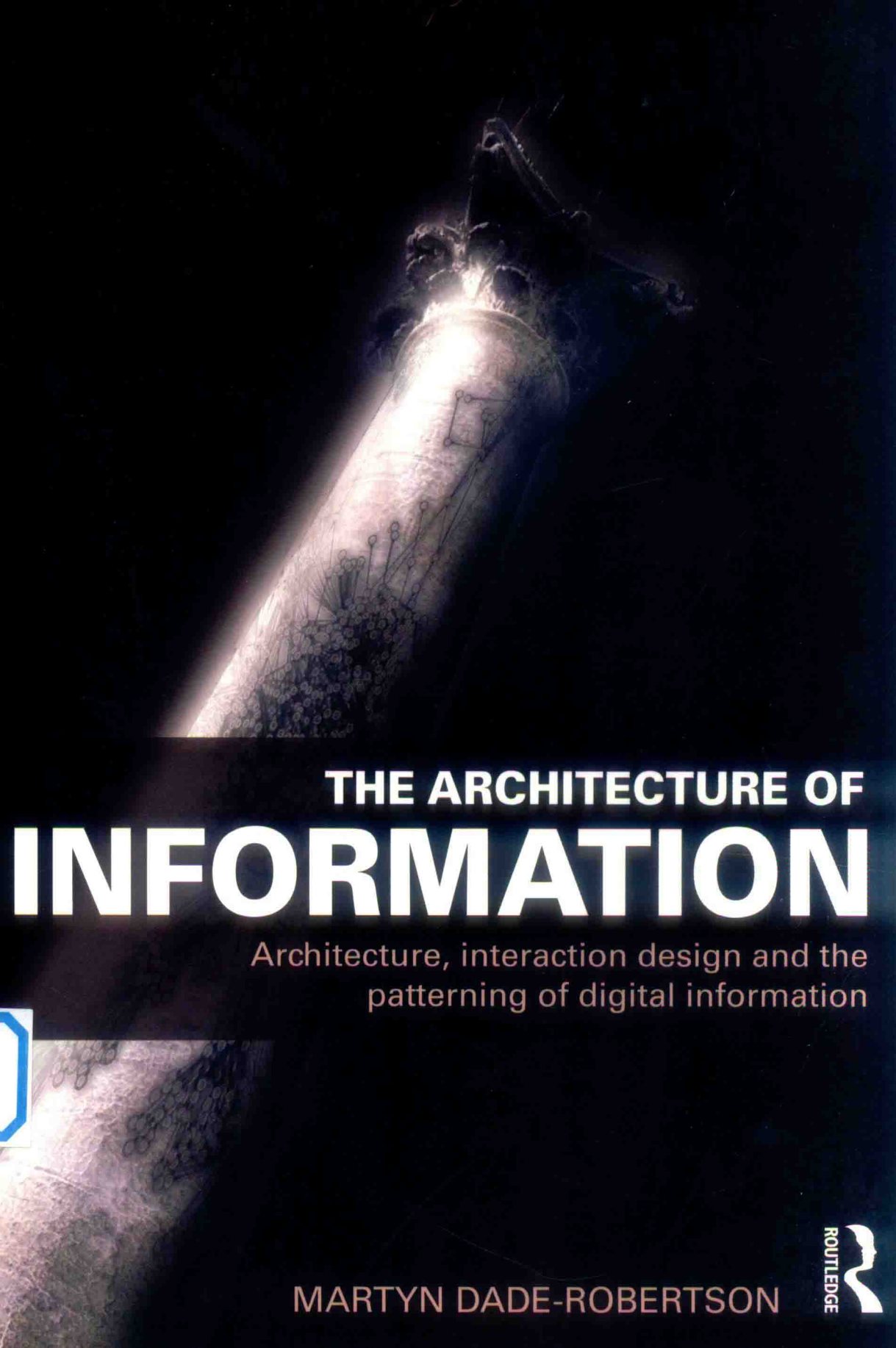

# THE ARCHITECTURE OF INFORMATION

Architecture, interaction design and the patterning of digital information

MARTYN DADE-ROBERTSON

ROUTLEDGE

# The Architecture of Information

## Architecture, interaction design and the patterning of digital information

**Martyn Dade-Robertson**



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# The Architecture of Information

Despite its potential to break the mould, digital information has been characterised by its reliance on metaphors from a pre-digital era. Architectural ideas have pervaded discussions of digital information, from the urbanisation of cyberspace in science fiction through to the adoption of spatial visualisations in the design of graphical user interfaces. Are these the equivalent of the car's 'horseless carriage' phase or are they a pointer to a more fundamental relationship between human beings and their representations of information?

Architectural, philosophical, psychological and historical knowledge are united in this book to develop an understanding of the relationship between information and its representation in a post-digital era. From the development of Memory Palaces to the modern library, buildings have acted as classification devices by associating the arrangement of ideas with the organisation of physical objects. This tradition – knowledge made manifest through the articulation of architectural space – has been challenged by the development of digital technologies which separate information from its material representation.

This book tackles:

- the historical importance of physical places to the organisation and expression of knowledge
- the limitations of using the organisation of objects as the basis for systems of categorisation and taxonomy
- the emergence of digital technologies and the new conceptual understandings of knowledge and its organisation
- the concept of disconnecting the storage of information objects from their presentation and retrieval
- ideas surrounding 'semantic space'
- the potential of hypertexts versus the realities of the types of user interface which now dominate modern computing.

Posing the question 'what sort of space is information space?', the book examines the motivations behind the perceived need to disguise the complexity of digitally encoded information with metaphors of physical spaces and architecture. The conclusion of the book looks for a better understanding of information architecture, defining a new design domain for the practice of architecture as it relates to the complexity of digitally organised information.

**Martyn Dade-Robertson** is Lecturer in Architecture and Communication in the School of Architecture, Planning and Landscape at Newcastle University. He originally did a degree in Architecture at Newcastle University before embarking on an MPhil and PhD at Cambridge University (Darwin College) on the topic of Information Architecture.

To my dad

# Preface

A thought experiment, which I have started using with my postgraduate students, is to ask them to imagine a parallel universe containing a society at a similar stage in its technological development to our own but with one key difference: that the idea of architecture hasn't been invented yet. Buildings still exist, along with a plethora of other designed artefacts, but there is no distinction between design disciplines. A bright design theorist decides that this lack of distinction between the design of different artefacts is a problem and endeavours to categorize design into coherent disciplines based on criteria he must define. I then ask my students to imagine, free from their knowledge of how the world actually is, what categories he or she might come up with.

Would it be possible to define design in relation to the materials from which various artefacts are created? Wooditecture, steelytecture, plasticitecture ...? Or through geometric similarity between designed artifacts? triangletecture, rectangletecture ...? It's a silly game but allows my students to do three things.

1. They stop thinking about the design of the built environment as something independent from all other design disciplines since many of their fictitious categories define groups of artefacts which include, but are not limited to, buildings. Wooditecture for example includes chairs, pencils and log cabins.
2. By thinking in terms of categories which are invented by them and are outside their everyday experience, it reveals how even logical categorisations can be alien when viewed from a different perspective. The notion of a wooditecture seems intuitively wrong but is not ridiculous given that there are common methods for working and constructing with wood.
3. When the students return to our universe, they are able to look critically at our own categorization of the design of artefacts and to assess where titles such as 'architecture' seem logical and where they seem arbitrary.

The division of design disciplines is useful but it can also be limiting. I graduated with a degree in architecture in 2000 with a nagging doubt. I had enjoyed my three years and was about to embark on my year in practice to be followed by a further two years of study and another year out before I would be able to receive full RIBA accreditation. Despite the extensive nature of an architect's education, however, I still felt that I was missing something. During the late nineties I had, as an architecture student, seen territory that I felt belonged to me as an architectural designer, captured by the World Wide Web. I felt instinctively that there was

something architectural about buying books online, navigating a news website or searching for files and folders on my computer's desktop graphical user interface. Furthermore, terms and ideas were being stolen from my chosen profession as a new breed of 'information architects' arrived, citing cannons of architectural theory such as Kevin Lynch and Christopher Alexander. Despite this, we were not being taught web programming in our technology lectures or discussing the history of computing as part of our 'history of the designed landscape' courses. This intuition, that there was more to architecture than the built environment, continued through my Masters and PhD. Studies and the results of my search for a broader definition of architecture in the digital age is charted in this text.

This book is narrated through classifications. In the first instance it is about the classification of architecture itself as something which has been applied, and has the potential to be applied much further, outside the design of the built environment. I don't hold with, what seems to me to be, the parochial distinction between architecture and building as being exemplified by the difference between a cathedral and a bicycle shed. Rather, I see architecture as a design practice defined by the creation of objects of a certain scale in relation to the human body. Any artefact that surrounds us and through which we move has the potential to be architectural (independent of whether an architect has had a hand in its design). The structuring of our environment into patterns which are perceived as we move through them is the central role of architectural design and this, in an age of digital environments, is extended to include environments that are virtual rather than physical.

In the second instance it is about classification as a subject in its own right. In other words how we structure our world in relation to groups of objects or concepts in real or conceptual spaces. In particular I will focus on the role of architecture in articulating categories through the creation of patterns in our environment. By understanding classification as a patterning activity, light can be shed on a whole range of digital artefacts which might not seem to have much to do with architecture at all, but are central to how we communicate.

It will be up to the reader to decide whether I have made a case for an 'architecture of information'. In fact, while I have used the idea of architecture to analyze a range of digital artefacts, we are, with digital technologies, living in a similar place to my parallel universe. The lens of architecture allows me to cut across a range of ideas and designed artefacts and to understand a commonality that has nothing to do with the way they are categorized by their professional and disciplinary boundaries, at a time when a new generation of designed objects is emerging that have yet to find a framing discipline of their own.

Martyn Dade-Robertson
Newcastle, September 2010

# Acknowledgements

For musicians there is the difficult second album and for academics there is the difficult first book (although having only written a first book I can only assume that the second book is going to be easier). The ideas and research for this book started in the year 2000 as I completed my architecture degree and faced the challenge of what to do next. I had the gut feeling that I had missed something in my education and the research project outlined here started with some notional ideas I had in the year following my degree and which took form through my Masters degree, PhD and, ultimately, the start of my academic career.

This book was started, conceptually if not materially, at Newcastle University while I was doing the BA in Architectural Studies and it seems fitting that the book should also have been finished at Newcastle University, albeit now as a member of staff in the department where I did my first degree. Suffice it to say that I am grateful to the staff and students I have encountered during both my spells at Newcastle, with a special mention to Stephen Kite and Di Leach, who both guided me on my current academic path and encouraged the more experimental aspects of my design practice.

Most of this work took shape at Cambridge University while I was a student on the MPhil in Architecture and the Moving Image and ultimately as a PhD student in what was called the Cambridge University Moving Image Studio (CUMIS) at 1 Bene't Place. The group has now lost its building and its name, but its alumni have spread far and wide and my time there has left an indelible impression on this book. Special mention should go to my supervisors and the directors of CUMIS, Francois Penz and Maureen Thomas, who created something special in Cambridge, the effects of which are still to be fully realized. In addition, I'd like to thank Alan Blackwell, who acted as an unofficial co-supervisor and provided the much needed link to computing and Human–computer interaction. I also want to thank the staff and students of Darwin College who became my Cambridge family for the best part of five years and to thank CRASSH (Centre for Research into Social Sciences and Humanities) and Ludmilla Jordinova and the interdisciplinary reading group for opening my eyes.

While at Cambridge I undertook an internship at Microsoft Research and this opportunity has turned out to be critical in the development of some of the ideas in this book and my future career trajectory. The work I did there still awaits proper publication, but I want to make special mention of Ralph Sommerer for his patience and the development work he did on our attempts at new information visualizations, and Ken Wood for giving me the opportunity to work at Microsoft in the first place.

Upon completing the PhD, my thesis was examined by Mauri Kaipainen. I will forever be grateful to him for his support during my PhD and for his part in an extraordinary PhD exam, which did what a good PhD examination should do and opened up research horizons beyond the thesis. My pursuit of cognitive psychology and embodiment in particular owes much to Mauri's influence. I also want to make special mention of my other PhD examiner, William J. Mitchell, who sadly passed away in June 2010. I owe him, not only for his extraordinary generosity in wading through my thesis while on a long-haul flight at a time when his illness had already been diagnosed, but also because his influence on my work has been profound. As I occupy that strange territory of design that has been fuzzied by computer technologies, I am sometimes inclined to explain what I do to others with the phrase 'I'm a bit like Bill Mitchell' – if only that were true.

Returning again to Newcastle, my first post-doc position was in the newly created Culture Lab. While Cambridge is undoubtedly an extraordinary place to study, I have always found, and continue to find, a creative energy and enthusiasm in Newcastle which is unique. These characteristics are epitomized by my former boss, Sally Jane Norman, who gave me my first proper job and launched my career. If this book were an organism, its DNA would be from CUMIS and its sustenance would be from Culture Lab. With this in mind, I would also like to thank Patrick Olivier for maintaining my connection to computer science, driving my ambition and opening up research opportunities which aren't usually options for those studying in the arts and humanities.

Behind all these physical and intellectual moves, there is an infrastructure of funds and supports that made all the research possible. To this end, I must acknowledge the Arts and Humanities Research Council, who have funded my Masters degree and PhD. While at Culture Lab, I was also funded by the EU 6th Framework Program. Libraries are an important part of this book, both as a theme and as a resource and, to this end, I would like to thank Cambridge University Library (not least for finding my keys, mobile phone, wallet and any other possession I lost while training to become an absent-minded academic) and the Robinson Library in Newcastle.

And finally, I would like to acknowledge my parents and wife Meng, whose support, encouragement, editing, belief and love I do not have enough words to describe.

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It is patterns which connect.

(Bateson 1988: 11)

In Ersilia, to establish the relationships that sustain the city's life, the inhabitants stretch strings from the corners of houses [...] When the strings become so numerous that you can no longer pass among them, the inhabitants leave and the houses are dismantled; only the strings and their supports remain [...] Thus when travelling in the territory of Ersilia you come upon the ruins of the abandoned cities, without walls which do not last, without the bones of the dead which the wind rolls away: spider webs of intricate relationships seeking a form.

(Calvino 1997: 76)

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# Introduction

## Part 1: The architecture of everything

### *The Theatre of Memory*

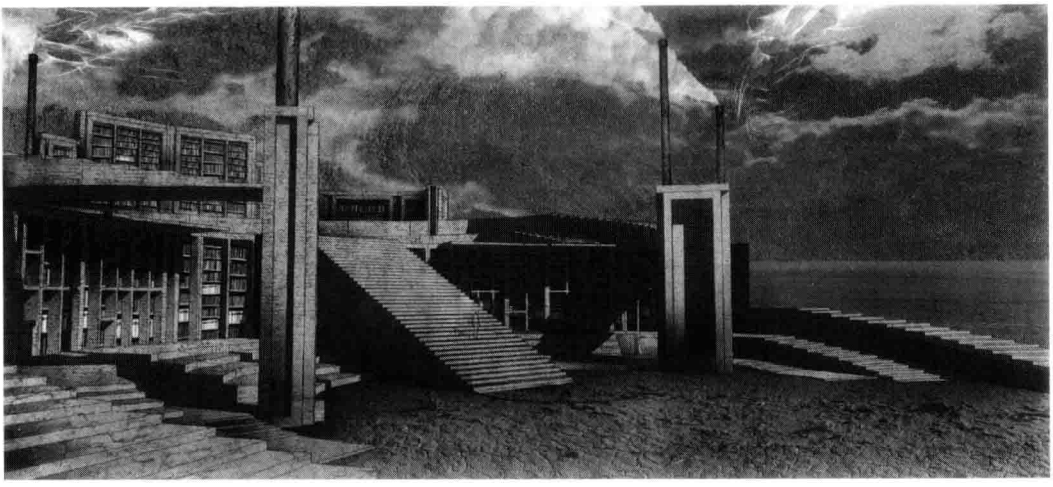
It is sixteenth-century Italy and a young scholar stands, with trepidation, on the stage of a massive amphitheatre. The scholar's nervousness is not caused by stage fright as his only audience is a distant, solitary figure bent down over a scroll. Rather, our young scholar is overwhelmed by the task that lies ahead of him. Contained within the drawers and shelves that make up the theatre's seven graded stalls are 'all things men can conceive' (Viglius quoted in Yates 2001: 137) and the phenomenal challenge ahead of the young scholar is to memorize the entire content of this massive archive and to emerge, after many months and years have passed, with a truly encyclopaedic knowledge.

The scholar's task will be aided by the fact that the knowledge contained within this extraordinary building is ordered through a master classification system which is both physically and conceptually held aloft by Solomon's Seven Pillars of Wisdom and organized by the seven known planets. This represents nothing less than a perfect organization of objects and the ideas they articulate. The scholar is right to feel apprehensive but he may also be comforted by the knowledge that this building has been constructed to channel an almost mystical power so that, as surely as he will be able to navigate the stalls of the theatre, by the end of his diligent study, he will have a perfect mental representation of the theatre and an ability to navigate through any discourse and comfortably inhabit any subject.

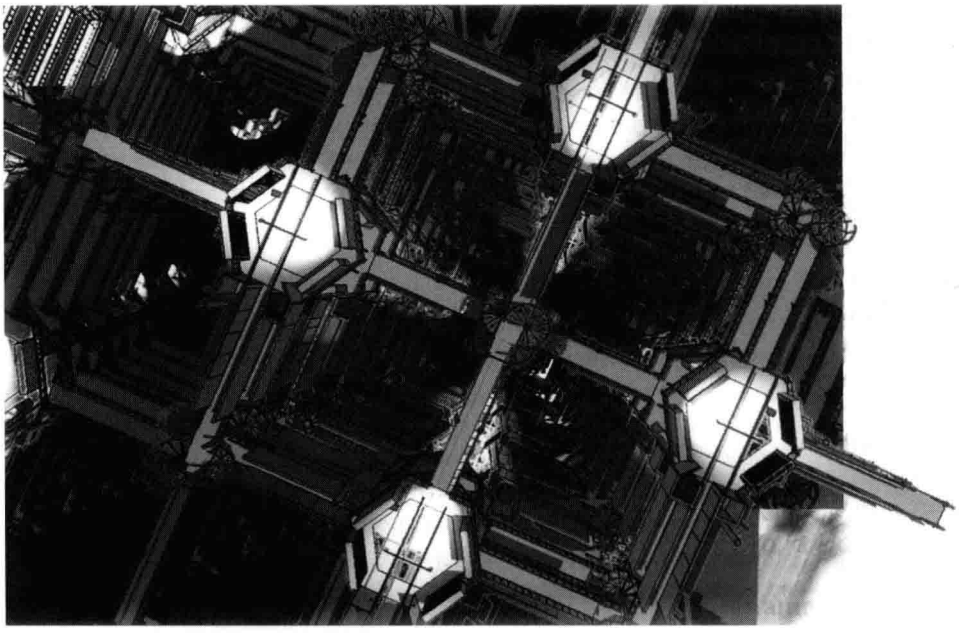
### *The Library of Babel*

At an undisclosed time and location, an old man calling himself 'a librarian' sets down his pen for the final time. He sits in a dimly lit, hexagonally shaped room containing row upon row of identically bound books. This is one amongst a seemingly infinite pattern of rooms stretching horizontally and vertically in all directions.

It is possible, perhaps likely, muses the librarian, that this vast structure contains all books that have been or might ever be written. To this end, the library contains every utterance that can be made and thus every piece of knowledge that can be articulated using the 25 symbols that make up the librarian's language. There is, however, a catch. The combinatorial completeness of the library means that, alongside the coherent texts, there are many more containing random configurations of letters. There are, in fact, so many of these incoherent



I.1
A re-imagining of 'The Memory Theatre' by Neringa Stonyte



I.2
Illustration of the Borges story 'The Library of Babel' by James Britton

books that the likelihood of the librarian finding a book with a single meaningful sentence, within his lifetime, is negligible.

The librarian's despair at this personal revelation is reinforced by the monotony of his surroundings. The repetition of identically bound books and the invariability of each library cell is a sure indicator that this terrible, vast building is not governed by a master organizing system but is rather a cathedral to randomness, chance and improbability.

## *The idea of the universal archive*

Both the scholar and the librarian are protagonists in stories of impossible worlds. The Theatre of Memory, a building proposed by the sixteenth-century polymath Giulio Camillo Delmino in his book *L'idea del theatro* and highlighted by Francis Yates in *The Art of Memory* (2001), was never built. The theatre's mnemonic origins, and the strategy of externalizing memory which were the theatre's genesis, have been relegated to the status of an 'intellectual fossil' (Rossi 2000: xxi). The explosion of knowledge and our appreciation of the complexity of its representation and organization has advanced to such an extent that we can be certain that no such master organizing system exists, let alone that it could be contained and articulated in a single building. We might also observe that Camillo's idea of a universal archive, perfect in its organization and completely comprehensive, could never be realized.

The tragic figure of the librarian was first described in the twentieth century in one of Jorge Luis Borges's most enduring short stories, 'The Library of Babel' (2000). The Library of Babel is, of course, an allegory in keeping with Borges's other works, which deal with problems of knowledge and society through often fantastical and enigmatic fables.

The two stories have clearly different origins and aspirations but are bound by common themes. They both speak of the idea of a universal archive. An idea that Michael Foucault articulates in his discussion of the heteratopia. An idea that exists

> ... of accumulating everything, of creating a sort of universal archive, the desire to enclose all times, all eras, forms and styles within a single place and yet a place that is outside time, inaccessible to the wear and tear of the years, according to a plan of almost perpetual and unlimited accumulation within an irremovable place.
>
> (Foucault 1997: 355)

Both stories also depict the interaction between a solitary individual and a vast store of information that is embodied and articulated by a building and the organization of physical objects within it. This interaction involves both physical and mental tasks for the protagonists, epitomized by the purposeful navigation of the scholar and the hopeless wanderings of the librarian. These different types of bodily engagement are further articulated by the buildings themselves and the way they configure space from the bounded panoptic order of the theatre to the unbounded maze of the library.

## *An articulate architecture*

'All buildings organize something' suggests Thomas Markus in *Buildings and Power* (Markus 1993: 4). If we look beyond the pragmatic purpose of providing shelter and the more indulgent paraphernalia of architectural decoration and style, we are still left with articulate buildings. We are left with buildings which structure the organization of space, generating relationships between people and objects by shaping our 'concrete reality' (ibid.). We are left with buildings that impose order on chaos. In doing these things, buildings can be inspirational or tyrannical, creating spaces of beauty and harmony or stamping on complexity with an imposed simplistic order. Buildings are, therefore, great communicators, informing on the political, social and moral ideals of those who built them and affording possibilities and restrictions on the communities they serve. Buildings define our institutional world and restrict what we can do in it. Our ability to participate in society is shaped, however, not only by our use of buildings, but also by our ability to read them, to know the difference between a shop and a prison, a school, a bank, a library and a church. Buildings, therefore, define the world through typologies described through the bounding and configuration of space.

Three particular building typologies are of interest here. Perhaps more than any other types of building, the library, archive and museum, stand out as clear illustrations of architecture's organizational and communicative modes. Although, by modern definitions, these building types serve different purposes, their origins, are, in fact, hybrid forms of the great temples for the muses such as the Library of Alexandria and the memory palaces. Their aims are the same, to store and organize material objects and structure them in such a way that their

> ... high and incomparable placing not only performs the office of conserving for us the things, words, and arts we confide to it, so that we may find at once whenever we need them, but also gives us true wisdom from those founts so that we come to the knowledge of things from their causes and not from their effects.
>
> (Camillo quoted in Yates 2001: 147)

In other words, more than a storehouse of knowledge, these buildings, through the organization of the spaces in which material objects are held, form a discourse that is separate, although not independent, from their contents.

The vision, articulated by Camillo through the Theatre of Memory, is recognisably the scourge of the modern library. Bounded by the constraints of space and the inevitably linear arrangements of books on shelves, the physical organization of objects ignores 'the multi-dimensional relations among books, and forces a librarian to choose one amongst many possible relations' (Markus 1993: 174). But, although limited, these arrangements provide a useful purpose. In Michael Foucault's terms, these physical organizations represent 'discursive formations', a concept which Gary Radford articulates in his description of an encounter with the shelves of a library (Figure I.3):

> Just by looking at the titles on the spines, you can see how the books cluster together ... you can identify those books that seem to form