to full-time studies in the 1950s coheres around the adoption of the Beaux-Arts model of the atelier or design studio, embedding neo-classical traditions of formalist design composition in the modernist curriculum, at the expense of implementation studies – which remain largely un-recontextualised and therefore tacit in residual pupilage.

The weak framing of the communicative relation between student and master under pupilage (with the even weaker framing in relation to the dead masters, whose past display of tacit knowledge serves as a model for the pupil), continues in the full-time studio classes, where the 'studio-master' models the performance for the student to follow. This continuation of the craft tradition of weak framing reinforces tacit design knowledge which is unarticulated in relation to new patterns of implementation.

Regulation of the professional membership exams which attempt to shift the definition of disciplinary knowledge from design aesthetics to implementation studies see 17th and 18th century knowledge of neo-classical composition, based on the scholarship and aesthetics of architecture as an art, continually being mapped onto the new knowledge of industrialised construction and commercial business practices. Contestation occurs over whether the knowledge is primarily of an art allied to the fine arts, or of a combination of art, science and business. This tension is resolved by the membership exams being fairly evenly weighted between arts and design on the one hand, and science and technology on the other – with knowledge of the business of architecture and management of implementation being relegated to a relatively minor exam in

professional practice. This pattern remains the basis of the curriculum as it moves into full-time transmission in the mid-20th century, when the period of professional experience is extended from one year to two years followed by an exam in practice and management.

In this application of Bernstein's pedagogic device to the history of architectural pedagogy, the separation of the elements of production, recontextualisation and regulation reveal that in each of these layers of analysis, despite attempts to integrate design and implementation knowledge, these are set in opposition as arts and sciences at the expense of management, and the dominance of the neo-classical tradition skews the balance in favor of formalised compositional knowledge. This occurs at the level of the production of knowledge (where the aesthetics of form has pre-eminance), transmission of knowledge (where the traditions of the design studio favor compositional order over technology or process) and regulation of the exams (which is used to counteract initiatives which favor science and business). In the final form of the curriculum agreed in the 1970s, assessment of implementation is separated into the Part Three exam, unrecontextualised as a segmental listing of horizontal implementation discourse, and un-integrated into the design-based curriculum. Unsurprisingly, the sedimentation of these layers in the pedagogy is likely to result in periodic complaints about 'failures of implementation', such as those which have been noted in Chapter 2[98].

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[98] In his essay 'Thoughts on the Trivium and Quadrivium: the Divorce of Knowledge from the Knower', Bernstein traces the tension between arts and sciences to the origins of two discourses in the medieval university – the Trivium, derived from Christian knowledge of 'grammar, logic and rhetoric', and the Quadrivium, derived from Greek knowledge of 'arithmetic, astronomy, geometry and music' (Bernstein, 2000, 82). This primary classification of knowledge was held together in neo-classical design education, where the grammar of design composition was underpinned by mathematical order (arithmetic proportioning systems and Euclidean geometry).

Bernstein makes a tantalising statement, which he does not explain or develop: 'I have tried to show that in the medieval period we had two differently specialised discourses, one for the construction of the inner, one for the construction of the outer – the material world. The construction of the inner was the guarantee for the construction of the outer. In this we can find the origin of the professions' (op.cit., 85). This requires that understanding the fault line between design and implementation knowledge evident in architectural pedagogy be taken to this further level of historical analysis. While Bernstein implies that professional knowledge developed in the 'specialised disciplines of the Quadrivium' and 'the disciplines of the Trivium have become the disciplines of symbolic control – the social sciences', architectural knowledge has always attempted to straddle this division, although the suggestion in this dissertation is that the Trivium-aligned components of the region remain robust in the face of Quadrivium aligned pressures (ibid.).

5.0 Chapter 5: CONCLUSION

5.1 FINDINGS OF THE DISSERTATION

Bernstein's pedagogic device sets out three fields of knowledge (production, transmission and acquisition) through which knowledge is recontextualised (disembedded) from its creation in the field of production of discourse to become a virtual or imaginary discourse in the field of reproduction of discourse. This process of recontextualising knowledge occurs firstly in an official recontextualising field (controlled by educational agents of the state), and secondly through a pedagogic recontextualising field (controlled by pedagogues of educational institutions). It is a process which is regulated by three sets of rules. Firstly, distributive rules which determine what forms of knowledge are distributed to whom (resulting from the power relations operative between agents of the official resontextualising field). Secondly, by recontextualising rules which shape the disembedding on knowledge (resulting from the definition of knowledge in the official recontextualising field). And thirdly, by evaluative rules which condense all of these operations of the device to steer the acquisition of knowledge (in turn shaping consciousness, which feeds back into the field of production of discourse and the creation of new knowledge) (Bernstein, 2000).

In the case of architectural knowledge, one would expect that these structurings of the pedagogic device should be able to be applied in a straightforward way to describe the disembedding of a complete and coherent field of professional knowledge, its precise description as a totality by official agents, and its recontextualisation in a way which transmits the full spectrum of this professional knowledge. The general question is, does this pedagogisation of architectural knowledge occur coherently across the full spectrum of professional knowledge, or does it have gaps? As architects work across two different kinds of knowledge - individualised creative design knowledge of the synthesis of complex project requirements in coherent design work which is both aesthetically meaningful and technically sound on the one hand, and collectivised procedural knowledge of the marshalling of the multiple resources and processes required to implement architecture from inception to completion on the other - the particular question is, is there a gap between design knowledge and implementation knowledge in the pedagogisation of architectural knowledge?

The first place to look for an answer to this particular question is in the conversation which architects have with each other about the work that they do. In this research the institution of the architectural exhibition has been used as a window into this conversation (Forster, 2004a, 2004b). While an exhibition of the world's best architecture is astonishing in the range and virtuosity of the built work, the curious thing is that the presentation and description of the work is explicit at the level of form-making (e.g. aesthetic qualities, spatiality, materiality, relationships between architectural and urban form, and cultural meaning), but silent at the level of implementation (e.g. the social, political and economic conditions of project initiation, development of the brief, land matters, multi-disciplinary design development, questions of budget and cost control, the impact of procurement strategies on design and documentation, risk management and buildability). Clearly all of these implementation issues must have been well considered in order to achieve this work successfully, but they seem to be scarcely important enough to architects to warrant mention when they present their work to each other.

This curiously one sided depiction of architectural knowledge has therefore made it necessary to examine other sources of information within the architectural community to check whether it is indeed the full story of what constitutes architectural knowledge. This second investigation has involved examining official reports of the organised profession, which it turns out are highly critical of the knowledge of architects – particularly their knowledge of implementation (MacEwan, 1973), (RIBA, 2003, 2005). These reports point to failures of implementation in the work of architects which relate to social failures (e.g. misunderstanding the needs of occupants), to economic failures (e.g. misunderstanding the needs of clients both programmatically and financially) and to delivery failures (misunderstanding the demands of delivery on time, within budget and to good quality).

From this comparison of information of architects' description of their knowledge it seems that there is indeed a gap between design knowledge and implementation knowledge, that this gap is serious (the 'position historically occupied by architects [as principle advisor to the client] is being removed from them fairly easily') and seems to be insurmountable (the gap between the 'aspirations and priorities' of architects and their clients 'is much larger than we could have anticipated [and] seems to be growing') (RIBA, 1993, 20, 27).

To try to understand this gap between design and implementation knowledge then required an examination of the knowledge structure itself. Bernstein describes professionalised architectural knowledge as a region which aggregates other knowledge systems into applied knowledge of architecture (Bernstein, 2000). In the case of architecture, this region is so broad that it cuts across all of the vertical discourses of knowledge which Bernstein defines – hierarchical knowledge structures (as in the application of science to building performance), horizontal knowledge structures with strong grammar (as in the application of mathematics and technology to the design and making of buildings), and horizontal knowledge structures with weak but relatively explicit grammar (as in the application of humanities and social science theory to design theory). The core of this region of architectural knowledge is creative spatial design knowledge, located at the extreme edge of vertical discourse as a horizontal knowledge structure with weak and tacit grammar – verging on the edge of the craft knowledge from which this discourse emerged.

However there is an area of the region of architectural knowledge beyond the edge of vertical discourse, and this is tacit implementation knowledge – so horizontal that it tips into horizontal discourse, where it exists as a segmental set of procedures of professional practice (horizontal implementation discourse). While these procedures should be able to generate hierarchical knowledge to the extent that they impact on the design and making of architecture, their location at the disjuncture between vertical and horizontal discourse is the first indication that the gap between design and implementation knowledge may be structural, which may impede the recontextualisation of implementation knowledge.

The next question to examine therefore is how the architectural curriculum deals with this division between horizontal and vertical discourse in the region in order to leverage implementation knowledge into design knowledge. An examination of the official description of the generic architectural syllabus (of Commonwealth countries) indicates that there is strong representation of implementation knowledge in the syllabus, both as a subject in itself and integrated with other subjects – including the core subject of design (RIBA, 2003). Furthermore the operation of studio based pedagogy in weakening the classifications of knowledge in the region should in theory facilitate the integration of implementation knowledge in design learning. And yet, failures of implementation persist. Why this is so may have something to do with the coding of the curriculum -

which in Bernsteinian terms is an elaborated code comprising both integration and collection sub-codes. While this code analysis points to a curriculum challenge of reconciling the irreconcilable – collection code modalities of applied sciences with integration code modalities of applied arts – the segmental nature of horizontal implementation discourse tends to drop out of this dichotomy altogether. To understand whether this is indeed so then required a historical analysis of the pedagogisation of architectural knowledge (in the UK context): what happened to implementation knowledge in this history?

This historical analysis proceeded along the lines suggested by the pedagogic device: firstly, how was knowledge of architecture defined historically in the field of production of discourse; secondly, how was the knowledge to be acquired by entrants to the profession defined by agents of the official recontextualising field; and thirdly, how was this knowledge recontextualised in the pedagogy. This is a story of the establishment of the modern profession as a consequence of industrialisation, but it is informed by pre-industrial conditions of craft production. In this historical analysis the lens needed to be kept focussed on what happened to implementation knowledge, and why.

Firstly, in the field of production of discourse, the historical definition of the region of professional architectural knowledge begins with an arena of aesthetic knowledge (in contrast with engineering which developed as a separate profession), and this origin remains dominant throughout the history. To this knowledge is added knowledge of detailing arising from new industrial technologies, and the documentation and contract administration required by increasingly complex patterns of commerce. However knowledge of property development, the business of building, and cost control are excluded in defence of the role of the architect as an independent arbiter of taste. At this level of analysis implementation knowledge is included in the region to the extent that it relates to technology and contract administration, but is excluded to the extent that it relates to the business and cost of building. However the included largely tacit implementation knowledge is secondary in the hierarchy of knowledge, where largely explicit knowledge of architectural style dominates.

Secondly, in the official recontextualising field, contestation over the official regulation of architectural knowledge, as defined in the professional entry exams, follows a similar pattern in both phases of voluntary and compulsory entry exams: business oriented

officials of the RIBA argue for assessment of technical and managerial knowledge only; then eminent architects (both RIBA members and non members, together with novices) argue against any form of examination on the basis that architecture is an art derived from innate talent which cannot be examined. To resolve this dilemma, the RIBA (acting as a 'professional parliament') brokers an agreement between 'businessman architects' and 'artist architects' in which the entry exam includes assessment of both arts and sciences, weighted equally. At this level of analysis, the still largely tacit managerial knowledge – the starting point of the exam debate – is peripheralised in the compromise deal between artists and businessmen, and is included only as a minor exam in professional practice.

Thirdly, in the transmission of architectural knowledge, through one and a half centuries of industrialisation up to the mid 20th century transmission is based on pupilage, following the pre-existing pattern of craft artisanship in the studio of the master. Part-time courses are gradually added to this pupilage, developing into the current palette of four architectural 'course work' subjects: cultural studies (developing from art history classes), communication (developing from drawing classes), technology and environment (developing from building construction and materials science classes), and management practice and law (developing from professional practice classes). The introduction of the building construction and professional practice classes follows the agreements on the entry exams, but the history of art and drawing classes precede these agreements, developing organically from the aesthetic emphasis of pre-industrial and proto-industrial practice.

Design classes start informally in the mid-19th century, become part-time studio classes in the first half of the 20th century, and full-time studio based design classes in the 1950s. This recontextualisation of the transmission of architectural knowledge as experienced in the drawing office of the master to project based transmission under the tutelage of a studio master in the design studio is based on the Beaux-Arts' atelier tradition of neo-classical design education, emphasising formal compositional design rules over the integration of technology and implementation process in design thinking. The weakening of classifications across the code division allows design theory derived from cultural studies to be more easily integrated into design work in the studio than applied knowledge of science and technology. As a result, studio based design pedagogy is biased more towards form, aesthetics and cultural meaning than towards

science and technology. However the major recontextualising move of the pedagogy which shifts transmission from the craft based tradition of pupilage to the institutionally based design studio does not do away with pupilage entirely – a residual form of pupilage remains in the form of a requirement for two years of practical experience after completion of full-time studies. Despite a minor course in management practice and law which is included in the full-time curriculum, still largely tacit knowledge of implementation remains primarily un-recontextualised in the pedagogy, to be transmitted through this residual pupilage as horizontal discourse. The curious dichotomy then results that the exit exam from full-time studies is primarily an assessment of design knowledge (largely in the absence of implementation understanding), whereas the professional entry exam taken at the end of the two years of residual pupilage is entirely an assessment of implementation ability (in the absence of design knowledge). At this level of analysis pedagogic recontextualisation fundamentally divides codified design knowledge and horizontal implementation discourse, while trying to mediate the code division between arts and sciences.

The overlaying of these three operations of the pedagogic device sediment a fracture in the pedagogy between design knowledge and implementation discourse: the segmental nature of implementation discourse which tends to result in its exclusion from vertical discourse; overlaid on the official compromise on the regulation of exams which balances the two fundamental forms of knowledge in the region (arts and sciences) but largely ignores knowledge of how design is informed by and taken into implementation; overlaid on the pedagogy of the design studio which emphasises individual virtuosity in form-making (primarily informed by cultural theory and secondarily informed by science and technology, but largely ignoring the integration of implementation issues with knowledge of design).

In conclusion, the finding of the dissertation is that there is indeed a gap between design and implementation knowledge in architectural pedagogy, that this gap is structural, and is deeply entrenched in the knowledge and pedagogical structures of the architectural region.

5.2 POSTSCRIPT

This minor dissertation stops short of remedial recommendations for the architectural curriculum. However it raises the question of what could or should be done to deal with the structural gap in the knowledge and its pedagogy. On the basis of the conceptual analysis work could commence on more detailed literature reviews, in a search for evidence of the segmental / recontextualised, tacit / explicit, Trivium / Quadrivium, inner / outer, imagination / administration. First thoughts for this next work are:

Develop this analysis further:

This minor dissertation has been based on a limited selection of texts. Further work to develop and test the conceptual argument could be done by finding and examining other sources of data, reviewing all ten of the Venice Biennale catalogues in detail, by extending the historical analysis from the mid-20th century to the millennium and considering its relation to literature on the sociology of professions.

A good arena for further exploration of the persistent relationship between craft knowledge and architectural pedagogy could be the contrast between the British Arts and Crafts movement (steered by Morris away from industrial production) and the Deutscher Werkbund (steered by Muthesius from its craft guild origins towards industrial production, influencing the development of modern architecture in Germany) [99]. After all, the first modernist architectural curriculum emerged at the Bauhaus (an ailing provincial crafts college before Gropius got hold of it), structured around production in the workshops. While capitalist teachers fled west to the US after the Bauhaus was closed by the national socialists in 1933, and socialist teachers fled east to the Soviet Union - both sets of refugees carrying the Bauhaus curriculum with them - it is not clear from the literature reviewed in this dissertation how the Bauhaus curriculum might have influenced the formation of full-time architectural courses in the UK.

In this investigation it became apparent that the Beaux-Arts tradition of transmission continued to have an impact on 20th century pedagogy in the UK – maintaining neo-classical methods at a time when one might have expected modernism to have favoured

[99] Recent translation of German texts on the Bauhaus and its precursors would make this exercise timely, e.g. Wick (2000), and Muthesius (1994).

a different model (e.g. a Bauhaus one). The nature of this tradition and its precise impact in the UK requires further investigation.

Bernstein literature needs further exploration, together with its relation to other theory in higher education studies. The durability of classical thought requires better explanation, perhaps located in exploration of the Trivium and Quadrivium, and of the structure of universities at the time that architectural knowledge was first incorporated.

Investigate primary data on architectural knowledge:

Definition of architectural knowledge in this work has been based on secondary sources. It would therefore seem prudent to examine the source of production of architectural knowledge in good practice – i.e. what is it that architects actually do to design and implement good architecture. Existing literature on this needs to be investigated[100], and new data could be collected.

The speculation is that 'good architects' have two absolutely primary areas of knowledge in their practice: knowledge of how to take design ideas into materialisation and into implementation.

Consider changing the definition of the knowledge:

Coincidentally, these primary areas of knowledge (materialisation and implementation) sit squarely over fault lines in the pedagogy – the first between collection and integration codes and the second between vertical and horizontal discourse. The recontextualisation of architectural knowledge into pre-existing groupings of knowledge in the region places the important knowledge of the field of production right in the fractures of the curriculum. Work could therefore be done on how these two weak areas could be re-recontextualised – perhaps as subjects which are different to the existing ones and which have different recontextualising rules (either replacing the existing ones or sequenced into them)[101].

This investigation would also require examination of new areas of practice currently impacting the region, e.g.: project management, facilities management, environmental

[100] E.g. van Schaik, 2005.

[101] Nicol and Pilling (2000) survey current trends in practice and suggest changes in structure or content, and adaptation of teaching methods.

management and heritage management, all of which carry ideological boundary policing. The investigation would need to see whether these new areas of tacit implementation knowledge have been recontextualised sufficiently into a form which allows incorporation in the pedagogy.

Consider changing the definition of the practice:

The above strategy seeks to re-emphasise practice which is under threat through failures of codification and transmission. An alternative strategy would be to accept a narrowing of the region, and reinforce the residual pedagogy of tacit transmission through the studio of individualised design virtuosity. The professional consequences of this would need to be thought through, but there may be clues in emerging practice at the cutting edge of the knowledge economy, where specialist designers trade niche knowledge in networked design teams[102].

Move from general modelling to the specifics of classroom data:

This research has not delved into acquisition through instructional and regulative discourse, and evaluation practices. Analysis of this kind of data could close the loop on the structuring of the pedagogic device in architecture examined here (i.e. at the level of the shaping of consciousness), or introduce other dynamics – perhaps how the pedagogy does indeed try to bridge the gaps.

Consider the role of professionals in the developmental state:

Finally, the analysis needs to be brought back to the local context, where pressures for economic growth and social development remain unresolved and in tension – as is particularly evident in the built environment. The knowledge that architects need under these conditions, and how this squares with the pedagogy, requires that the analysis shift to the global south. This work could involve historical analysis of the transfer of the UK model to the colonies, and comparison of current case studies in the global south.

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[102] E.g. Patteeuw, 2003.

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7.1 Appendix One: DESIGN DATA

The catalogue of the 2004 Venice Biennale 'International Architecture Exhibition' is used as the source data for defining current architectural design knowledge (Forster, 1994a,b,c). The catalogue is a substantive document which identifies thematic aspects of recent built work and locates these in contemporary social issues. The catalogue text is analysed here to provide evidence of dominant trends in contemporary architectural design knowledge.

The exhibition catalogue comprises three volumes: one volume of essays ('Focus') and two volumes of work ('Trajectories' and 'Vectors'). 'Trajectories' describes a Thematic Exhibition, and 'Vectors' records three further sections of the exhibition – an exhibition of the work of countries (here called the National Exhibition), an exhibition of waterfront cities (here called the Urban Exhibition), and an exhibition of interiors (here called the Interior Design exhibition). In addition, descriptions of various photographic exhibitions and installations are scattered throughout the documents.

THEMATIC EXHIBITION

Curator Kurt Forster organised this part of the exhibition into six thematic areas of work, which he called 'Topography', 'Surfaces', 'Atmospheres', 'Transformations', 'Concert Halls', and 'Hyper-projects'. Evidence of design knowledge in each of these thematic categories is summarised below.

'TOPOGRAPHY'

This section of the thematic exhibition presented a number of projects (42 from the EU and 21 others, mainly from Asia) which develop the idea that a building and its site are not only inextricably connected but can be completely fused:

> Numerous recent projects (are based) on an extended concept of topography as a condition of weaving together building (as a set of prospective purposes) and site (as geological and historical accumulations (Forster, 2004b, 9).

These projects were mostly museums, art galleries or exhibition centres, and parks, park pavilions or urban promenades. Also included were a number of large office complexes, visitors' and resource centres, ferry terminals, schools, an observatory, a commercial centre, a market, student residences, houses, apartments, a hotel, performing arts centres, theme parks and recreational centres, a car park and a crematorium[1].

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[1] The architects and project locations for 'Topography' were Eisenman Architects, EMBT, Dominique Perrault, Martinez Lapena-Torres, Carlos Ferrater, Vicente Guallart, Mansilla + Tunon, Baldeweg Asociados, Carlos Ferrater, Lapena-Torres Arquitectos (Spain), Foreign Office Architects (Spain + Switzerland), Renzo Piano (Switzerland), Chipperfield Architects (Spain + UK), Hopkins, Richard Rogers , Grimshaw (UK), Massimiliano Fuksas, UN Studio, Arata Isozaki, Mario Bellini, The Next Enterprise (Italy), Shigeru Ban, Manuelle Gautrand (France), Jacob + Macfarlane (Corsica), Souto de Moura (Portugal), Asymptote, West 8, NL Architects (the Netherlands), Lungard + Tranberg, Dagmar Richter (Denmark), 3xNielsen, SLA, Wingardh Arkitektkontor (Sweden), Architekturatelier Podrecca (Austria), LAB Architecture Studio (Germany), Zaha Hadid (Germany and Korea), GA.A + Mass Studies + Slade Architecture (Korea), Toyo Ito,

While the idea of building the site has always been part of building the building, creating a condition where 'site and building become truly inseparable' (Forster, 2004a, 141), what is exceptional here is that these buildings use distinctly *topographical concepts* of contours, mounds, geological strata or crystalline patterns, and the mathematics of complex curved geometries, to embed the building and site in a singular constructed landscape.

Common **formal design strategies**[2] used in these projects are:

- buildings inserted into mounds of earth, e.g.: 'the building will look like just another hill on the site' (op.cit., 155);
- layering of horizontal landscapes on top of each other, e.g.: 'folding playing field over building' (op.cit., 154), 'a [second] surface cloned from the first' (op.cit., 162), 'a potential for the roofscape of Fifth Avenue to be defined as a second urban datum' (op.cit., 157), 'rather than simply placing a picturesque park on top of a conventional car park, our ambition is to produce a new composite, which we call 'Thick Park'' (op.cit., 159);
- use of crystalline geometries, e.g.: 'a crystalline genesis for the project' (op.cit., 163), 'a regular web of irregular trapezes' (op.cit., 165);
- use of geometries derived from patterns of organic growth, e.g.: 'the building was generated from a natural pattern known as spiral phylotaxis, which is the basis for much plant growth' (op.cit., 191), 'a fractal order and dimension, organizing itself out of irregularity and fragmentation' (op.cit., 161), 'a cluster of similar and different elements which try to establish a hidden geometry of nature' (op.cit., 164);
- formal organisational systems which are analogous to organic systems, e.g.: 'the 'rhizomic' architectural ordering [...] is the basis for a new system of linkages' (op.cit., 165);
- formal organization which is analogous to geological formations, e.g. 'roofscapes fold and bend like shifting geologic plates' (op.cit., 145), 'the mediated elaboration of the earth's crust' (op.cit., 166), 'a loose pattern of tectonic shifts' (op.cit., 168);
- and, design strategies inspired by biotechnology, e.g.: 'a speculation on how artificial and natural processes may be able to generate new forms of mutual enhancement', and 'the distinction between artifice and nature [has] become obsolete' (op.cit., 159).

These formal or **compositional systems derived from nature**, are often tied to mixtures of use, particularly the interaction of public and private activities in non-traditional and temporal mixes, e.g.: 'a system of multiple itineraries' (op.cit., 163), 'space becomes flexible and takes on a plasticity' (op.cit., 177), 'museum as an ever-changing event space' (op.cit.,195), 'activities are modelled as a network of diverse circuits' (op.cit., 169), and 'allowing for flexible arrangements within which the narrative of the city can unfold' (op.cit., 193).

Kengo Kuma, Jean Nouvel, SANAA, Tezuka Architects (Japan), Michael Sorkin Studio, RUR Architecture (Taiwan), R + Sie (Thailand), ODBC (China + Austria), Kovac Architecture (Australia), Morphosis, Smith-Miller + Hawkinson, Kol/Mac Studio, Steven Holl, FO, Diller Scofidio + Renfro, Xefirotarch, Ocean D, and Acconci Studio (USA).

[2] 'Form' refers here to mean three-dimensional shape.

The compositional systems are often linked to non-linear and non-hierarchical circulation systems, e.g.: 'merchandise is circulated in [a] deterritorialised universe' (op.cit., 156), 'a new open-ended, non-linear museum order' (op.cit., 165).

While these buildings construct new landscapes and new combinations of use, they also contain **representation of cultural ideas** about the chaos of the city rather than the order of the city, e.g.: 'plunged into an intoxicating urban chaos' (op.cit., 156), 'entangled in the realities of the place' (op.cit., 174), and 'the exacerbation of localisation' (op.cit., 156). Instead of nature being 'a tableau with frontal and fixed perspectives' it is interpreted as 'the field we inhabit and are part of, an active lifescape' (op.cit., 170, 171).

Within all this complexity geometry usually becomes one of the **ordering mechanisms**, in relation to both nature and the city:

- in relation to nature, e.g.: 'strategies that permit organisationally complex landscapes to emerge through the production of topographies artificially generated by a mediated integration of rigorously modelled orders' (op.cit., 169), and 'an organic synthesis based on fluid forms akin to nature's own, which one arrives at via the precision of the most advanced artificial geometries' (op.cit., 174);
- and in relation to the city, e.g.: 'geometric resources [...] are superimposed in search of new opportunities for tackling the complexity, hedonism and chaos of today' (ibid.).

Beyond these specific design ideas derived from landscape, from geometry and from attitudes to occupancy of both buildings and cities, the 'Topography' section of the thematic exhibition provides evidence of three general areas of architectural design knowledge, i.e.:

- the **underlying order in formal composition**, even where this is an order of apparent disorder;
- the integration of multiple requirements of the project in **a unifying idea**, which works at different levels – e.g. in the case of these projects ideas of geometric order are often combined with non-linear systems of circulation and flexible patterns of occupancy, integrated in a single form;
- and, definition of the **relationship between building and context**.

While this knowledge of order and synthesis is fundamental to generic architectural knowledge, the contemporary concerns in the above descriptions point to important parts of contemporary architectural knowledge, i.e.:

- order which is complex, non-linear, non-heirarchical, often underpinned by a mathematics of complex curves;
- and synthesis which fuses disciplinary knowledge (architecture and landscape architecture) and which fuses occupancies (public / private, building / city, i.e. which combines design at the scales architecture and urban design).

'SURFACES'

This section of the thematic exhibition presented 44 projects where the overall form arises almost entirely from manipulation and distortion of surfaces. While the need for enclosure is fundamental to building, the expression of enclosure as a 'skin' which clads the structure has become a familiar element of recent architecture. Forster notes that the difference with the skins exhibited in this exhibition is that the surface activates use, circulation or information over and above the provision of enclosure - 'a new direction is suggested by thinking of these surfaces as active rather than passive' (op.cit., 225).

The projects in 'Surfaces' were mainly from the EU and USA, with a few from South America, Eastern Europe, Japan and China. They included museums, libraries, a city hall, university buildings, a military academy, an architecture centre, art and music centres, a cinamaplex, a sports complex, an exhibition pavilion, a fashion institute, a fashion showroom, motor car showrooms, car parks, a traffic control centre, train stations, a nomadic internet dwelling, smart lofts, a proposal for inserting hotel lobbies into existing high-rise buildings, corporate headquarter buildings, an advertising agency office, mixed-use skyscrapers, a few houses, footbridges, and a fountain[3]. **Programming of use** in these buildings is usually hybridised, merging different activities which often occur in new combinations, e.g.:

- 'includes a military academy as well as many offices and apartments, sports facilities and technical infrastructure' (op.cit., 232);
- 'it combines, in one structure, a natural history museum with a cutting-edge contemporary art museum' (op.cit., 251);
- 'comprising a hotel, fitness clubs, office space, a sports and games centre, film and video auditoriums, press agencies, and restaurants' (op.cit., 252);
- 'a department store, shops, offices, apartments, restaurants, a hotel with conference facilities or whatever' (op.cit., 235);

The main **compositional idea** in 'Surfaces' is that of a loop or ribbon of material which integrates floor wall and roof into a single continuous surface which folds over to create space, i.e. 'a homogenous field of materiality' (op.cit., 258). This 'single pliable surface strategy' (op.cit., 264) is used to organise space in two ways:

- either by folding around the *outside* of the whole volume, e.g.: a continuous skin 'wrapped around and thus connecting the three parts of the building' (op.cit., 239);
- or by folding *through* the volume to create space on both sides, e.g.: 'a pliable ribbon that locates *production* (atelier) on one side and *presentation* (museum / theatre) on the other' (op.cit., 262).

[3] The architects and project locations for 'Surfaces' were Foreign Office Architects, Wilkinson Eyre Architects (UK), Rafael Moneo (Spain), dECOi, Manuelle Gautrand (France), UN Studio, NOX, ZVI Hecker, NL Architects, René van Zuuk, EEA (the Netherlands), Dagmar Richter (Denmark), Architektur Consult ZT GESMBH, Acconci Studio (Austria), Bernard Tschumi, Aconci Studio (Switzerland), Asymptote, De Zwarte Hond, Campo Baeza, Leeser Architecture, (Germany), Eisenman Architects (Germany + Italy), OFIS Architekti, SadarVugar Arhitekti (Slovenia), Greg Lynn, Diller + Scofidio, ROTO Architects, TEN Arquitectos, Archi-tectonics, RUR Architecture (USA), Moss Architects (Mexico), Patterns (Argentina), Makoto Sei Watanabe, Shuhei Endo (Japan), SOM (China), SHOP, Penezic + Rogina, Servo, Max Wan, Kilian Mayer + Visman, Ingenhoven Und, and Querkraft (unknown locations).

The single surface captures and merges different components of the mixed-use programmes (and is thus sometimes called 'the continuous programmatic surface') (op.cit., 236), e.g.:

- 'programmatic boundaries are broken down' (op.cit., 264), 'reinforces the fluid relationships between management, design and production' (op.cit., 261), and 'the most challenging problem [...] is the dynamic integration of traditionally distinct programmes [...] the new paradigm for this programmatic hybrid [...] is the operational and aesthetic interlacing of *production* and *presentation*' (op.cit., 262).

The idea of the single continuous surface is also 'linked to the idea of continuous movement' (op.cit., 225), blurring the direct linear connections between activities, e.g.:

- 'the Möbius House integrates programme, circulation and structure seamlessly' (op.cit., 253).

Complexities of programme sometimes require distortions of the looped surface, which can be shifted, sheared or slipped to animate the activities, adding a level of complexity to an otherwise simple formal device, e.g.: 'slippages reveal other activities' (op.cit., 264), 'fragmented strips that form terraces' (ibid.), 'the crease as mediation [...] allow[s] for slippage between interior urbanism and urban privacy' (op.cit., 243), and 'the relationship becomes more intricate when a loop of ribbon at one level is sheared in half and slipped into alignment with a level above or below' (op.cit., 262).

Material becomes an important issue in the making of continuous surfaces, made possible through the use of new materials, e.g.: 'it is precisely for their varied properties that artificial membranes, from glass and Plexiglas to waffle-like strata, polycarbonates and laminates with different reactive layers, have been steadily gaining ground over traditional building materials' (op.cit., 225).

The fluidity of both space and programme arising from the compositional device of the continuous surface is seen to represent informational and globalised conditions, both directly and symbolically:

- directly in the form of media integrated into the surface as a virtual architecture, e.g. 'custom-fit LED panels throughout the surface [transform the curtain wall] into a dynamic membrane of visual display' (op.cit., 229), 'this opaque side [...] will be treated as a broadcasting device, as a piece of film, capable of producing coloured, changing images' (op.cit., 263), and 'the surface becomes inscribable' (op.cit., 264);
- and indirectly in terms of the symbolism of connectivity: 'continuousness suggests the global network that we are newly experiencing...boundaries are amorphous today' (op.cit., 260).

There are a number of fundamental aspects of architectural knowledge evident here, i.e.:

- development of **coherent ideas for the combination of form, space, activity and circulation**, achieved here through continuity and fusion;
- animation or **activation of the social programme** of the building in its urban context, achieved here through hybridisation;

- **materialisation of the form**, achieved here through the use of new materials;
- and the development of **form which resonates with cultural conditions**, achieved here through the use of media and connectivity.

Manipulation of mathematics is again apparent in the geometry of the folded surfaces, e.g.: 'the double-locked torus' (op.cit., 253), 'controlled by a structuring geometry [...] accentuating the topology of the shell' (op.cit., 256), and 'this produces intense moiré interference patterns' (op.cit., 258).

'ATMOSPHERE'

This section of the thematic exhibition presented work which captured the ability of new buildings to adjust their appearance on a rapid cycle, creating 'elusive and instable' visual effects that 'intrigue and even puzzle observers' (op.cit., 273). This 'insubstantial and ever-changing' quality is captured in the title Atmosphere: 'like a breath, a cloud or the twilight, atmosphere is everywhere, but nowhere to be grasped' (ibid.). This ephemeral quality arises from the visual properties of new materials and fabrication techniques, and the environmental adjustments made possible by electronic building management systems.

Forty-two of this kind of project were shown, two thirds from the EU, a handful each from the USA and Japan, one from China and one from Africa. The buildings included corporate head office and government administration buildings, a municipal civic centre, a patent office, embassies, exhibition halls and pavilions, university and college buildings, cultural centres, libraries, museums, an art gallery, a chapel, an olympic swimming centre, a gymnasium, commercial retail buildings, apartment buildings, a hotel, a house, and a proposed 'wrap' for an existing power station consisting of 'a membrane of roses, lights and honeysuckle', described as a 'confluence and co-evolution of technological and organic culture' (op.cit., 299)[4]!

All of these projects involved wrapping the building in a layer of material which has particular **visual properties**, e.g. perforated metal screens or glass of different colours and opacity, creating a variety of visual effects:

- in glass wraps: the facade 'is built up of glass panels with an integrated multi-coloured foil [and depending on] the angle of incidence, the façade changes from yellow to blue, to red or from purple to green and back again' (op.cit., 301), and 'undulating slightly, the facades [...] become an instrument of light, giving an ever-changing composition of visual effects' (op.cit., 306);
- in metal or mesh wraps: 'a precious silver fabric or curtain, fine and nimble, taking on a new colour in every different light' (op.cit., 280), 'the skin is a light

[4] The architects and project locations were Wingårdh Arkitekkontor, Eric Owen Moss Architects, SHoP, Cero 9 (USA), Ten Arquitectos (Mexico), Snøhetta (Egypt), PTW (China), Jean Nouvel, Toyo Ito, Kengo Kuma (Japan), Claeson Koivisto Rune (Japan + Sweden), Anders Wilhelmson (Sweden), Sanaksenaho (Finland), 3xNielsenh (Denmark), Berger + Parkkinen, J Mayer H, Sauerbruch Hutton Architects (Germany), EEA (Hungary), Gigon / Guyer, AGPS Architecture (Switzerland), Massimilaino Fuksas (Italy), Grazioli Krischanitz , Abalos + Herreros, SANAA, Juan Navarro Baldeweg Asociados, S+Aa, Mansilla + Tuñón (Spain), NOX, Jacob + MacFarlane (France), MVRDV, UN Studio, ONL, Wiel Arets, Neutelings Riedijk Architecten (the Netherlands), Alsop Architects, Wilkinson Eyre Architects, Moller Architects, Adjaye Associates (UK).

perforated metal which allows light, wind and rain to pass through gently' (op.cit., 284), 'a luminous skin [...] almost holographic' (op.cit., 300).

Perforations in the metal or surface treatment of the glass sometimes take the form of a pattern, e.g. 'a punched-hole-pattern titanium façade' with cherry leaf pattern, backlit by green light (294), and 'an abstract frosted tree-trunk pattern on the glass façade' (op.cit., 295).

These abstracted references to nature could be replaced by nature itself, e.g.: the 'proposed metal-mesh system for the façade would [...] allow vegetation to grow all around, enveloping the whole complex' (op.cit., 278).

Visual qualities may also be generated from the layering of surfaces, e.g.: 'we explore layering of glass and wood. Layer on layer, visibility, opaqueness, shine, illumination and light penetration' (op.cit., 285).

Sometimes the visual effects are amplified through animation of the surface by electric lighting or water, e.g.: 'computer animated artificial rain dripping from underneath the flat, cantilevered roof', 'hanging glass fibre cables project points of light onto the ground, animated by the movement of the wind' (op.cit., 289), and 'internally mounted light boxes blur the massing of the building as day turns to night' (op.cit., 290).

These wraps could be tightly fused to the building envelope or set away from it, creating interstitial space which provides for either circulation or environmental control, e.g.:

- in terms of **circulation**: the glass addition creates a 'diaphanous threshold' (op.cit., 276), the skin creates 'a semi-indoor/outdoor space' (op.cit., 284); 'a threshold space enfolds the whole building between this [glass] façade and the masonry one' (op.cit., 297), and 'shadowed walkways, balconies and guests become visible' behind the glass skin (op.cit., 291);
- and in terms of **environmental control**: 'The outer layer of the façade is coated with shimmering, crisp serigraph glass plates [...] they serve as a transparent solar screen [and] can swivel to the horizontal to provide a completely unobstructed view' (op.cit., 292).

In some cases, the **structural support** of the building is integrated into the wrap, e.g.: 'the surfaces are both graphic and structural' (op.cit., 305), and 'the whole structure [...] is based on a single lightweight construction [...] derived from the geometric structure of water in its aggregate state of foam' (op.cit., 314).

In all of these projects, as with the Surfaces section of the exhibition, the wrap acts as a **unifying device** which suppresses the functional articulation of parts of the building, e.g.: 'the windows create a random pattern at the exterior of the building, making it hard to distinguish the separate units' (op.cit., 293), 'the copper band ties up the building mass [and] incorporates all six buildings within its boundaries' (op.cit., 287), 'we developed a chessboard pattern [...] as the uniform cladding for the facades, roofs and ceilings of the overhangs' (op.cit., 308), and 'this new skin wraps and adapts to the units at different heights, shrouding them and unifying them with a silhouette and a single common material' (op.cit., 299).

Geometry re-emerges here as an underlying consideration, e.g.: 'behind this seemingly utterly chaotic structure is hidden a strict geometry' (op.cit., 314), and 'starting from the selected six-frequency icosahedral grid [we developed] a third triangular grid of flat and folded steel plates' (op.cit., 303).

In this section of the exhibition architectural knowledge relates mainly to **visual appearance**, in terms of both mass and material, i.e.:

- knowledge of massing, in relation to coherence of the overall shape, i.e. striking a considered balance between part and whole;
- and knowledge of materials and fabrication techniques, including new materials and digital manufacturing techniques

Knowledge of the integration in spatial design of structural stability, techniques of environmental control, and geometry are also suggested.

'TRANSFORMATIONS'

There were 11 conversion and adaptation projects in this section of the thenmatic exhibition (eight from the EU, one each from China and the USA, and one un-sited investigation), including conversion of le Corbusier's prototypical 'Domino' house into a 'Dom-in(f)o house, three art museums added to cultural or industrial precincts, expansion of a children's museum, conversion of a bullring into an entertainment complex, insertion of public volumes into a high-rise office block, additions to apartment blocks, replacement of a shop front and store, and a documentation centre balancing on top of part of the Nuremberg rally grounds[5].

In introducing this work Forster contests the notion that important old buildings require 'preservation' in terms of fixed typologies and historical idiom. Rather, the argument here is that because many buildings outlast their use 'architecture ought to be ever capable of metamorphosis' requiring 'imaginative transformation', i.e. an argument in favour of adapting both the use and appearance of historical buildings rather than freezing them in time (op.cit., 127)[6].

Knowledge here involves understanding and **analysis of historical design ideas** ('as necessary as it may be to change buildings physically, as indispensable is it to analyse their concept and penetrate their rationale'), and the ability to find creative synthesis in a way which is both sensitive to the old and unashamedly new ('a new mesh of concept and process [and] choice of materials and modifications in transforming existing structures [which] suggest ways of upgrading and rehabilitating that transcend customary limitations') (ibid.).

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[5] Architects and project locations for 'Transformations' were Steven Holl Architects (Finland), Wolfgang Tschapeller (Austria), Gűnther Domenig (Germany), OBDC (Italy), Richard Rogers (Spain), Michele Saee (France), Greg Lynn (the Netherlands), dECOi (UK), Rafael Viñoly (USA), Arata Isozaki (China), and Dagmar Richter (un-sited).

[6] The tension between preservation and development is suggested in Forster's comment: 'Who recognized a generation ago that the noble intentions of preservation (of what exists) would increasingly inhibit what is yet to be?' (Forster, 2004, 10) [manually inserted ref, add 'Focus'?]

'CONCERT HALLS'

This section of the thematic exhibition brought together 49 major new concert hall designs (shown together with Scharoun's 1956 Berlin Philharmonia which still sets the trend for many new projects). Half of these projects were from the EU, 7 from Asia, 3 from Eastern Europe and Russia, 3 from the USA, and 1 from South America[7]. These were all large projects, usually combining a number of auditoria varying in size from 2,800 to 250 seats for symphonic or operatic works (some of these integrate complex machinery which allows adaptation of the auditorium from one use to the other). The projects include substantial front-of-house and backstage requirements, and often integrate complementary facilities such as music schools, libraries, or convention facilities.

These large civic projects were all positioned as cultural icons in their urban context, e.g.:

- 'a theatre that would function as a new cultural icon for the city centre [and act] as a magnet for the twenty-four-hour liveliness of the surrounding area' (op.cit., 54);
- the 'theatre creates a powerful cultural presence housed in a dynamic volume defining the urban piazza [...] the iconic shape of the theatre creates a focus for its urban context' (op.cit., 55);
- the design 'considers both the opera as new expressive icon for the city of Guangshou and its integration in an urban strategy for the new cultural and arts square' (op.cit., 58);
- 'visible from all directions, it acts like a beacon, signalling the presence of the Music Centre in the cityscape' (op.cit., 65);
- 'its unique twin boulder design will enhance urban function [...] and at the same time will create a new dialogue with the emerging New Town' (op.cit., 74);
- 'the building's orientation, combined with the curving and folding exterior walls, presents highly sculptural compositions as viewers move along adjacent streets' (op.cit., 76).

While the **iconic form** of these buildings is generally conceived of in contrast to the cityscape, sometimes it is conceptualised as part of the landscape, e.g.:

- as a result of site location adjacent to a river and beach, 'the key programmatic elements of the scheme are conceived as separate autonomous volumes, as two gigantic rocks stranded at the mouth of the river forming part of the landscape rather than belonging to the city' (op.cit., 36).

In some cases the iconic status of these buildings is specifically linked to the positioning of cities as 'winning cities' in the regional or global economy, e.g.:

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[7] Architects and project locations for 'Concert Halls' were Hans Scharoun (Germany), Rafael Moneo, Eisenman, Mansilla + Tuñón, Juan Navarro Baldeweg, S & Aa (Spain), Foster, Caruso St John (UK), Daniel Liebeskind (Ireland), HLT (Sweden), Jean Nouvel, 3xNielsen (Denmark), Ocean North, SARC Architects, Sanaksenaho Architects (Finland), PLOT, Snøhetta (Norway), RUR Architecture, Laus Kada, Berger + Parkkinen (Austria), UN Studio, NOX (the Netherlands), Claus en Kaan (Belgium), Renzo Piano, Toyo Ito (Italy), Volker Gienke (Latvia), Urban Future (Bosnia and Herzegovina), Dominique Perrault (Russia), Zaha Hadid, Coop Himmelb(l)au, Arata Isozaki, Paul Andreau (China), Toyo Ito, Maki Associates (Japan), Xefirotarch (Korea), Richard Meier + Arata Isozaki, Rafael Moneo (USA), and Christain de Portzamparc (Brazil).

- 'the new concert hall plays a fundamental role in the long-term strategy for positioning Stavanger as an economic and cultural node in Europe' (op.cit., 71).

The dramatic appearance of these buildings is usually combined with the activation of the urban space around the building, through the **creation of new public space**, e.g.:

- 'we have chosen to mobilize the architecture to intensify the relationship between the building and the city around it [...] an outdoor arena spans the two auditoriums [...] a stage for public activity (ibid.).

Linked to the urban and regional importance of these buildings is a sense of heightened **drama given to the experience** of the building itself, e.g.:

- 'the task was to accommodate [the works in a way that] lifts the dramatic intensity of the hall' (op.cit., 38);
- 'the expressions of an intense inner life' (op.cit., 40);
- 'a mood of excitement and anticipation characterizes the public spaces' (op.cit., 45);
- 'the theatre visualizes the entrance to a different world' (op.cit., 54);
- 'a hyper-articulated space of acoustic and visual intensities' (op.cit., 42).

Exaggeration of the experience of the internal space of the building is often achieved through a sense of the mystical, e.g.:

- 'the interior is a world unto itself, complex and diverse [...] a world of contrasts, of surprises, a labyrinth of space' (op.cit., 40);
- 'a dense, opaque, yet changing mass by day, and a mysterious and dazzling source of light by night' (op.cit., 36);
- 'a magic box enshrouded in its own mystery' (op.cit., 46);
- 'the permanent is completed by the ephemeral' (op.cit., 40).

The dramatic internal spatial experience of these buildings is also usually given external expression at night, celebrating and making manifest the public event of attending a concert, e.g.:

- 'at night the faceted skin is transformed into a giant lantern, revealing a festive multitude of concert goers ascending and descending through the building' (op.cit., 48).

The **creation of order within complex form** is often stated as a primary concern of the architect, achieved through a variety of design strategies, e.g.:

- through geometry: 'two divers orders appear: the perimeter of the apertures that refer to geometry, and the inner aperture of each window, fruit of the necessities of the interior' (op.cit., 37);
- through the pattern of the plan: 'after studying a variety of patterns we came up with the idea of turning the hall around and placing the stage at the centre' (op.cit., 50);
- through the organisation of circulation: 'the interior organisation is based on a sequence of public foyer and ancillary spaces surrounding the main concert hall' (op.cit., 48);

- through the articulation of contrast between interior and exterior orders: 'the Music and Arts Centre appears simple on the outside and exceedingly articulated on the inside' (op.cit., 42), and 'we aimed to design a building that is simple outside, but very complex inside [...] a big inflexed work, i.e. a fluid system of spaces whose interior complexity differs profoundly from the shape of the building as a whole' (op.cit., 75);
- or, through a spatial and social concept: 'the building is based on the concept of stages: the stage of the theatre itself, the stage of the piazza and the stage of the theatre lobby above the piazza, when it is illuminated at night' (op.cit., 55).

The descriptions accompanying these designs also reveal a deep understanding of the history of theatre and concert hall design, and the development or reinterpretation of tried and tested design principles. In the **history of typological design** of concert halls these principles often relate to the use of:

- *vineyard seating* (tiered groups of seating which provide vertical surfaces within the seating area for local sound reflection) e.g.: 'the 1,800-seat main hall is a developed form of vineyard-type music concert hall' (op.cit., 44), this hall 'comes, as do the greatest and most famous concert halls, under the category of *vigneto*, the structure reproducing the terracing of vineyards' (op.cit., 62);
- *baroque 'shoebox'* halls (traditionally with a proportion of 1:1:2 with axial seating), *arena* seating (wrapping around the performers), or variations of these, e.g.: 'the main concert hall is conceived of a hybrid shoebox-cum-arena auditorium with vineyard seating for 2,400' (op.cit., 48);
- *proscenium* solutions (developed from Elizabethan and Victorian models with galleries and boxes occupying the wall space) e.g.: 'it adopts a scenographic formula related to that of an Elizabethan theatre, in which the entire public experiences a sense of community, where the walls are inhabited by the audience' (op.cit., 51).

In some cases the solution follows a synthesis of design strategies evident in a previous trend-setting building, e.g.: 'one of the worthy descendents of Scharoun's Philharmonie, Frank Gehry's Walt Disney Concert Hall in Los Angeles, shares in the lasting impact on the townscape and in the heightened, almost crystalline quality of its sound' (op.cit., 33).

Knowledge of acoustical design and stage functionality is also a fundamental requirement in the design of these buildings, e.g.:

- 'each of the three concert halls [...] has its individual characteristics and is the fruit of previous experience gained in the domain of acoustics' (op.cit., 62);
- 'interior and form are a direct expression of acoustical parameters' (op.cit., 76);
- and 'the concert hall is based on essential demands: optimum acoustics, the audience's intense perception and a non-compromised functionality of the stage area' (op.cit., 49).

In this section of the exhibition the kind of architectural knowledge in evidence relates to:

- the integration in a spatial idea of complex programmatic and technical functions which have a historical design lineage that needs to be well understood but which is subject to continual development;
- the organisation and experience of major events of cultural production and public assembly;

- the creation of urban landmarks and urban places for public assembly;
- and the invention of a spatial and conceptual order within this functional, social and visual complexity.

It seems that architectural knowledge is particularly well sited to the **design of large, functionally and spatially complex, urban, public buildings** – in this case, the 'space for the production of civic events' (op.cit., 43).

'HYPER-PROJECTS'

The works in 'Hyper-projects' were large urban developments at important nodal points in their cities, which combine a number of Forster's previous thematic categories, i.e.:

> 'they conjoin site and structural frameworks into new topographies, creating variegated atmospheres by means of spaces and conduits which are fashioned from materials that unfold the impression of cyclical time [...] Their characteristic hybrid of activities, spaces and publics [...] form a kind of paradigm of the metropolis itself, hence their site tends to be enormous, their internal physiology staggeringly complex and their life parasitic of the city they replicate' (op.cit., 339).

Eighteen projects were presented in this section of the exhibition – 13 from the EU, 3 from the USA, 1 from China and 1 from Israel[8]. These could be considered to be Urban Design projects in that they usually define long term development frameworks. They included master-plans and redevelopment projects for large urban precincts and Olympic Villages, urban parks, promenades and public swimming pools, a waste recycling plant, a banking complex, and a cultural centre with library.

The urban scale and urban qualities of these projects were expressed through the following design ideas:

- mixing uses, or hybridising public activity, e.g.: 'focuses on finding overlapping areas of shared parameters' (op.cit., 349), 'ensuring that the public domain extends across the site, that the streetscape benefits and that the building truly contributes to public life' (op.cit., 350), and 'the architecture hybridizes the typology of a museum with the typology of an urban leisure space' (op.cit., 357);
- providing for temporal use, often associated with in-between spaces, e.g.: 'this open area will in future be given over to unforeseeable and unexpected uses' (op.cit., 346), and 'a strategy of in-betweens: spaces between the old and the new, below and above' (op.cit., 351);
- connectivity, e.g.: 'this new community stimulates a sense of increased connectivity and interdependence within the greater five-borough area' (op.cit., 344), 'movement studies are therefore the cornerstone of the proposal: [their trajectories], duration, links to different programmes and interconnections' (op.cit., 349), and 'it contributes to consolidating the fragile surrounding fabric' (op.cit., 353);

[8] Architects and project locations for 'Hyper-projects' were Alvaro Siza (Portugal + Spain), Ábalos + Herreros, Martínez Lapeña-Torres (Spain), Coop Himmeb(l)au (France), UN Studio (the Netherlands), Schmidt Hammer + Lassen (Denmark), Eisenman, Behnisch (Germany), Bellini (Italy), Alsop (UK), Heneghan Peng (Ireland), Morphosis, SOM, HLT (USA), Tschumi (China), and Preston Scott Cohen (Israel).

- iconography, e.g.: 'the Olympic village has an important symbolic role to play in public life' (op.cit., 344), 'all of this will be converted into an emblematic political operation, an expression of the sensitivity towards environmental issues' (op.cit., 347), and 'a landscape fit for the twenty-first century and inhabited by twenty-first century icons: extraordinary objects' (op.cit., 348);
- generative frameworks or interventions which suggest and stimulate further urban development, e.g.: 'a revitalised new community providing a new generative tissue' (op.cit., 344), a 'master plan that would regenerate and reposition not only the town of Middlesbrough but also the whole Tees Valley Corridor' (op.cit., 348), 'an unfolded coastline as an urban event generator' (op.cit., 355), and (in terms of both the iconographic and the generative) 'an icon viewed from Manhattan and Brooklyn [and] an urban generator [acting as a dynamo for] Queens West' (op.cit., 345);
- and, the definition of the relationship between new and existing development, either through integration or contrast, e.g.: 'working deliberately to sculpt land and building forms into a coherent relationship with the existing urban fabric' (op.cit., 344), 'we are interested in the confrontation of the old and new' (op.cit., 351), and 'the balance between new and old is all about contrast and connections' (op.cit., 354).

Underpinning these urban design ideas is a search for **organising principles which resolve unity and complexity**. These principles could be spatial, geometric, social, or a combination of these, i.e.:

- spatial organisation, e.g.: 'our scheme proposes a multi-layered, three-dimensional urban organization that prioritizes open space' (op.cit., 344), and 'our strategy for the projected complex starts from a realization of the techniques of the picturesque' (op.cit., 347);
- geometric organisation, e.g.: 'to articulate a new geometric pattern between old and new, uniting the ensemble' (op.cit., 341), and 'the solution is a pair of twisting geometric forms that unify the new building with the site' (op.cit., 356);
- or social organisation: 'the idea of folding was used on the site to initiate new social organizations of urban space and to reframe existing organizations' (op.cit., 343).

From these descriptions it seems that, at the scale of the urban, architectural knowledge is about understanding **order within complex phenomena which operate at both formal and social levels**. Complex and often contradictory urban needs (or programmes) are resolved through prioritisation or balance, (e.g. 'a delicate balance between traffic, recreation, commerce, consumption and human interaction is achieved') (op.cit., 345). The relationship between public and private activity is defined and activated, here usually through the in-between and temporal. Compositional unity or tension is found in the geometry and form-making. And ongoing urban development is catalysed through the invention of generative frameworks which establish order and place in the short-term, but which are sufficiently open-ended to allow flexible occupation and flexible growth in the long-term.

SECONDARY EXHIBITIONS

A range of other exhibitions were included in the 2004 Bienalle. These were:
- a National exhibition of work from 42 countries[9];
- an Urban Design exhibition[10];
- an Interior Design exhibition[11];
- Photographic exhibitions[12];
- Installations[13];
- Retrospective exhibitions[14];
- and a variety of smaller presentations grouped under the title 'Metaevents'[15].

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[9] These included 32 countries in Europe, Eastern Europe and Russia, 3 Asian countries, 3 South American countries, 2 North American countries, 1 Middle Eastern and 1 African country. These local exhibitions were separately curated variations of the theme 'Metamorphosis'.

[10] The Urban Exhibition ('Metamorphoses of Cities on Water') presented major developments in 17 waterfront cities (two thirds from Europe, four from Asia, and two from the Americas). Issues dealt with included the integration of parts of the city through networks of public streets, parks and promenades, provision of new cultural, recreational or business facilities, development of new mixed-use and inner city residential districts, and the establishment of iconic imagery for cities and regions competing as tourist destinations or business hubs in the global market These urban renewal projects are generally premised on the need to reconnect these cities to their coastlines or riverfronts, using major projects such as Olympic or Expo facilities and large civic buildings to catalyse these processes, or by recycling derelict docklands into commercial districts.

[11] The Interior Design Exhibition ('News from the Interior Italy 2004: A Pulviscular Vitality') dealt with hybridisation of interior uses arising from new patterns of living and working, often of a temporal nature.

[12] Three photographic exhibitions dealt with visual properties of buildings and landscapes. The first, 'In Praise of Shadows', presented the ethereal effects of transparency and reflection through glass. The second, 'Nature of Artifice', explored the 'subtle transitions between natural and built landscapes'. The third photographic (and video) exhibition, 'Harrowing of the City', explored the ordinary and the everyday in cityscapes, contesting the perspectival abstractions and highlights of the 'ideal city'. All of this work asserted the subtle and ambiguous nature of urban experience in contrast to the spectacular or iconographic experience.

[13] The 'episodes' were exhibition installations designed by a number of leading architects, generally allegorical in nature. Amongst others these included installations by:
- Eisenman: a labarynthine space which destabilised 'any continuous or sequential 'promenade architeturale' [and which] denies any access to a central hierarchical place' (Forster, 2004a,24);
- UN Studio: a full size piece of their new BMW museum (i.e. what it will *be* like);
- Saurbruch Hutton Architects: took an opposing view to UN Studio in presenting their work, i.e. that an exhibition installation is not 'the building', but an analogous experience of the sight and sound of the building (i.e. what it will *feel* like) (op.cit., 270).

[14] Two 'mini retrospectives' were included in the exhibition - the work of Ivan Leonidov, a Russian utopian whose unbuilt images of skyscrapers resonate with contemporary tall building design, and Eladio Dieste, a Uruguayan engineer who was making complex curved shells in the ordinary material of brickwork long before contemporary architects started to warp surfaces of titanium. These mid and early twentieth century designers were revisited because of their resonance with the contemporary preoccupations of object and surface.

[15] These 'metaevents' included:
- hypothetical design work from a Cuban workshop on 'architecture and water', and an exploration of the integration of buildings into agricultural land;
- exhibitions of the work of various influential designers, including Italian furniture designer Ron Arad, Brazilian architect and cultural worker Lina Bo Bardi, and a photographic exhibition of the work of Carlo Scarpa by fifty different photographers;
- project work, including four major new Italian railway stations, recent public works commissioned by the Swiss Federal Construction Office, and a new Venetian bridge;
- an exhibition of twentieth century Catholic churches;
- a built landscape by American architect Richard Eisenman, and a Taiwanese pavilion built in a Venetian garden (complemented by the building of a full scale replica of a Venetian Pallazo in Taiwan!);

These exhibitions all repeated or developed many of the issues explored in the Thematic Exhibition, sometimes extending them into related design fields. The secondary exhibitions do not contribute substantively to the implications for architectural knowledge set out in the primary 'thematic' exhibition, and are not analysed further here.

- a Danish retail outlet for pre-designed waterfront projects which could be bought 'off plan';
- and an audio-visual project, including radio shows, sound and video installations, and concerts.

7.2 Appendix Two: IMPLEMENTATION DATA

Phases One and Two of the RIBA's 1991 – 1995 'Strategic Study of the Profession' have been summarised in the text (Chapter 2). This Appendix summarises phases Three and Four of the study, which took the research and analysis phases into discussion (compiled in one volume, RIBA, 1995).

Phase Three of the Strategic Study consisted of widespread discussion with clients and architects of the Phase Two findings. Clients met in 7 sectoral focus groups, and considered the study in relation to challenges in their sector[16] (RIBA, 1995, 11 - 66). Architects met in a series of four seminars, considering the key issues of 'breaking out of the mould', 'positioning for profit', 'tuning in to clients', and 'managing briefing and design' (op.cit., 69 – 76). These detailed discussions do not add substantively to the general findings noted above, and are not dealt with further here.

However Phase Four of the study is of interest, as this took the research findings into a discussion with 8 Schools of Architecture[17], on the basis that 'architectural schools will play a pivotal role in any future strategic alignment by the profession' (op.cit., 79). While noting that the Schools face their own challenges ('student expectation, swollen by a new consumerist approach to higher education' and 'onerous requirements of parent institutions'), the focus here was on understanding how the Schools are facing up to 'the demands of a profession feeling the strain of dramatic social and industrial transformations' (ibid.). This discussion with the Schools was open ended, attempting to capture 'the mood of the moment' rather than 'to frame a series of fixed recommendations' (op.cit., 80).

The report summarises the responses of four different groups who may have had different interests in the discussion, i.e.:

- Part 1 undergraduate students;
- Part 2 graduate students;
- Part 3 interns;
- and Faculty staff.

The ranked priorities of these different groups are compared in the table below[18].

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[16] These sectors were Higher Education, Retail, Housing, Health, Offices, Primary and Secondary Education, and Sports and the Arts.

[17] The 'Roadshow to Schools of Architecture' visited the University of Sheffield, University College London, Queen's University of Belfast, University of Strathclyde, Welsh School of Architecture, University of Bath, Oxford Brookes University, and the Kent Institute of Art and Design – selected to represent a range of institutional types and geographic locations.

[18] This table has been compiled from separate listing of the priorities of each group in RIBA, 1995, 81 – 85, with the ranking of respondents scrolled.

RANKING OF TOP PRIORITIES FOR EDUCATIONAL CHANGE (RIBA, 1995)

		Part 1 Students	Part 2 Students	Part 3 Students	Faculty Staff
IMPLEMENTATION SKILLS	More collaboration with other building disciplines, particularly structural engineering	1	1	-	-
	More emphasis on project management and practice skills	3	3	-	-
	A more practical bent towards the materials of construction	5	7	-	-
	More 'real-life' client simulation / involvement in studio projects	7	6	-	-
	Improve communication skills	10	-	-	-
STRENGTHENING DESIGN EDUCATION	A greater focus on design for human/social needs	3	-	-	1
	More understanding and exploitation of technological change	-	-	1	2
	Study best international practice during training	-	9	3	-
	Preserve and nurture core design skills of the architect		3	-	-
	Be more responsive to profound changes in industry and society	-	-	-	6
	Defend broad and diverse approaches in architectural eduction	-	5	-	7
	A stronger emphasis on research to underpin knowledge base	-	-	-	9
	More emphasis on green/ecological issues	-	-	-	10
IN DEFENSE OF DESIGN	More public education and campaigning about architecture / Improve communication with audiences outside of architecture	2	2	1	5
	Show more unity and purpose as a profession	-	-	5	-
	A robust defense of the traditional architect role as design leader	6	-	-	-
	Promote the core identity of the architect as designer	-	-	-	10
COURSE	Reasses and reconfigure course structure and duration	9	10	4	3
	Negotiate a new deal between between schools and practices	-	8	-	3
	More diversity and plurality in discussing career options	7	-	-	7

Some interesting comparisons emerge from this data:

• While students in the first six years of study (Parts 1 and 2) all express the need for additional implementation skills (with high priority given to understanding project management and teamwork with other building disciplines), none of these issues are a priority for University staff.

• Rather, staff emphasise the need for defending a broad education with design as the core, grounded in social issues (including technological and environmental issues). Comments included:

- 'Architecture as a body of knowledge is far bigger and broader than just putting up buildings on time and on budget';
- '...not all truth and beauty lies with clients. Its not good enough just to copy the outside world. We need our own intellectual research frameworks to provide the depth and width required';
- 'The idea that the education system exists to churn out perfect but inexperienced practitioners should be challenged' (op.cit., 87).

• Of the student groupings, only Part 2 students identify the importance of a broad education with design at the core – it seems that on returning from their 'year out' they have renewed commitment to design thinking:

- 'fresh from the battleground of practice, these students clearly valued more abstract, broad and experimental approaches to architectural education and called for these to be defended against an entirely conformist, technocratic agenda' (op.cit., 83).

• Senior students in Part 3 (internship preceding registration as an architect, at which stage they are deeply embedded in design development and technical work) emphasise the need for better understanding of technological changes and best international practice.

• Part 1 and 2 students did not identify the impact of technological change (including the impact of I.T.) as a key priority. However staff 'expressed enthusiasm for a redefinition of the profession through technology (as) a route to robust architecture' (op.cit., 84). Similarly students did not express awareness of environmental challenges, whereas staff interest in 'technological advance was tempered by a priority...to teach green architecture issues' (op.cit., 85). Staff emphasis is on adjusting design teaching to contemporary social challenges, rather than to the challenges of management and delivery in professional practice.

• There is general consensus among all four groups of the need for more public promotion of architectural design, and for a general reassessment of the course structure.[19]

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[19] There are no recommendations in the Part 4 report on changes to course structure. However suggestions mentioned in the record of discussion include:

- 'introducing a foundation year';
- 'placing the year out between years two and three of the undergraduate course';
- 'dividing the year out between two six-month elements shared between the school and practice';

• Apart from these general comparisons, some specific responses from different groups are understandable, e.g.:

- the importance that only Part 3 students give to showing 'more unity and purpose as a profession', as they are at the point of achieving professional status and may be concerned about the working conditions which they face ('they want the profession to stop backpedalling and start showing more unity and purpose ...'we've got to redefine ourselves as innovators and creators with the confidence and skill to carry projects through' (said one Part 3 student)') (op.cit., 84);
- of the student groupings only Part 2 students are concerned about 'negotiating a new deal between schools and practices', as having just returned from their year out they would be aware of both positive and negative practical training experiences;
- of the student groupings only Part 1 students emphasise the need for diverse career options, as streaming into parallel design careers mostly occurs immediately after the BAS degree.

What is surprising, however, is that it is only the junior Part 1 students who express the need for a 'robust defence of the traditional architect role as design leader', presumably in response to the erosion of the team leader role by Project Managers. Somehow, in their earliest exposure to architectural knowledge they have adopted an idealistic understanding of design authority.

Clearly there are none of the RIBA's concerns for increased management training, cost awareness, and analysis of user needs on the staff radar. In contrast students express a strong desire firstly for better teamwork and project management / practice skills (priorities 1 and 3), and secondly for a more practical understanding of construction and more 'real-life' simulation in studio projects (priorities 5 – 7). Although students *are* committed to a broad and design based education (various priority ratings from 1 – 9), and commence architectural studies with a strong sense of social idealism[20], the disjunction in priorities for knowledge transmission between teachers and learners is stark. The RIBA's 'Strategic Study of the Profession' makes no further comment on or analysis of this contradiction, and there is no further indication in the report of how this

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- reallocating resources 'for training needs at different times over a 40 year career';
- 'the ideal practice will take the time and trouble to train students properly';
- debate about ways to re-engineer the relationship with practice and reconfigure course structures';
- 'shortening the formal course and diverting resources to sponsor the student in a practice placement, effectively an old-style apprenticeship';
- ' a much sharper difference in flavour between the Part 1 course and Part 2. Part 1 could be radical, experimental, idealistic; Part 2 more focused on the skills and demands of the profession';
- 'distate for...modularisation';
- de-professionalise the first degrees 'allowing them to become a more broad-based liberal education', although professionalised first degrees 'provided valuable leverage within the institution (and) withdrawal from Part 1 could have disastrous resourcing implications';
- and, 'examine what design means and how it relates to other forms of thinking' (RIBA, 1995, 82 – 87).

The report concludes that a 'basis for future discussion and policy development (is a desire to) reconfigure the structure and length of courses' (op.cit., 87).

[20] Part 1 students 'nearly all expressed the determination to carry on and qualify as a professional architect. The overriding motivation for this, however, was grounded in social idealism and the belief that design of the built environment could advance human progress' (RIBA, 1995, 81).

discussion with the Schools of Architecture was taken forward, or whether it led to any curriculum changes.

7.3 Appendix Three: HISTORICAL DATA

HISTORY OF THE RIBA

The first professional associations which emerged in the late 18th and early 19th centuries were study associations, i.e.:

- The Architects' Club, formed in 1791 as an exclusive group of prominent architects who met once a month to discuss their design work over dinner (Kaye, 1960, 58)[21];
- The London Architectural Society, formed in 1806 for discussion of members' work and writing;
- The Architects' and Antiquaries' Club, formed in 1819 for discussion of members' essays on ancient architecture (op.cit., 60 – 61).

These were associations which provided opportunities for members to fraternise and exchange ideas, rather than organisations which regulated membership. The regulatory role of professional organisation starts to emerge in the 1830s around a tension in the scope of architectural work. This tension related to the extent of architects commercial involvement in the implementation of built work, and was centred around the role of building 'measurers'.

Measuring the quantities of materials and estimating their cost was a skill of the master-masons which accrued to both architects and builders in the division of their roles – to architects who had to estimate and report the anticipated cost of a design to their clients, and to builders who had to check the architects estimates and keep track of the actual quantities used. At the beginning of the 19th century architects sometimes did this measuring work for builders, and were termed 'measurers'.

At this time there were many overlaps between the work and business relationships of architects and builders, which provided opportunities to defraud the client. Kaye notes the prevalence of the following practices (op.cit., 72):

- architects who acted as building contractors for their own designs could inflate the cost of the works;
- acting as the builder's measurer, or insisting on a measurer named by them, allowed architects to inflate the quantities and to defraud the client in collusion with the builder[22];
- and, architects might take commissions from builders for the award of contracts.

The rapid expansion of building activity after the end of the Napoleonic Wars in 1815 escalated these fraudulent activities, and 'the money to be made in architecture,

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[21] Summerson notes that 'The Club was extremely exclusive, since no one was to be elected unless a Royal Academician, associate, or Gold Medallist or a member of one of the principal foreign academies' (Summerson, 1953, 305). Kaye records several of their deliberations – a discussion 'to define the professions and qualifications of an architect', an investigation of 'the efficacy of various fire-resisting materials', a discussion of protocols for taking over the work of other architects, and overcharging on fees (Kaye, 1960, 59).

[22] '...any architect who was employed as a measurer was ostracized by his professional brethren' as on occasion measurers add to the figures 'thus increasing the builders' wages' (Kaye, 1960, 73).

particularly in collaboration with dishonest builders, attracted a vast force of unscrupulous men into the profession' (op.cit., 57).

This created a general public mistrust of architects, and Kaye comments that 'during the third and fourth decades of the nineteenth-century ... the general standard of practice was so fraudulent as to justify the mistrust it occasioned' (op.cit., 72). The emerging profession therefore had to distance itself from these activities and the perception of architects which they created, in order to establish credibility with employers. This was particularly important for successful architects with large practices, who needed to retain the confidence of important civic and commercial clients. A credible professional organisation with a code of conduct binding its members was necessary to achieve this[23]. The shift from 'relatively uncritical, and, on the whole, beneficient protection' of patronage to competition for clients in an open market brought with it a need to 'guarantee competence and integrity...professional association was the only practical method of meeting this need' (op.cit., 56, 57).

In January 1834 a group of architects agreed to form a Society of Architects and Surveyors for the study and promotion of architecture (providing for 'a library, museum, the reading of essays, *conversazioni*, and all the familiar accessories of similar societies'), with membership open to 'such persons as have been educated for, and are practising, *solely*, the profession of an Architect and Surveyor' (op.cit., 75, 76). This organisation also had no code of conduct, and Kaye observes that no 'reference was made to the [then] controversial subject of measuring', leading him to suggest that the formation of this group 'represents in fact, an attempt by the architect-surveyors (i.e. those who practised both professions) to ally themselves with the architects, rather than with the measurers' (op.cit., 76).

Some architects present at the initial meetings of this Society were concerned that the presence of these architect-surveyors would undermine the need for architects to distance themselves from the potentially fraudulent activities of architects who acted as builder's measurers[24] (ibid.). This group decided to set up a rival organisation, the Society for British Architects, which would exclude the measurers. They managed to prevent the founding meeting of the Society of Architects and Surveyors from proceeding with the adoption of its constitution and rules, on the basis that two Societies should rather merge (ibid.). The Society of British Architects then drew up a code of conduct specifically precluding 'measuring and valuing works on the behalf of builders', as well as receiving commissions from builders, or any commercial involvement with building contractor (op.cit., 77). They got a joint meeting of the committees of both Societies to agree to this despite initial objections from the Society of Architects and Surveyors[25]. This lead to the formal constitution of the Society of British Architects in June 1834, under the name of the Institute of British Architects, whose objective was to

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[23] At this time none of the professional associations had a binding code of conduct, although the Architects' Club attempted to agree on in 1796 (Kaye, 1960, 53).

[24] A anonymous commentator wrote at the time: '...allow me to point out a mode by which these abuses might be remedied. This is simply to form a society...to make rules for the governance of the profession; to make a fair tariff of prices, according to the variation of the market; to regulate the mode of measuring; and to enquire into every abuse or infringement connected with the profession' (Kaye, 1960, 74, quoting Scrutator, 'On the present state of the professions of architect and surveyor, and of the building trade, in England', Architectural Magazine 1, 1834, 12 – 16).

[25] In a joint meeting subsequently claimed by the aggrieved measurers to have been unconstitutional as it included non-committee members of the Society of British Architects in the vote (Kaye, 1960, 78).

establish the 'uniformity and respectability of practice in the profession' (op.cit., 78-80)[26]. A Royal Charter of Incorporation was granted in 1837, and the organisation called itself the Royal Institute of British Architects (RIBA) from then onwards (op.cit., 76 - 82).

The RIBA started as a voluntary organisation to which members were elected by the existing members[27], and it had no statutory protection of the role of the architect. Its ethos was self-regulatory – to establish the credibility of its members via a code of conduct. Voluntary examinations for membership of the RIBA were introduced in 1862, becoming compulsory in 1882. Agitation for statutory registration of architects began in the eighteen-eighties.

Following the launch of the RIBA many provincial associations were set up based on the RIBA model, but with a range of membership conditions. The RIBA extended its influence by incorporating representatives of these provincial (as well as the colonial) architectural societies in 1889[28], which 'had the ultimate effect of changing the whole character, functions and influence of the Royal Institute by converting it form a select club of metropolitan architects into a professional parliament with world-wide representation and jurisdiction' (op.cit., 126).

During the 1880s younger Associate members of the RIBA started to motivate for compulsory statutory examination of qualifications and registration of architects (as opposed to the voluntary membership of the RIBA which operated then). The senior Fellows of the RIBA did not pay much attention to this idea, and as the Associates did not have the voting rights of Fellows, they broke away in 1884 to form a rival 'Society of Architects', and succeeded in introducing a Registration Bill into Parliament in 1889[29]. The RIBA objected to it and the Bill was defeated. While the RIBA's position may have been based on their founding principle of self-regulation, i.e. that public acceptance of the actual and ongoing performance of its members, in open competition with non-members, was the 'guarantee of competence' rather than legislation, some suspected that they were simply waiting to implement an Act under their own control (op.cit., 135).

Having opposed various attempts by the Society of Architects to get a registration act passed by Parliament, the RIBA finally adopted a statutory registration policy in 1906 (op.cit., 148). With this decision the reason for the separate existence of the Society of Architects was removed, and efforts began to re-unify the two organisations. This was

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[26] Summerson comments that in the 1830s English architecture '...slumped further into the chaos of incompetence, whither the illiterate patronage of the industrial age concocted it. At 1830 we are on the threshold of the period of professional association which ... became in the 1830s the means by which the better element in the profession tried to retrive architecture's lost reputation and to provide for it a status independent of the fluctuations and degradations of patronage by the individual' (Summerson, 1953, 323).

[27] Some influential architects of the time were not members of the RIBA, e.g polychromist William Butterfield, Arts and Crafts architect Phillip Webb, and proto-modern theorist William Lethaby (List of signatories to the 1891 'Memorial to the RIBA' in Kaye, B. (1960, 138), quoting 'The Times' (March 3, 1891)).

[28] Full amalgamation of these groups was not agreed then, as they generally had less strict entry conditions with most still accepting surveyors as members (Kaye, 1960, 126).

[29] This occurred as the economy was moving into a decade of recession in the eighteen-eighties. Although Kaye does not explain this convergence, the timing suggests that the young Associate members who were trying to establish themselves in practice faced increasing competition from non-architects, and sought the protection of legislation. The Fellows, who were already successful practitioners, probably did not need this protection.

achieved after the interruption of the First World War in 1925, when a joint Registration Committee started work on a Bill to put before Parliament.

When it became clear that the RIBA was aiming to 'close the profession', i.e. firstly to restrict use of the term Architect to those who were qualified and registered, and secondly to restrict involvement in architectural work to those on the register, those architect-surveyors who were still practising outside of membership of the RIBA set up rival associations – the Incorporated Association for Architects and Surveyors in 1925, and the Faculty of Architects and Surveyors in 1926[30] (op.cit., 151). These organisations were not opposed to registration, but wanted to guard the interests of those working in this combined area, and ensure that the RIBA 'did not control the register' (ibid).

The RIBA's Bill went before Parliament in 1927, with provision for the RIBA to control the statutory register and the qualifications of architects. Debate in the house ranged from:

- support in that 'it provided for the education of architects, and protected the public from unqualified practitioners';
- comment that 'beautiful architecture was only produced by educated people';
- appreciation of 'the great principle of trade unionism that is underlying it';
- and opposition in that 'it made it difficult for working class children to enter the profession' (op.cit., 152).

The Bill was approved in 1931, with amendments which provided for:

- voluntary registration rather than compulsory registration;
- protection of the title 'Registered Architect' rather than 'Architect'[31];
- control of the register by a Registration Council with pro-rata representation of the various professional organisations based on their membership, including the architect-surveyor organisations.

The Registration Council together with its Board of Education were dominated by the RIBA, which has held a majority of seats since its inception. In the process of consolidating its control of the profession's system of registration and qualification, the RIBA's membership grew from 27% of practising architects in 1911 to 71% in 1931 (op.cit., 147, 175).

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[30] '... there is little doubt that one of the aims of professional closure was to eliminate this class [of architect-surveyor], or at least the control of their activities through the code of conduct' (Kaye, 1960,151).

[31] In a revision of the Act in 1938 the title 'Architect' was protected, although reservation of work was not achieved.

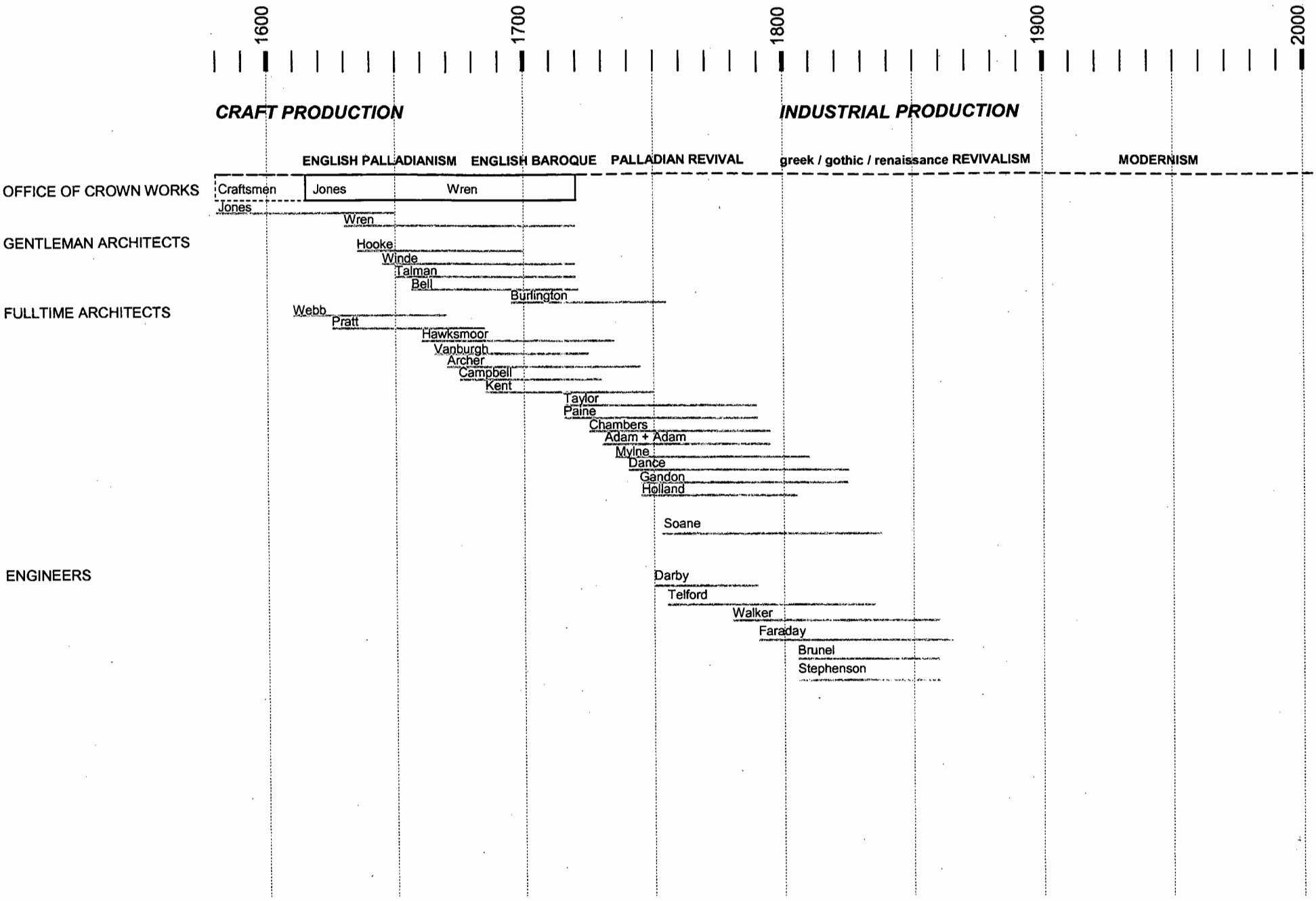

Diagram 17: **Timeline of 17th + 18th century Architects**
(Data from Kaye, 1960)

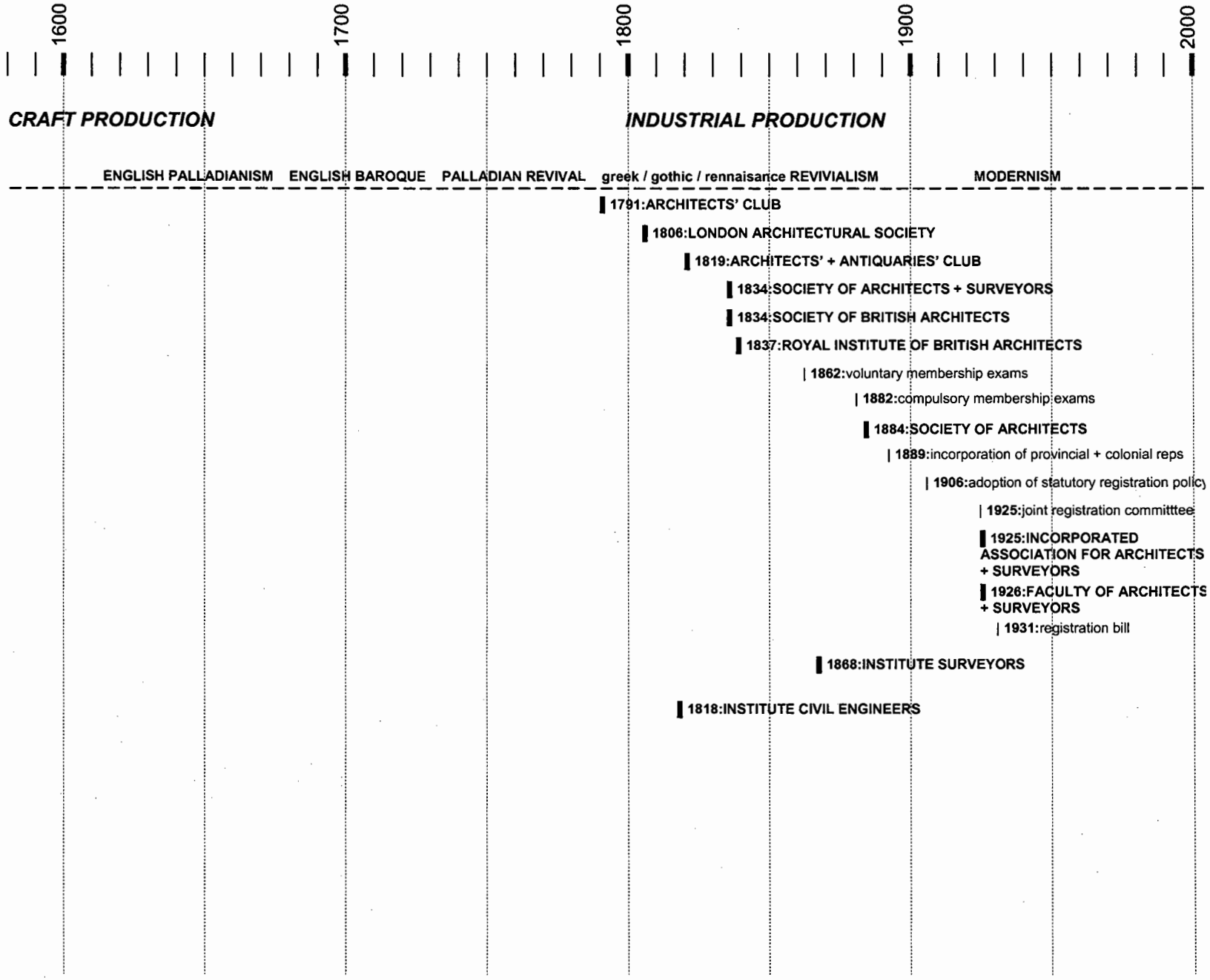

Diagram 18: **Agents of the Official Recontextualising Field**
(Data from Kaye, 1960)